

**Main Criteria:** Forward

**Secondary Criteria:** Alberta Programs of Study, British Columbia Curriculum, Manitoba Curriculum Frameworks, New Brunswick Curriculum, Newfoundland and Labrador Curriculum Guides, Northern Territory Curriculum, Nova Scotia Curriculum, The Ontario Curriculum, Prince Edward Island Curriculum, Québec Education Program Progression of Learning, Programme de formation de l'école québécoise - Progression des apprentissages, Saskatchewan Curriculum

**Subjects:** Mathematics, Science, Technology Education

**Grades:** 11, 12

**Forward****Autonomous Electric Vehicles of the Future****Alberta Programs of Study****Mathematics**

Grade 11 - Adopted: 2008

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.10C.</b>	<b>Mathematics 10C</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>10C.3.</b>	<b>Develop algebraic and graphical reasoning through the study of relations.</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.4.	Describe and represent linear relations, using: words, ordered pairs, tables of values, graphs, equations. [C, CN, R, V]
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.6.	Relate linear relations expressed in: slope-intercept form ( $y = mx + b$ ), general form ( $Ax + By + C = 0$ ), slope-point form ( $y - y_1 = m(x - x_1)$ ) to their graphs. [CN, R, T, V] [ICT: C6-4.3]
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.7.	Determine the equation of a linear relation, given: a graph, a point and the slope, two points, a point and the equation of a parallel or perpendicular line to solve problems. [CN, PS, R, V]
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.8.	Represent a linear function, using function notation. [CN, ME, V]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.20-2.</b>	<b>Mathematics 20-2</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>20-2.3.</b>	<b>Develop number sense and logical reasoning.</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.1.	Analyze and prove conjectures, using inductive and deductive reasoning, to solve problems. [C, CN, PS, R]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.30-2.</b>	<b>Mathematics 30-2</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>30-2.1.</b>	<b>Develop logical reasoning.</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	1.1.	Analyze puzzles and games that involve numerical and logical reasoning, using problem-solving strategies. [CN, ME, PS, R]
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GENERAL OUTCOME / COURSE	AB.10-3.	Mathematics 10-3
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GENERAL OUTCOME / SPECIFIC OUTCOME	10-3.2.	Develop spatial sense.
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	2.1.	Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies. [C, CN, PS, R]
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GENERAL OUTCOME / COURSE	AB.20-3.	Mathematics 20-3
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GENERAL OUTCOME / SPECIFIC OUTCOME	20-3.3.	Develop number sense and critical thinking skills.
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.1.	Analyze puzzles and games that involve numerical reasoning, using problem-solving strategies. [C, CN, PS, R]
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GENERAL OUTCOME / COURSE	AB.30-3.	Mathematics 30-3
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GENERAL OUTCOME / SPECIFIC OUTCOME	30-3.3.	Develop number sense and critical thinking skills.
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.1.	Analyze puzzles and games that involve logical reasoning, using problem-solving strategies. [C, CN, PS, R]
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GENERAL OUTCOME / COURSE	AB.30-3.	Mathematics 30-3
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GENERAL OUTCOME / SPECIFIC OUTCOME	30-3.4.	Develop algebraic reasoning.
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	4.1.	Demonstrate an understanding of linear relations by: recognizing patterns and trends, graphing, creating tables of values, writing equations, interpolating and extrapolating, solving problems. [CN, PS, R, T, V] [ICT: C6-4.1, C6-4.3, C7-4.2]
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Grade 11 - Adopted: 1995

GENERAL OUTCOME / COURSE	AB.M31.	Mathematics 31
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>M31.A.</b>	<b>Precalculus and Limits</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>M31.A.3.</b>	<b>Procedural Knowledge</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>M31.A.3.2.</b>	<b>Students will demonstrate competence in the procedures associated with the transformation of functions, by:</b>
<b>EXPECTATION</b>	<b>M31.A.3.2.4.</b>	<b>Finding the equation of a line, given any two conditions that serve to define it</b>

**Alberta Programs of Study  
Mathematics  
Grade 12 - Adopted: 2008**

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.10C.</b>	<b>Mathematics 10C</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>10C.3.</b>	<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>3.4.</b>	<b>Describe and represent linear relations, using: words, ordered pairs, tables of values, graphs, equations. [C, CN, R, V]</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>3.6.</b>	<b>Relate linear relations expressed in: slope-intercept form (<math>y = mx + b</math>), general form (<math>Ax + By + C = 0</math>), slope-point form (<math>y - y_1 = m(x - x_1)</math>) to their graphs. [CN, R, T, V] [ICT: C6-4.3]</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>3.7.</b>	<b>Determine the equation of a linear relation, given: a graph, a point and the slope, two points, a point and the equation of a parallel or perpendicular line to solve problems. [CN, PS, R, V]</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>3.8.</b>	<b>Represent a linear function, using function notation. [CN, ME, V]</b>

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.20-2.</b>	<b>Mathematics 20-2</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>20-2.3.</b>	<b>Develop number sense and logical reasoning.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>3.1.</b>	<b>Analyze and prove conjectures, using inductive and deductive reasoning, to solve problems. [C, CN, PS, R]</b>

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.30-2.</b>	<b>Mathematics 30-2</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>30-2.1.</b>	<b>Develop logical reasoning.</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE 1.1. Analyze puzzles and games that involve numerical and logical reasoning, using problem-solving strategies. [CN, ME, PS, R]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.10-3.</b>	<b>Mathematics 10-3</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>10-3.2.</b>	<b>Develop spatial sense.</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE 2.1. Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies. [C, CN, PS, R]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.20-3.</b>	<b>Mathematics 20-3</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>20-3.3.</b>	<b>Develop number sense and critical thinking skills.</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE 3.1. Analyze puzzles and games that involve numerical reasoning, using problem-solving strategies. [C, CN, PS, R]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.30-3.</b>	<b>Mathematics 30-3</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>30-3.3.</b>	<b>Develop number sense and critical thinking skills.</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE 3.1. Analyze puzzles and games that involve logical reasoning, using problem-solving strategies. [C, CN, PS, R]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.30-3.</b>	<b>Mathematics 30-3</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>30-3.4.</b>	<b>Develop algebraic reasoning.</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	4.1.	Demonstrate an understanding of linear relations by: recognizing patterns and trends, graphing, creating tables of values, writing equations, interpolating and extrapolating, solving problems. [CN, PS, R, T, V] [ICT: C6-4.1, C6-4.3, C7-4.2]
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Grade 12 - Adopted: 1995

GENERAL OUTCOME / COURSE	AB.M31.	Mathematics 31
GENERAL OUTCOME / SPECIFIC OUTCOME	M31.A.	Precalculus and Limits
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	M31.A.3.	Procedural Knowledge
ILLUSTRATIVE EXAMPLE	M31.A.3.2.	Students will demonstrate competence in the procedures associated with the transformation of functions, by:

EXPECTATION	M31.A.3.2.4.	Finding the equation of a line, given any two conditions that serve to define it
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Alberta Programs of Study  
Science

Grade 11 - Adopted: 2014

GENERAL OUTCOME / COURSE	AB.S10.	Science 10
GENERAL OUTCOME / SPECIFIC OUTCOME	S10.3.A.	Unit A: Energy and Matter in Chemical Change (Nature of Science Emphasis): Identify and classify chemical changes, and write word and balanced chemical equations for significant chemical reactions, as applications of Lavoisier's law of conservation of mass

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.A.2.	Identify chemical reactions that are significant in societies (e.g., reactions that maintain living systems, such as photosynthesis and respiration; reactions that have an impact on the environment, such as combustion reactions and decomposition of waste materials)
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.A.4.	Differentiate between endothermic and exothermic chemical reactions (e.g., combustion of gasoline and other natural and synthetic fuels, photosynthesis)
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.A.5.	Classify and identify categories of chemical reactions; i.e., formation (synthesis), decomposition, hydrocarbon combustion, single replacement, double replacement
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.A.7.	Predict the products of formation (synthesis) and decomposition, single and double replacement, and hydrocarbon combustion chemical reactions, when given the reactants
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GENERAL OUTCOME / COURSE	AB.S10.	Science 10
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.5.A.</b>	<b>Unit A: Energy and Matter in Chemical Change (Nature of Science Emphasis): Performing and Recording: Conduct investigations into relationships between and among observable variables, and use a broad range of tools and techniques to gather and record data and information</b>
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE

S10.5.A. 3. Select and integrate information from various print and electronic sources or from several parts of the same source (e.g., collect information on research into subatomic matter, research how pre-contact First Nations communities used available materials such as brain tissue for tanning hides)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S10.</b>	<b>Science 10</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.3.B.</b>	<b>Unit B: Energy Flow in Technological Systems (Science and Technology Emphasis): Apply the principles of energy conservation and thermodynamics to investigate, describe and predict efficiency of energy transformation in technological systems</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE

S10.3.B. 8. Explain the need for efficient energy conversions to protect our environment and to make judicious use of natural resources (e.g., advancement in energy efficiency; Aboriginal perspectives on taking care of natural resources)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S10.</b>	<b>Science 10</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.5.B.</b>	<b>Unit B: Energy Flow in Technological Systems (Science and Technology Emphasis): Performing and Recording: Conduct investigations into relationships between and among observable variables, and use a broad range of tools and techniques to gather and record data and information</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE

S10.5.B. 4. Select and integrate information from various print and electronic sources or from several parts of the same source (e.g., create electronic documents, containing multiple links, on using alternative energy sources, such as wind or solar, to generate electricity in Alberta; relate the importance of the development of effective and efficient engines to the time of the Industrial Revolution and to present-day first-world economics)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S10.</b>	<b>Science 10</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.6.B.</b>	<b>Unit B: Energy Flow in Technological Systems (Science and Technology Emphasis): Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE

S10.6.B. 6. Construct and test a prototype of a device or system, and troubleshoot problems as they arise (e.g., design and build an energy conversion device)

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE

S10.6.B. 8. Evaluate a personally designed and constructed device on the basis of self-developed criteria (e.g., evaluate an energy conversion device based on a modern or traditional design)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S10.</b>	<b>Science 10</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.1.D.</b>	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Describe how the relationships among input solar energy, output terrestrial energy and energy flow within the biosphere affect the lives of humans and other species</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.1.D. 1.	Explain how climate affects the lives of people and other species, and explain the need to investigate climate change (e.g., describe the responses of human and other species to extreme climatic conditions; describe housing designs, animal habitats, clothing and fur in conditions of extreme heat, cold, dryness or humidity, wind)
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.1.D. 5.	Describe and explain the greenhouse effect, and the role of various gases—including methane, carbon dioxide and water vapour—in determining the scope of the greenhouse effect
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GENERAL OUTCOME / COURSE	AB.S10.	Science 10
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GENERAL OUTCOME / SPECIFIC OUTCOME	S10.3.D.	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Relate climate to the characteristics of the world's major biomes, and compare biomes in different regions of the world</b>
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.D. 4.	Identify the potential effects of climate change on environmentally sensitive biomes (e.g., impact of a reduction in the Arctic ice pack on local species and on Aboriginal societies that rely on traditional lifestyles)
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GENERAL OUTCOME / COURSE	AB.S10.	Science 10
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GENERAL OUTCOME / SPECIFIC OUTCOME	S10.4.D.	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Investigate and interpret the role of environmental factors on global energy transfer and climate change</b>
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.4.D. 1.	Investigate and identify human actions affecting biomes that have a potential to change climate (e.g., emission of greenhouse gases, draining of wetlands, forest fires, deforestation) and critically examine the evidence that these factors play a role in climate change (e.g., global warming, rising sea level(s))
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.4.D. 3.	Describe and evaluate the role of science in furthering the understanding of climate and climate change through international programs (e.g., World Meteorological Organization, World Weather Watch, Global Atmosphere Watch, Surface Heat Budget of the Arctic Ocean (SHEBA) project, The Intergovernmental Panel on Climate Change (IPCC); the study of paleoclimates and models of future climate scenarios)
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.4.D. 4.	Describe the role of technology in measuring, modelling and interpreting climate and climate change (e.g., computer models, devices to take measurements of greenhouse gases, satellite imaging technology)
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.4.D. 6.	Assess, from a variety of perspectives, the risks and benefits of human activity, and its impact on the biosphere and the climate (e.g., compare the Gaia hypothesis with traditional Aboriginal perspectives on the natural world; identify and analyze various perspectives on reducing the impact of human activity on the global climate)
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GENERAL OUTCOME / COURSE	AB.S10.	Science 10
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GENERAL OUTCOME / SPECIFIC OUTCOME	S10.5.D.	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Initiating and Planning: Ask questions about observed relationships, and plan investigations of questions, ideas, problems and issues</b>
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.5.D. 1.	Identify questions to investigate that arise from practical problems and issues (e.g., develop questions related to climate change, such as “How will global warming affect Canada’s northern biomes?”; “How will a species be affected by an increase or decrease in average temperature?”)
GENERAL OUTCOME / COURSE	AB.S10.	Science 10
GENERAL OUTCOME / SPECIFIC OUTCOME	S10.6.D.	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Performing and Recording: Conduct investigations into relationships between and among observable variables, and use a broad range of tools and techniques to gather and record data and information</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.6.D. 4.	Use library and electronic research tools to collect information on a given topic (e.g., research sources of greenhouse gases; research protocols to control human sources of greenhouse gases)
GENERAL OUTCOME / COURSE	AB.S14.	Science 14
GENERAL OUTCOME / SPECIFIC OUTCOME	S14.3.B.	<b>Unit B: Understanding Energy Transfer Technologies (Science and Technology Emphasis): Describe and compare simple machines as devices that transfer energy and multiply forces or distances</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.3.B.7	Explain the need to encourage and support the development of machines that are efficient and rely upon renewable energy sources (e.g., hand-wound radios, solar-powered calculators, solar cookers)
GENERAL OUTCOME / COURSE	AB.S14.	Science 14
GENERAL OUTCOME / SPECIFIC OUTCOME	S14.4.B	<b>Unit B: Understanding Energy Transfer Technologies (Science and Technology Emphasis): Initiating and Planning: Ask questions about relationships between and among observable variables, and plan investigations to address those questions</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.4.B. 3.	Propose alternative solutions to a given practical problem, select one, and develop a plan (e.g., identify ways to reduce thermal energy loss or gain in school buildings)
GENERAL OUTCOME / COURSE	AB.S14.	Science 14
GENERAL OUTCOME / SPECIFIC OUTCOME	S14.6.B.	<b>Unit B: Understanding Energy Transfer Technologies (Science and Technology Emphasis): Analyzing and Interpreting: Analyze qualitative and quantitative data, and develop and assess possible explanations</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.6.B. 6.	Evaluate designs and prototypes in terms of function, reliability, safety, efficiency, use of materials and impact on the environment (e.g., test insulating materials and methods; determine the efficiency of a machine)
GENERAL OUTCOME / COURSE	AB.S14.	Science 14



<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S14.1.D.</b>	<b>Unit D: Investigating Matter and Energy in the Environment (Social and Environmental Emphasis): Describe how the flow of matter in the biosphere is cyclical along characteristic pathways and can be disrupted by human activity</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.1.D. 8.	Identify and assess the needs and interests of society that have led to technologies with unforeseen environmental consequences (e.g., fishing technologies that result in harvesting more than the rate of reproduction, use of pesticides such as DDT, impact of driving a car on atmospheric compositions)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S14.</b>	<b>Science 14</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S14.2.D.</b>	<b>Unit D: Investigating Matter and Energy in the Environment (Social and Environmental Emphasis): Analyze a local ecosystem in terms of its biotic and abiotic components, and describe factors of the equilibrium</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.2.D. 9.	Trace the development of a technological application that has altered an ecosystem (e.g., power generation, fishing, logging, oil and gas exploration, agricultural practices)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.2.A.</b>	<b>Unit A: Applications of Matter and Chemical Change (Science and Technology Emphasis): Investigate and classify chemical reactions</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.2.A. 4.	Investigate, describe and compare the changes to reactants and products in fossil fuel combustion and rusting reactions
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.4.A.</b>	<b>Unit A: Applications of Matter and Chemical Change (Science and Technology Emphasis): Analyze common technological products and processes encountered in everyday life and careers, and analyze their potential effects on the environment</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.A. 2.	Investigate and describe simple chemical processes occurring in everyday life (e.g., acid-base reactions in cleaning and food processing, dyeing of hair, washing of clothes, burning of gasoline in a car engine, swimming pool maintenance, rusting of metal)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.A. 4.	Investigate and describe greenhouse gases and air pollution resulting from combustion reactions (e.g., carbon dioxide and carbon monoxide released when methane is burned in a household furnace, sulfur dioxide and nitrogen dioxide released in car exhaust)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.6.A.</b>	<b>Unit A: Applications of Matter and Chemical Change (Science and Technology Emphasis): Performing and Recording: Conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.6.A. 4.	Select and integrate information from various print and electronic sources or from several parts of the same source (e.g., prepare an inventory of useful chemical substances used in a typical day, and classify them in categories: acids, bases, salts, alloys and polymers)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.1.B.</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Investigate and interpret transformation and conservation of various forms of energy in physical and technological systems</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.1.B.2	Design, construct and evaluate a simple model or device that transforms energy from one form to another (e.g., windmill, water wheel, model vehicle powered by rubber bands/mousetraps/carbon dioxide/electric motor)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.3.B.</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Investigate and describe the energy conversions associated with change in chemical and biological systems</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.3.B.1	Investigate and describe common chemical reactions that produce or absorb energy (e.g., light and heat given off by the combustion of fossil fuels, cold and hot packs)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.3.B. 8.	Compare combustion of a fossil fuel with cellular respiration
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.4.B</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Analyze and describe the impact of fossil fuel based technologies and their importance in meeting human needs</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.B. 1.	Explain the importance of the fossil fuel industry in Alberta in meeting energy requirements
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.B. 2.	Compare present fossil fuel consumption by industry, homes and automobiles with projected consumption in the future
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.B. 3.	Describe the sources of fossil fuels; and describe, in general terms, the extraction and refining processes used to provide people with fossil fuels

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.B. 4.	Assess the impact of fossil fuel based technologies on the environment
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.6.B.</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Performing and Recording: Conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.6.B. 2.	Compile and organize data, using appropriate formats and data treatments to facilitate interpretation (e.g., list, in charts and tables, sources of energy in food)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.7.B.</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Analyzing and Interpreting: Analyze qualitative and quantitative data, and develop and assess possible explanations</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.7.B. 4.	Identify and correct practical problems in the way a technological device or system functions (e.g., redesign a model car to increase the distance it travels)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.7.B. 5.	Evaluate a personally designed and constructed device on the basis of criteria they have developed themselves (e.g., assess an energy conversion device or an artificial light technology to promote indoor plant growth)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.7.D.</b>	<b>Unit D: Motion, Change and Transportation Safety (Nature of Science Emphasis): Analyzing and Interpreting: Analyze qualitative and quantitative data, and develop and assess possible explanations</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.7.D. 1.	Describe and apply classification systems and nomenclature used in the sciences (e.g., use terms such as force, speed [velocity], impulse, momentum)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.8.D.</b>	<b>Unit D: Motion, Change and Transportation Safety (Nature of Science Emphasis): Communication and Teamwork: Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.8.D. 1.	Communicate questions, ideas and intentions; and receive, interpret, understand, support and respond to the ideas of others (e.g., develop a plan to assess the safety features of new cars)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-A2.</b>	<b>Unit A: Chemical Changes: Students will explain oxidation, reduction and spontaneity and apply this knowledge to voltaic and electrolytic cells and to industrial processes.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-A2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-A2.3sts.</b>	<b>Illustrate how technological problems often require multiple solutions that involve different designs, materials and processes and that have both intended and unintended consequences (ST3) [ICT C6-4.5, F3-4.1]</b>

EXPECTATION S20-A2.3sts.1. Describe the need for industrial processes to make use of efficient designs to provide optimal yields within constraints of cost and requirements for sustainability (production of smaller and longer-lasting batteries, for example, and considerations for their disposal)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-A3.</b>	<b>Unit A: Chemical Changes: Students will describe the properties of simple hydrocarbons and describe hydrocarbon-based industrial processes that are important in Alberta.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-A3.k.</b>	<b>Specific Outcomes for Knowledge</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-A3.5k.</b>	<b>Classify, balance and apply mole ratios to important hydrocarbon reactions:</b>

EXPECTATION S20-A3.5k.1. Combustion of hydrocarbons to produce carbon dioxide, water vapour and energy

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-B2.</b>	<b>Unit B: Changes in Motion: Students will describe and analyze the law of conservation of momentum for one-dimensional collisions and change in momentum (impulse) to explain how force affects motion.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-B2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-B2.1sts.</b>	<b>Explain that the goal of technology is to provide solutions to practical problems (ST1) [ICT F2-4.4]</b>

EXPECTATION S20-B2.1sts.2. Trace the development of safety technologies in sports or transportation over the past 50 years, and compare the functioning of first- and current-generation safety technologies, such as sports safety equipment (helmets, shin guards, gloves) and automobile safety devices (lap belts, shoulder belts, air bags)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-C4.</b>	<b>Unit C: The Changing Earth: Students will analyze the evidence of, and assess the explanations for, natural variations in Earth's climate over the last two million years.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-C4.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-C4.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>

EXPECTATION S20-C4.4s.1. Synthesize information from multiple sources when making inferences about global warming and climate change, recording relevant data, acknowledging sources of information and citing sources correctly (CT-SEC2) [ICT C7-4.2, F3-4.2, F3-4.3]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-D1.</b>	<b>Unit D: Changes in Living Systems: Students will analyze ecosystems and ecological succession in the local area and describe the relationships and interactions among subsystems and components.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-D1.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-D1.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>

EXPECTATION S20-D1.4s.3. Prepare a visual display that explains initiatives undertaken by industry to protect the environment (CT-NS2) [ICT P4-4.2]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-D2.</b>	<b>Unit D: Changes in Living Systems: Students will analyze and investigate the cycling of matter and the flow of energy through the biosphere and ecosystems as well as the interrelationship of society and the environment.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-D2.k.</b>	<b>Specific Outcomes for Knowledge</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-D2.2k.</b>	<b>Describe artificial and natural factors that affect the biogeochemical cycles:</b>

EXPECTATION S20-D2.2k.2. Carbon cycle; e.g., emissions of carbon oxides from extraction, distribution and combustion of fossil fuels, releases associated with deforestation and cement industries

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-D2.</b>	<b>Unit D: Changes in Living Systems: Students will analyze and investigate the cycling of matter and the flow of energy through the biosphere and ecosystems as well as the interrelationship of society and the environment.</b>

<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	S20-D2.sts.	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	S20-D2.1sts.	<b>Explain that science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F2-4.8, F3-4.1]</b>
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EXPECTATION	S20-D2.1sts.1.	Assess whether the efforts to reduce human impact on biogeochemical cycles are viable, taking into consideration a variety of perspectives (considerations for deep-well and deep-ocean injection of wastes, for example, include properties of waste, concentration, uncertainty, environmental concerns, risks and benefits to human health and organisms, costs)
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-D2.</b>	<b>Unit D: Changes in Living Systems: Students will analyze and investigate the cycling of matter and the flow of energy through the biosphere and ecosystems as well as the interrelationship of society and the environment.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	S20-D2.s.	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	S20-D2.4s.	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>
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EXPECTATION	S20-D2.4s.3.	Work cooperatively in a group to investigate the influence of human activities on the biogeochemical cycles and, using appropriate multimedia, present the findings (CT-SEC1, CT-SEC2) [ICT P3-4.1]
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-B1.</b>	<b>Unit B: Chemistry and the Environment: Students will analyze the sources of acids and bases and their effects on the environment.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	S30-B1.k.	<b>Specific Outcomes for Knowledge</b>
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ILLUSTRATIVE EXAMPLE	S30-B1.8k.	Outline the chemical reactions (e.g., combustion reactions) that produce air pollutants (i.e., sulfur dioxide and nitrous oxides) that, when combined with water, ultimately result in acid deposition
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-B2.</b>	<b>Unit B: Chemistry and the Environment: Students will analyze the sources of organic compounds and their effects on the environment.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	S30-B2.k.	<b>Specific Outcomes for Knowledge</b>
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ILLUSTRATIVE EXAMPLE	S30-B2.4k.	List the sources of, and analyze the hazards posed by, halogenated hydrocarbons and benzene derivatives
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ILLUSTRATIVE EXAMPLE	S30-B2.5k.	Identify and explain how human activities and natural events contribute to the production of photochemical smog, the depletion of the ozone layer and increased concentrations of organic compounds in the environment; e.g., driving a car, use of CFCs, agricultural practices
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-B3.</b>	<b>Unit B: Chemistry and the Environment: Students will analyze, from a variety of perspectives, the risks and benefits of using chemical processes in meeting human needs and assess technologies for reducing the impact of chemical compounds on the environment.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-B3.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE	S30-B3.1k.	Describe the risks and benefits of using chemical processes that may produce products and/or by-products that have the potential to harm the environment
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-B3.</b>	<b>Unit B: Chemistry and the Environment: Students will analyze, from a variety of perspectives, the risks and benefits of using chemical processes in meeting human needs and assess technologies for reducing the impact of chemical compounds on the environment.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-B3.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE	S30-B3.3s.	Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions
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EXPECTATION	S30-B3.3s.3.	Evaluate methods used to reduce the incidence of acid deposition and photochemical smog; e.g., reducing sulfur content in fuels, using catalytic converters in automobiles, smokestack scrubbers (AI-SEC2)
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE	S30-C1.11k.	Compare the general design and function of a DC electric motor and a generator
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>

<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.2sts.</b>	<b>Explain that technological development may involve the creation of prototypes, the testing of prototypes and the application of knowledge from related and interdisciplinary fields (ST2) [ICT C6-4.5, F2-4.8]</b>

EXPECTATION S30-C1.2sts.1. Explain the significance of a simple electric generator or motor in society

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.2s.</b>	<b>Performing and Recording: Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information</b>

EXPECTATION S30-C1.2s.3. Construct a simple electric generator or a DC motor (PR-ST2)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.3s.</b>	<b>Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>

EXPECTATION S30-C1.3s.1. Test and evaluate a self-constructed, simple electric generator or motor in terms of design, ruggedness and ability to perform a specific function (AI-ST1)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>

EXPECTATION S30-C1.4s.1. Work cooperatively in designing and constructing a simple electric generator or motor and troubleshoot problems as they arise (CT-ST1)



<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE    S30-D1.4k.    Explain the need to develop technologies that use renewable and nonrenewable energy sources to meet the increasing global demand

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE    S30-D1.1sts.    Explain that science and technology are developed to meet societal needs and expand human capability (SEC1) [ICT F2-4.4, F2-4.8]

EXPECTATION    S30-D1.1sts.1.    Investigate and assess the need for strategies (e.g., co-generation, waste-energy recovery, electrical load scheduling) and policies to increase energy efficiency as a means of balancing global energy demands with maintaining a viable biosphere

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE    S30-D1.1s.    Initiating and Planning: Formulate questions about observed relationships and plan investigations of questions, ideas, problems and issues

EXPECTATION    S30-D1.1s.1.    Identify questions to investigate that arise from science- and technology-related issues; e.g., "Which energy sources and technologies best balance the need for global energy demand with acceptable environmental impacts?" (IP-SEC1) [ICT F2-4.8]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>

<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	S30-D1.s.	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	S30-D1.2s.	<b>Performing and Recording: Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information</b>
EXPECTATION	S30-D1.2s.1.	Research current information relevant to global oil and gas reserves or sustainable development initiatives (PR-SEC1) [ICT C2-4.1, F2-4.7]
EXPECTATION	S30-D1.2s.2.	Compile and organize findings as part of a briefing for a public hearing on an issue such as the proposed development of an energy source in an ecologically sensitive area (PR-NS4) [ICT C6-4.2, P2-4.1]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	S30-D1.s.	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	S30-D1.3s.	<b>Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>
EXPECTATION	S30-D1.3s.1.	Analyze data charts, tables and graphs on global energy consumption in the past, in the present and predicted for the future [ICT C7-4.2]
EXPECTATION	S30-D1.3s.2.	Evaluate the bias, reliability and validity of electronically accessed information on alternative and renewable energy sources (AI-SEC1) [ICT C2-4.2, C3-4.1, C3-4.2]
EXPECTATION	S30-D1.3s.4.	Assess policies intended to facilitate efficient use of energy and reliance on renewable energy sources (AI-SEC2)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	S30-D1.s.	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	S30-D1.4s.	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>
EXPECTATION	S30-D1.4s.1.	Present a visual display of initiatives taken by industry to protect the environment (CT-SEC2) [ICT C1-4.4, P6-4.1]
EXPECTATION	S30-D1.4s.2.	Develop and present an energy policy, based upon a set of criteria, in relation to a possible energy crisis in Canada (CT-SEC3)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>

<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE    S30-D2.3k.    Describe the conversion of solar energy into renewable forms (e.g., wind, hydropower, chemical potential energy by photosynthesis) and nonrenewable forms (e.g., coal, oil and gas) and further conversion into electrical and thermal energy

ILLUSTRATIVE EXAMPLE    S30-D2.10k.    Compare and contrast conventional coal, oil-fired or hydroelectric power stations with nuclear power stations, in terms of purpose, process of energy conversions, design and function

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>
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ILLUSTRATIVE EXAMPLE    S30-D2.1sts.    Explain that decisions regarding the application of scientific and technological development involve a variety of perspectives, including social, cultural, environmental, ethical and economic considerations (SEC4b) [ICT F2-4.2, F3-4.1]

EXPECTATION    S30-D2.1sts.1.    Evaluate the environmental and economic implications of energy transformation technologies; e.g., nuclear, geothermal, fossil fuel, hydroelectric, wind, tidal power or hydrogen-cell power in a risk-benefit analysis

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>
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ILLUSTRATIVE EXAMPLE    S30-D2.2sts.    Explain that science and technology are developed to meet societal needs and expand human capability (SEC1) [ICT F2-4.4, F2-4.8]

EXPECTATION    S30-D2.2sts.1.    Determine how the allocation of funds for research into the development of new energy conversion devices and sources balances the needs of society with preservation of the environment

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.2s.</b>	<b>Performing and Recording: Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information</b>
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EXPECTATION	S30-D2.2s.1.	Research, integrate and synthesize information from various print and electronic sources on sustainable development initiatives, such as fuel cells (PR-SEC1) [ICT C1-4.1, C2-4.1, C3-4.1, C3-4.2]
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>
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EXPECTATION	S30-D2.4s.1.	Use advanced menu features within word processing software to insert tables and energy budgets for a risk-benefit analysis of an energy transformation technology (CT-ST2) [ICT P4-4.3]
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EXPECTATION	S30-D2.4s.2.	Consult a wide variety of sources to evaluate varied perspectives on topics such as cogeneration, fuel efficiency, waste-energy recovery, electrical load scheduling and policies that facilitate energy efficiency and increase reliance on renewable energy sources (CT-SEC1) [ICT C2-4.1, C2-4.2]
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.B20.</b>	<b>Biology 20</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>B20-A2.</b>	<b>Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.1sts.</b>	<b>Explain that science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F3-4.1]</b>
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EXPECTATION	B20-A2.1sts.1.	Discuss the influence of human activities on the biogeochemical cycling of phosphorus, sulfur, iron and nitrogen: feedlot operations; composting; fertilizer applications; waste and sewage disposal; vehicle and refinery emissions; acid deposition; persistent organic pollutants
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.B20.</b>	<b>Biology 20</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>B20-A2.</b>	<b>Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.1s.</b>	<b>Initiating and Planning: Formulate questions about observed relationships and plan investigations of questions, ideas, problems and issues</b>
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EXPECTATION	B20-A2.1s.2.	Hypothesize how alterations in the carbon cycle, resulting from the burning of fossil fuels, might affect other cycling phenomena; e.g., sulfur, iron, water (IP-NS3) [ICT C6-4.1]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.B20.</b>	<b>Biology 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>B20-A2.</b>	<b>Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>

EXPECTATION	B20-A2.4s.1.	Work cooperatively in a group to investigate the influence of human activities on the biogeochemical cycles and use appropriate multimedia to present the information to a group (CT-SEC1, CT-SEC2, CT-SEC3) [ICT C1-4.2, F2-4.7, P3-4.1]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.B20.</b>	<b>Biology 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>B20-A3.</b>	<b>Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the balance of energy and matter exchange in the biosphere, as an open system, and explain how this maintains equilibrium.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>B20-A3.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE	B20-A3.2k.	Explain how the equilibrium between gas exchanges in photosynthesis and cellular respiration influences atmospheric composition
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C20.</b>	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C20-D1.</b>	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will explain how balanced chemical equations indicate the quantitative relationships between reactants and products involved in chemical changes.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C20-D1.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE	C20-D1.1k.	Predict the product(s) of a chemical reaction based upon the reaction type
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C20.</b>	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C20-D1.</b>	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will explain how balanced chemical equations indicate the quantitative relationships between reactants and products involved in chemical changes.</b>

<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C20-D1.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C20-D1.1sts.</b>	<b>Explain that the products of technology are devices, systems and processes that meet given needs; however, these products cannot solve all problems (ST6) [ICT F2-4.4]</b>

EXPECTATION C20-D1.1sts.1. Analyze the chemical reactions involved in various industrial and commercial processes and products that use stoichiometric and chemical principles: production of urea; fertilizers; fuel combustion; water treatment; air bag deployment; neutralization of excess stomach acid

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C20.</b>	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C20-D2.</b>	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will use stoichiometry in quantitative analysis.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C20-D2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C20-D2.1sts.</b>	<b>Explain that scientific knowledge may lead to the development of new technologies, and new technologies may lead to or facilitate scientific discovery (ST4) [ICT F2-4.4]</b>

EXPECTATION C20-D2.1sts.1. Describe how industries apply principles of stoichiometry to minimize waste and maximize yield

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C20.</b>	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C20-D2.</b>	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will use stoichiometry in quantitative analysis.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C20-D2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C20-D2.2sts.</b>	<b>Explain how the appropriateness, risks and benefits of technologies need to be assessed for each potential application from a variety of perspectives, including sustainability (ST7) [ICT F3-4.1]</b>

EXPECTATION C20-D2.2sts.1. Assess the significance of specific by-products from industrial, commercial and household chemical reactions

EXPECTATION C20-D2.2sts.2. Analyze the use of technologies, such as smokestacks and catalytic converters, to reduce emissions that are harmful to the environment, such as SO<sub>2</sub>(g) and greenhouse gases

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C20.</b>	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C20-D2.</b>	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will use stoichiometry in quantitative analysis.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C20-D2.s.</b>	<b>Specific Outcomes for Skills (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C20-D2.2s.</b>	<b>Performing and Recording: Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information</b>

EXPECTATION	C20-D2.2s.3.	Research methods used by industry to reduce emissions (PR-ST1) [ICT F2-4.4]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-A1.</b>	<b>Unit A: Thermochemical Changes: Students will determine and interpret energy changes in chemical reactions.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE C30-A1.9k. Identify that liquid water and carbon dioxide gas are reactants in photosynthesis and products of cellular respiration and that gaseous water and carbon dioxide gas are the products of hydrocarbon combustion in an open system

ILLUSTRATIVE EXAMPLE C30-A1.10k. Classify chemical reactions as endothermic or exothermic, including those for the processes of photosynthesis, cellular respiration and hydrocarbon combustion.

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-A1.</b>	<b>Unit A: Thermochemical Changes: Students will determine and interpret energy changes in chemical reactions.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.s.</b>	<b>Specific Outcomes for Skills (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.2s.</b>	<b>Performing and Recording: Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information</b>

EXPECTATION C30-A1.2s.4. Select and integrate information from various print and electronic sources to create multiple-linked documents about the use of alternative fuels (PR-ST1) [ICT C1-4.1, P5-4.1]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-A1.</b>	<b>Unit A: Thermochemical Changes: Students will determine and interpret energy changes in chemical reactions.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.s.</b>	<b>Specific Outcomes for Skills (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.3s.</b>	<b>Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>

EXPECTATION C30-A1.3s.1. Compare energy changes associated with a variety of chemical reactions through the analysis of data and energy diagrams (AI-NS3) [ICT C7-4.2]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-A2.</b>	<b>Unit A: Thermochemical Changes: Students will explain and communicate energy changes in chemical reactions.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-A2.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE C30-A2.2k. Explain the energy changes that occur during chemical reactions, referring to bonds breaking and forming and changes in potential and kinetic energy

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-C2.</b>	<b>Unit C: Chemical Changes of Organic Compounds: Students will describe chemical reactions of organic compounds.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-C2.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE C30-C2.1k. Define, illustrate and provide examples of simple addition, substitution, elimination, esterification and combustion reactions

ILLUSTRATIVE EXAMPLE C30-C2.4k. Relate the reactions described above to major reactions that produce thermal energy and economically important compounds from fossil fuels.

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-C2.</b>	<b>Unit C: Chemical Changes of Organic Compounds: Students will describe chemical reactions of organic compounds.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-C2.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE C30-C2.2s. Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information

EXPECTATION C30-C2.2s.2. Use library and electronic research tools to collect information on: bitumen upgrading; the octane/cetane ratings of fuels and how they are determined; the costs and benefits of supporting the petrochemical industry (PR-SEC1, PR-SEC2) [ICT C1-4.1]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-C2.</b>	<b>Unit C: Chemical Changes of Organic Compounds: Students will describe chemical reactions of organic compounds.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-C2.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C30-C2.3s.</b>	<b>Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>



EXPECTATION	C30-C2.3s.2.	Investigate the issue of greenhouse gases; identify some greenhouse gases, including methane, carbon dioxide, water and dinitrogen oxide (nitrous oxide); and analyze their contribution to climate change (AI-SEC1, AI-SEC2) [ICT F3-4.1]
GENERAL OUTCOME / COURSE	AB.P30.	Physics 30
GENERAL OUTCOME / SPECIFIC OUTCOME	P30-B3.	Unit B: Forces and Fields: Students will explain how the properties of electric and magnetic fields are applied in numerous devices.
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	P30-B3.sts.	Specific Outcomes for Science, Technology and Society (STS) (Nature of Science Emphasis)
ILLUSTRATIVE EXAMPLE	P30-B3.2sts.	Explain that the goal of technology is to provide solutions to practical problems and that the appropriateness, risks and benefits of technologies need to be assessed for each potential application from a variety of perspectives, including sustainability (ST1, ST7) [ICT F2-4.2, F3-4.1]

EXPECTATION	P30-B3.2sts.1.	Evaluate an electromagnetic technology, such as magnetic resonance imaging (MRI), positron emission tomography (PET), transformers, alternating current (AC) and direct current (DC) motors, AC and DC generators, speakers, telephones
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**Alberta Programs of Study**  
**Science**  
Grade 12 - Adopted: 2014

GENERAL OUTCOME / COURSE	AB.S10.	Science 10
GENERAL OUTCOME / SPECIFIC OUTCOME	S10.3.A.	Unit A: Energy and Matter in Chemical Change (Nature of Science Emphasis): Identify and classify chemical changes, and write word and balanced chemical equations for significant chemical reactions, as applications of Lavoisier's law of conservation of mass
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.A.2	Identify chemical reactions that are significant in societies (e.g., reactions that maintain living systems, such as photosynthesis and respiration; reactions that have an impact on the environment, such as combustion reactions and decomposition of waste materials)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.A.4.	Differentiate between endothermic and exothermic chemical reactions (e.g., combustion of gasoline and other natural and synthetic fuels, photosynthesis)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.A.5.	Classify and identify categories of chemical reactions; i.e., formation (synthesis), decomposition, hydrocarbon combustion, single replacement, double replacement
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.A.7	Predict the products of formation (synthesis) and decomposition, single and double replacement, and hydrocarbon combustion chemical reactions, when given the reactants
GENERAL OUTCOME / COURSE	AB.S10.	Science 10

<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.5.A.</b>	<b>Unit A: Energy and Matter in Chemical Change (Nature of Science Emphasis): Performing and Recording: Conduct investigations into relationships between and among observable variables, and use a broad range of tools and techniques to gather and record data and information</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.5.A. 3.	Select and integrate information from various print and electronic sources or from several parts of the same source (e.g., collect information on research into subatomic matter, research how pre-contact First Nations communities used available materials such as brain tissue for tanning hides)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S10.</b>	<b>Science 10</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.3.B.</b>	<b>Unit B: Energy Flow in Technological Systems (Science and Technology Emphasis): Apply the principles of energy conservation and thermodynamics to investigate, describe and predict efficiency of energy transformation in technological systems</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.B. 8.	Explain the need for efficient energy conversions to protect our environment and to make judicious use of natural resources (e.g., advancement in energy efficiency; Aboriginal perspectives on taking care of natural resources)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S10.</b>	<b>Science 10</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.5.B.</b>	<b>Unit B: Energy Flow in Technological Systems (Science and Technology Emphasis): Performing and Recording: Conduct investigations into relationships between and among observable variables, and use a broad range of tools and techniques to gather and record data and information</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.5.B. 4.	Select and integrate information from various print and electronic sources or from several parts of the same source (e.g., create electronic documents, containing multiple links, on using alternative energy sources, such as wind or solar, to generate electricity in Alberta; relate the importance of the development of effective and efficient engines to the time of the Industrial Revolution and to present-day first-world economics)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S10.</b>	<b>Science 10</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.6.B.</b>	<b>Unit B: Energy Flow in Technological Systems (Science and Technology Emphasis): Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.6.B. 6.	Construct and test a prototype of a device or system, and troubleshoot problems as they arise (e.g., design and build an energy conversion device)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.6.B. 8.	Evaluate a personally designed and constructed device on the basis of self-developed criteria (e.g., evaluate an energy conversion device based on a modern or traditional design)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S10.</b>	<b>Science 10</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S10.1.D.</b>	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Describe how the relationships among input solar energy, output terrestrial energy and energy flow within the biosphere affect the lives of humans and other species</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.1.D. 1.	Explain how climate affects the lives of people and other species, and explain the need to investigate climate change (e.g., describe the responses of human and other species to extreme climatic conditions; describe housing designs, animal habitats, clothing and fur in conditions of extreme heat, cold, dryness or humidity, wind)
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.1.D. 5.	Describe and explain the greenhouse effect, and the role of various gases—including methane, carbon dioxide and water vapour—in determining the scope of the greenhouse effect
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GENERAL OUTCOME / COURSE	AB.S10.	Science 10
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GENERAL OUTCOME / SPECIFIC OUTCOME	S10.3.D.	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Relate climate to the characteristics of the world's major biomes, and compare biomes in different regions of the world</b>
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.3.D. 4.	Identify the potential effects of climate change on environmentally sensitive biomes (e.g., impact of a reduction in the Arctic ice pack on local species and on Aboriginal societies that rely on traditional lifestyles)
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GENERAL OUTCOME / COURSE	AB.S10.	Science 10
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GENERAL OUTCOME / SPECIFIC OUTCOME	S10.4.D.	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Investigate and interpret the role of environmental factors on global energy transfer and climate change</b>
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.4.D. 1.	Investigate and identify human actions affecting biomes that have a potential to change climate (e.g., emission of greenhouse gases, draining of wetlands, forest fires, deforestation) and critically examine the evidence that these factors play a role in climate change (e.g., global warming, rising sea level(s))
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.4.D. 3.	Describe and evaluate the role of science in furthering the understanding of climate and climate change through international programs (e.g., World Meteorological Organization, World Weather Watch, Global Atmosphere Watch, Surface Heat Budget of the Arctic Ocean (SHEBA) project, The Intergovernmental Panel on Climate Change (IPCC); the study of paleoclimates and models of future climate scenarios)
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.4.D. 4.	Describe the role of technology in measuring, modelling and interpreting climate and climate change (e.g., computer models, devices to take measurements of greenhouse gases, satellite imaging technology)
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.4.D. 6.	Assess, from a variety of perspectives, the risks and benefits of human activity, and its impact on the biosphere and the climate (e.g., compare the Gaia hypothesis with traditional Aboriginal perspectives on the natural world; identify and analyze various perspectives on reducing the impact of human activity on the global climate)
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GENERAL OUTCOME / COURSE	AB.S10.	Science 10
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GENERAL OUTCOME / SPECIFIC OUTCOME	S10.5.D.	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Initiating and Planning: Ask questions about observed relationships, and plan investigations of questions, ideas, problems and issues</b>
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SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.5.D. 1.	Identify questions to investigate that arise from practical problems and issues (e.g., develop questions related to climate change, such as “How will global warming affect Canada’s northern biomes?”; “How will a species be affected by an increase or decrease in average temperature?”)
GENERAL OUTCOME / COURSE	AB.S10.	Science 10
GENERAL OUTCOME / SPECIFIC OUTCOME	S10.6.D.	<b>Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Performing and Recording: Conduct investigations into relationships between and among observable variables, and use a broad range of tools and techniques to gather and record data and information</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.6.D. 4.	Use library and electronic research tools to collect information on a given topic (e.g., research sources of greenhouse gases; research protocols to control human sources of greenhouse gases)
GENERAL OUTCOME / COURSE	AB.S14.	Science 14
GENERAL OUTCOME / SPECIFIC OUTCOME	S14.3.B.	<b>Unit B: Understanding Energy Transfer Technologies (Science and Technology Emphasis): Describe and compare simple machines as devices that transfer energy and multiply forces or distances</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.3.B.7	Explain the need to encourage and support the development of machines that are efficient and rely upon renewable energy sources (e.g., hand-wound radios, solar-powered calculators, solar cookers)
GENERAL OUTCOME / COURSE	AB.S14.	Science 14
GENERAL OUTCOME / SPECIFIC OUTCOME	S14.4.B	<b>Unit B: Understanding Energy Transfer Technologies (Science and Technology Emphasis): Initiating and Planning: Ask questions about relationships between and among observable variables, and plan investigations to address those questions</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.4.B. 3.	Propose alternative solutions to a given practical problem, select one, and develop a plan (e.g., identify ways to reduce thermal energy loss or gain in school buildings)
GENERAL OUTCOME / COURSE	AB.S14.	Science 14
GENERAL OUTCOME / SPECIFIC OUTCOME	S14.6.B.	<b>Unit B: Understanding Energy Transfer Technologies (Science and Technology Emphasis): Analyzing and Interpreting: Analyze qualitative and quantitative data, and develop and assess possible explanations</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.6.B. 6.	Evaluate designs and prototypes in terms of function, reliability, safety, efficiency, use of materials and impact on the environment (e.g., test insulating materials and methods; determine the efficiency of a machine)
GENERAL OUTCOME / COURSE	AB.S14.	Science 14

<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S14.1.D.</b>	<b>Unit D: Investigating Matter and Energy in the Environment (Social and Environmental Emphasis): Describe how the flow of matter in the biosphere is cyclical along characteristic pathways and can be disrupted by human activity</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.1.D. 8.	Identify and assess the needs and interests of society that have led to technologies with unforeseen environmental consequences (e.g., fishing technologies that result in harvesting more than the rate of reproduction, use of pesticides such as DDT, impact of driving a car on atmospheric compositions)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S14.</b>	<b>Science 14</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S14.2.D.</b>	<b>Unit D: Investigating Matter and Energy in the Environment (Social and Environmental Emphasis): Analyze a local ecosystem in terms of its biotic and abiotic components, and describe factors of the equilibrium</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.2.D. 9.	Trace the development of a technological application that has altered an ecosystem (e.g., power generation, fishing, logging, oil and gas exploration, agricultural practices)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.2.A.</b>	<b>Unit A: Applications of Matter and Chemical Change (Science and Technology Emphasis): Investigate and classify chemical reactions</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.2.A. 4.	Investigate, describe and compare the changes to reactants and products in fossil fuel combustion and rusting reactions
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.4.A.</b>	<b>Unit A: Applications of Matter and Chemical Change (Science and Technology Emphasis): Analyze common technological products and processes encountered in everyday life and careers, and analyze their potential effects on the environment</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.A. 2.	Investigate and describe simple chemical processes occurring in everyday life (e.g., acid-base reactions in cleaning and food processing, dyeing of hair, washing of clothes, burning of gasoline in a car engine, swimming pool maintenance, rusting of metal)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.A. 4.	Investigate and describe greenhouse gases and air pollution resulting from combustion reactions (e.g., carbon dioxide and carbon monoxide released when methane is burned in a household furnace, sulfur dioxide and nitrogen dioxide released in car exhaust)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.6.A.</b>	<b>Unit A: Applications of Matter and Chemical Change (Science and Technology Emphasis): Performing and Recording: Conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data</b>

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.6.A. 4.	Select and integrate information from various print and electronic sources or from several parts of the same source (e.g., prepare an inventory of useful chemical substances used in a typical day, and classify them in categories: acids, bases, salts, alloys and polymers)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.1.B.</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Investigate and interpret transformation and conservation of various forms of energy in physical and technological systems</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.1.B.2	Design, construct and evaluate a simple model or device that transforms energy from one form to another (e.g., windmill, water wheel, model vehicle powered by rubber bands/mousetraps/carbon dioxide/electric motor)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.3.B.</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Investigate and describe the energy conversions associated with change in chemical and biological systems</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.3.B.1	Investigate and describe common chemical reactions that produce or absorb energy (e.g., light and heat given off by the combustion of fossil fuels, cold and hot packs)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.3.B. 8.	Compare combustion of a fossil fuel with cellular respiration
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.4.B</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Analyze and describe the impact of fossil fuel based technologies and their importance in meeting human needs</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.B. 1.	Explain the importance of the fossil fuel industry in Alberta in meeting energy requirements
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.B. 2.	Compare present fossil fuel consumption by industry, homes and automobiles with projected consumption in the future
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.B. 3.	Describe the sources of fossil fuels; and describe, in general terms, the extraction and refining processes used to provide people with fossil fuels

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.4.B. 4.	Assess the impact of fossil fuel based technologies on the environment
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.6.B.</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Performing and Recording: Conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.6.B. 2.	Compile and organize data, using appropriate formats and data treatments to facilitate interpretation (e.g., list, in charts and tables, sources of energy in food)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.7.B.</b>	<b>Unit B: Understanding Common Energy Conversion Systems (Science and Technology Emphasis): Analyzing and Interpreting: Analyze qualitative and quantitative data, and develop and assess possible explanations</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.7.B. 4.	Identify and correct practical problems in the way a technological device or system functions (e.g., redesign a model car to increase the distance it travels)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.7.B. 5.	Evaluate a personally designed and constructed device on the basis of criteria they have developed themselves (e.g., assess an energy conversion device or an artificial light technology to promote indoor plant growth)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.7.D.</b>	<b>Unit D: Motion, Change and Transportation Safety (Nature of Science Emphasis): Analyzing and Interpreting: Analyze qualitative and quantitative data, and develop and assess possible explanations</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.7.D. 1.	Describe and apply classification systems and nomenclature used in the sciences (e.g., use terms such as force, speed [velocity], impulse, momentum)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S24.</b>	<b>Science 24</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S24.8.D.</b>	<b>Unit D: Motion, Change and Transportation Safety (Nature of Science Emphasis): Communication and Teamwork: Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results</b>
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S24.8.D. 1.	Communicate questions, ideas and intentions; and receive, interpret, understand, support and respond to the ideas of others (e.g., develop a plan to assess the safety features of new cars)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-A2.</b>	<b>Unit A: Chemical Changes: Students will explain oxidation, reduction and spontaneity and apply this knowledge to voltaic and electrolytic cells and to industrial processes.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-A2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-A2.3sts.</b>	<b>Illustrate how technological problems often require multiple solutions that involve different designs, materials and processes and that have both intended and unintended consequences (ST3) [ICT C6-4.5, F3-4.1]</b>

EXPECTATION S20-A2.3sts.1. Describe the need for industrial processes to make use of efficient designs to provide optimal yields within constraints of cost and requirements for sustainability (production of smaller and longer-lasting batteries, for example, and considerations for their disposal)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-A3.</b>	<b>Unit A: Chemical Changes: Students will describe the properties of simple hydrocarbons and describe hydrocarbon-based industrial processes that are important in Alberta.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-A3.k.</b>	<b>Specific Outcomes for Knowledge</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-A3.5k.</b>	<b>Classify, balance and apply mole ratios to important hydrocarbon reactions:</b>

EXPECTATION S20-A3.5k.1. Combustion of hydrocarbons to produce carbon dioxide, water vapour and energy

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-B2.</b>	<b>Unit B: Changes in Motion: Students will describe and analyze the law of conservation of momentum for one-dimensional collisions and change in momentum (impulse) to explain how force affects motion.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-B2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-B2.1sts.</b>	<b>Explain that the goal of technology is to provide solutions to practical problems (ST1) [ICT F2-4.4]</b>

EXPECTATION S20-B2.1sts.2. Trace the development of safety technologies in sports or transportation over the past 50 years, and compare the functioning of first- and current-generation safety technologies, such as sports safety equipment (helmets, shin guards, gloves) and automobile safety devices (lap belts, shoulder belts, air bags)



<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-C4.</b>	<b>Unit C: The Changing Earth: Students will analyze the evidence of, and assess the explanations for, natural variations in Earth's climate over the last two million years.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-C4.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-C4.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>

EXPECTATION S20-C4.4s.1. Synthesize information from multiple sources when making inferences about global warming and climate change, recording relevant data, acknowledging sources of information and citing sources correctly (CT-SEC2) [ICT C7-4.2, F3-4.2, F3-4.3]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-D1.</b>	<b>Unit D: Changes in Living Systems: Students will analyze ecosystems and ecological succession in the local area and describe the relationships and interactions among subsystems and components.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-D1.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-D1.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>

EXPECTATION S20-D1.4s.3. Prepare a visual display that explains initiatives undertaken by industry to protect the environment (CT-NS2) [ICT P4-4.2]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-D2.</b>	<b>Unit D: Changes in Living Systems: Students will analyze and investigate the cycling of matter and the flow of energy through the biosphere and ecosystems as well as the interrelationship of society and the environment.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-D2.k.</b>	<b>Specific Outcomes for Knowledge</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-D2.2k.</b>	<b>Describe artificial and natural factors that affect the biogeochemical cycles:</b>

EXPECTATION S20-D2.2k.2. Carbon cycle; e.g., emissions of carbon oxides from extraction, distribution and combustion of fossil fuels, releases associated with deforestation and cement industries

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-D2.</b>	<b>Unit D: Changes in Living Systems: Students will analyze and investigate the cycling of matter and the flow of energy through the biosphere and ecosystems as well as the interrelationship of society and the environment.</b>

<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-D2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-D2.1sts.</b>	<b>Explain that science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F2-4.8, F3-4.1]</b>
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<b>EXPECTATION</b>	<b>S20-D2.1sts.1.</b>	Assess whether the efforts to reduce human impact on biogeochemical cycles are viable, taking into consideration a variety of perspectives (considerations for deep-well and deep-ocean injection of wastes, for example, include properties of waste, concentration, uncertainty, environmental concerns, risks and benefits to human health and organisms, costs)
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S20.</b>	<b>Science 20</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S20-D2.</b>	<b>Unit D: Changes in Living Systems: Students will analyze and investigate the cycling of matter and the flow of energy through the biosphere and ecosystems as well as the interrelationship of society and the environment.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S20-D2.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>S20-D2.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>
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<b>EXPECTATION</b>	<b>S20-D2.4s.3.</b>	Work cooperatively in a group to investigate the influence of human activities on the biogeochemical cycles and, using appropriate multimedia, present the findings (CT-SEC1, CT-SEC2) [ICT P3-4.1]
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-B1.</b>	<b>Unit B: Chemistry and the Environment: Students will analyze the sources of acids and bases and their effects on the environment.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-B1.k.</b>	<b>Specific Outcomes for Knowledge</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-B1.8k.</b>	Outline the chemical reactions (e.g., combustion reactions) that produce air pollutants (i.e., sulfur dioxide and nitrous oxides) that, when combined with water, ultimately result in acid deposition
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-B2.</b>	<b>Unit B: Chemistry and the Environment: Students will analyze the sources of organic compounds and their effects on the environment.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-B2.k.</b>	<b>Specific Outcomes for Knowledge</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-B2.4k.</b>	List the sources of, and analyze the hazards posed by, halogenated hydrocarbons and benzene derivatives
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ILLUSTRATIVE EXAMPLE	S30-B2.5k.	Identify and explain how human activities and natural events contribute to the production of photochemical smog, the depletion of the ozone layer and increased concentrations of organic compounds in the environment; e.g., driving a car, use of CFCs, agricultural practices
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-B3.</b>	<b>Unit B: Chemistry and the Environment: Students will analyze, from a variety of perspectives, the risks and benefits of using chemical processes in meeting human needs and assess technologies for reducing the impact of chemical compounds on the environment.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-B3.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE	S30-B3.1k.	Describe the risks and benefits of using chemical processes that may produce products and/or by-products that have the potential to harm the environment
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-B3.</b>	<b>Unit B: Chemistry and the Environment: Students will analyze, from a variety of perspectives, the risks and benefits of using chemical processes in meeting human needs and assess technologies for reducing the impact of chemical compounds on the environment.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-B3.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE	S30-B3.3s.	Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions
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EXPECTATION	S30-B3.3s.3.	Evaluate methods used to reduce the incidence of acid deposition and photochemical smog; e.g., reducing sulfur content in fuels, using catalytic converters in automobiles, smokestack scrubbers (AI-SEC2)
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE	S30-C1.11k.	Compare the general design and function of a DC electric motor and a generator
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>

<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.2sts.</b>	<b>Explain that technological development may involve the creation of prototypes, the testing of prototypes and the application of knowledge from related and interdisciplinary fields (ST2) [ICT C6-4.5, F2-4.8]</b>

EXPECTATION S30-C1.2sts.1. Explain the significance of a simple electric generator or motor in society

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.2s.</b>	<b>Performing and Recording: Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information</b>

EXPECTATION S30-C1.2s.3. Construct a simple electric generator or a DC motor (PR-ST2)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.3s.</b>	<b>Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>

EXPECTATION S30-C1.3s.1. Test and evaluate a self-constructed, simple electric generator or motor in terms of design, ruggedness and ability to perform a specific function (AI-ST1)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-C1.</b>	<b>Unit C: Electromagnetic Energy: Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-C1.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>

EXPECTATION S30-C1.4s.1. Work cooperatively in designing and constructing a simple electric generator or motor and troubleshoot problems as they arise (CT-ST1)

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE    S30-D1.4k.    Explain the need to develop technologies that use renewable and nonrenewable energy sources to meet the increasing global demand

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE    S30-D1.1sts.    Explain that science and technology are developed to meet societal needs and expand human capability (SEC1) [ICT F2-4.4, F2-4.8]

EXPECTATION    S30-D1.1sts.1.    Investigate and assess the need for strategies (e.g., co-generation, waste-energy recovery, electrical load scheduling) and policies to increase energy efficiency as a means of balancing global energy demands with maintaining a viable biosphere

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE    S30-D1.1s.    **Initiating and Planning: Formulate questions about observed relationships and plan investigations of questions, ideas, problems and issues**

EXPECTATION    S30-D1.1s.1.    Identify questions to investigate that arise from science- and technology-related issues; e.g., "Which energy sources and technologies best balance the need for global energy demand with acceptable environmental impacts?" (IP-SEC1) [ICT F2-4.8]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>

<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.2s.</b>	<b>Performing and Recording: Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information</b>
EXPECTATION	S30-D1.2s.1.	Research current information relevant to global oil and gas reserves or sustainable development initiatives (PR-SEC1) [ICT C2-4.1, F2-4.7]
EXPECTATION	S30-D1.2s.2.	Compile and organize findings as part of a briefing for a public hearing on an issue such as the proposed development of an energy source in an ecologically sensitive area (PR-NS4) [ICT C6-4.2, P2-4.1]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.3s.</b>	<b>Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>
EXPECTATION	S30-D1.3s.1.	Analyze data charts, tables and graphs on global energy consumption in the past, in the present and predicted for the future [ICT C7-4.2]
EXPECTATION	S30-D1.3s.2.	Evaluate the bias, reliability and validity of electronically accessed information on alternative and renewable energy sources (AI-SEC1) [ICT C2-4.2, C3-4.1, C3-4.2]
EXPECTATION	S30-D1.3s.4.	Assess policies intended to facilitate efficient use of energy and reliance on renewable energy sources (AI-SEC2)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D1.</b>	<b>Unit D: Energy and the Environment: Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-D1.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>
EXPECTATION	S30-D1.4s.1.	Present a visual display of initiatives taken by industry to protect the environment (CT-SEC2) [ICT C1-4.4, P6-4.1]
EXPECTATION	S30-D1.4s.2.	Develop and present an energy policy, based upon a set of criteria, in relation to a possible energy crisis in Canada (CT-SEC3)
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>

<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE    S30-D2.3k.    Describe the conversion of solar energy into renewable forms (e.g., wind, hydropower, chemical potential energy by photosynthesis) and nonrenewable forms (e.g., coal, oil and gas) and further conversion into electrical and thermal energy

ILLUSTRATIVE EXAMPLE    S30-D2.10k.    Compare and contrast conventional coal, oil-fired or hydroelectric power stations with nuclear power stations, in terms of purpose, process of energy conversions, design and function

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE    S30-D2.1sts.    Explain that decisions regarding the application of scientific and technological development involve a variety of perspectives, including social, cultural, environmental, ethical and economic considerations (SEC4b) [ICT F2-4.2, F3-4.1]

EXPECTATION    S30-D2.1sts.1.    Evaluate the environmental and economic implications of energy transformation technologies; e.g., nuclear, geothermal, fossil fuel, hydroelectric, wind, tidal power or hydrogen-cell power in a risk-benefit analysis

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE    S30-D2.2sts.    Explain that science and technology are developed to meet societal needs and expand human capability (SEC1) [ICT F2-4.4, F2-4.8]

EXPECTATION    S30-D2.2sts.1.    Determine how the allocation of funds for research into the development of new energy conversion devices and sources balances the needs of society with preservation of the environment

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>

<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.2s.</b>	<b>Performing and Recording: Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information</b>
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EXPECTATION	S30-D2.2s.1.	Research, integrate and synthesize information from various print and electronic sources on sustainable development initiatives, such as fuel cells (PR-SEC1) [ICT C1-4.1, C2-4.1, C3-4.1, C3-4.2]
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.S30.</b>	<b>Science 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>S30-D2.</b>	<b>Unit D: Energy and the Environment: Students will describe the sun as Earth's main source of energy and explain the functioning of some conventional and alternative technologies that convert solar, nuclear, tidal and other energy sources into useable forms.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>S30-D2.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>
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EXPECTATION	S30-D2.4s.1.	Use advanced menu features within word processing software to insert tables and energy budgets for a risk-benefit analysis of an energy transformation technology (CT-ST2) [ICT P4-4.3]
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EXPECTATION	S30-D2.4s.2.	Consult a wide variety of sources to evaluate varied perspectives on topics such as cogeneration, fuel efficiency, waste-energy recovery, electrical load scheduling and policies that facilitate energy efficiency and increase reliance on renewable energy sources (CT-SEC1) [ICT C2-4.1, C2-4.2]
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.B20.</b>	<b>Biology 20</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>B20-A2.</b>	<b>Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.sts.</b>	<b>Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.1sts.</b>	<b>Explain that science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F3-4.1]</b>
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EXPECTATION	B20-A2.1sts.1.	Discuss the influence of human activities on the biogeochemical cycling of phosphorus, sulfur, iron and nitrogen: feedlot operations; composting; fertilizer applications; waste and sewage disposal; vehicle and refinery emissions; acid deposition; persistent organic pollutants
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<b>GENERAL OUTCOME / COURSE</b>	<b>AB.B20.</b>	<b>Biology 20</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>B20-A2.</b>	<b>Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.</b>
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<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
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<b>ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.1s.</b>	<b>Initiating and Planning: Formulate questions about observed relationships and plan investigations of questions, ideas, problems and issues</b>
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EXPECTATION	B20-A2.1s.2.	Hypothesize how alterations in the carbon cycle, resulting from the burning of fossil fuels, might affect other cycling phenomena; e.g., sulfur, iron, water (IP-NS3) [ICT C6-4.1]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.B20.</b>	<b>Biology 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>B20-A2.</b>	<b>Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.s.</b>	<b>Specific Outcomes for Skills (Nature of Science Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>B20-A2.4s.</b>	<b>Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results</b>

EXPECTATION	B20-A2.4s.1.	Work cooperatively in a group to investigate the influence of human activities on the biogeochemical cycles and use appropriate multimedia to present the information to a group (CT-SEC1, CT-SEC2, CT-SEC3) [ICT C1-4.2, F2-4.7, P3-4.1]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.B20.</b>	<b>Biology 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>B20-A3.</b>	<b>Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the balance of energy and matter exchange in the biosphere, as an open system, and explain how this maintains equilibrium.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>B20-A3.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE	B20-A3.2k.	Explain how the equilibrium between gas exchanges in photosynthesis and cellular respiration influences atmospheric composition
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C20.</b>	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C20-D1.</b>	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will explain how balanced chemical equations indicate the quantitative relationships between reactants and products involved in chemical changes.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C20-D1.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE	C20-D1.1k.	Predict the product(s) of a chemical reaction based upon the reaction type
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C20.</b>	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C20-D1.</b>	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will explain how balanced chemical equations indicate the quantitative relationships between reactants and products involved in chemical changes.</b>

<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	C20-D1.sts.	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	C20-D1.1sts.	<b>Explain that the products of technology are devices, systems and processes that meet given needs; however, these products cannot solve all problems (ST6) [ICT F2-4.4]</b>

EXPECTATION C20-D1.1sts.1. Analyze the chemical reactions involved in various industrial and commercial processes and products that use stoichiometric and chemical principles: production of urea; fertilizers; fuel combustion; water treatment; air bag deployment; neutralization of excess stomach acid

<b>GENERAL OUTCOME / COURSE</b>	AB.C20.	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	C20-D2.	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will use stoichiometry in quantitative analysis.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	C20-D2.sts.	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	C20-D2.1sts.	<b>Explain that scientific knowledge may lead to the development of new technologies, and new technologies may lead to or facilitate scientific discovery (ST4) [ICT F2-4.4]</b>

EXPECTATION C20-D2.1sts.1. Describe how industries apply principles of stoichiometry to minimize waste and maximize yield

<b>GENERAL OUTCOME / COURSE</b>	AB.C20.	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	C20-D2.	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will use stoichiometry in quantitative analysis.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	C20-D2.sts.	<b>Specific Outcomes for Science, Technology and Society (STS) (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	C20-D2.2sts.	<b>Explain how the appropriateness, risks and benefits of technologies need to be assessed for each potential application from a variety of perspectives, including sustainability (ST7) [ICT F3-4.1]</b>

EXPECTATION C20-D2.2sts.1. Assess the significance of specific by-products from industrial, commercial and household chemical reactions

EXPECTATION C20-D2.2sts.2. Analyze the use of technologies, such as smokestacks and catalytic converters, to reduce emissions that are harmful to the environment, such as SO<sub>2</sub>(g) and greenhouse gases

<b>GENERAL OUTCOME / COURSE</b>	AB.C20.	<b>Chemistry 20</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	C20-D2.	<b>Unit D: Quantitative Relationships in Chemical Changes: Students will use stoichiometry in quantitative analysis.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	C20-D2.s.	<b>Specific Outcomes for Skills (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	C20-D2.2s.	<b>Performing and Recording: Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information</b>

EXPECTATION	C20-D2.2s.3.	Research methods used by industry to reduce emissions (PR-ST1) [ICT F2-4.4]
<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-A1.</b>	<b>Unit A: Thermochemical Changes: Students will determine and interpret energy changes in chemical reactions.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE C30-A1.9k. Identify that liquid water and carbon dioxide gas are reactants in photosynthesis and products of cellular respiration and that gaseous water and carbon dioxide gas are the products of hydrocarbon combustion in an open system

ILLUSTRATIVE EXAMPLE C30-A1.10k. Classify chemical reactions as endothermic or exothermic, including those for the processes of photosynthesis, cellular respiration and hydrocarbon combustion.

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-A1.</b>	<b>Unit A: Thermochemical Changes: Students will determine and interpret energy changes in chemical reactions.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.s.</b>	<b>Specific Outcomes for Skills (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.2s.</b>	<b>Performing and Recording: Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information</b>

EXPECTATION C30-A1.2s.4. Select and integrate information from various print and electronic sources to create multiple-linked documents about the use of alternative fuels (PR-ST1) [ICT C1-4.1, P5-4.1]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-A1.</b>	<b>Unit A: Thermochemical Changes: Students will determine and interpret energy changes in chemical reactions.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.s.</b>	<b>Specific Outcomes for Skills (Science and Technology Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C30-A1.3s.</b>	<b>Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>

EXPECTATION C30-A1.3s.1. Compare energy changes associated with a variety of chemical reactions through the analysis of data and energy diagrams (AI-NS3) [ICT C7-4.2]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
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<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-A2.</b>	<b>Unit A: Thermochemical Changes: Students will explain and communicate energy changes in chemical reactions.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-A2.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE C30-A2.2k. Explain the energy changes that occur during chemical reactions, referring to bonds breaking and forming and changes in potential and kinetic energy

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-C2.</b>	<b>Unit C: Chemical Changes of Organic Compounds: Students will describe chemical reactions of organic compounds.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-C2.k.</b>	<b>Specific Outcomes for Knowledge</b>

ILLUSTRATIVE EXAMPLE C30-C2.1k. Define, illustrate and provide examples of simple addition, substitution, elimination, esterification and combustion reactions

ILLUSTRATIVE EXAMPLE C30-C2.4k. Relate the reactions described above to major reactions that produce thermal energy and economically important compounds from fossil fuels.

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-C2.</b>	<b>Unit C: Chemical Changes of Organic Compounds: Students will describe chemical reactions of organic compounds.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-C2.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>

ILLUSTRATIVE EXAMPLE C30-C2.2s. Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information

EXPECTATION C30-C2.2s.2. Use library and electronic research tools to collect information on: bitumen upgrading; the octane/cetane ratings of fuels and how they are determined; the costs and benefits of supporting the petrochemical industry (PR-SEC1, PR-SEC2) [ICT C1-4.1]

<b>GENERAL OUTCOME / COURSE</b>	<b>AB.C30.</b>	<b>Chemistry 30</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME</b>	<b>C30-C2.</b>	<b>Unit C: Chemical Changes of Organic Compounds: Students will describe chemical reactions of organic compounds.</b>
<b>SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE</b>	<b>C30-C2.s.</b>	<b>Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)</b>
<b>ILLUSTRATIVE EXAMPLE</b>	<b>C30-C2.3s.</b>	<b>Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions</b>

EXPECTATION	C30-C2.3s.2.	Investigate the issue of greenhouse gases; identify some greenhouse gases, including methane, carbon dioxide, water and dinitrogen oxide (nitrous oxide); and analyze their contribution to climate change (AI-SEC1, AI-SEC2) [ICT F3-4.1]
GENERAL OUTCOME / COURSE	AB.P30.	Physics 30
GENERAL OUTCOME / SPECIFIC OUTCOME	P30-B3.	Unit B: Forces and Fields: Students will explain how the properties of electric and magnetic fields are applied in numerous devices.
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	P30-B3.sts.	Specific Outcomes for Science, Technology and Society (STS) (Nature of Science Emphasis)
ILLUSTRATIVE EXAMPLE	P30-B3.2sts.	Explain that the goal of technology is to provide solutions to practical problems and that the appropriateness, risks and benefits of technologies need to be assessed for each potential application from a variety of perspectives, including sustainability (ST1, ST7) [ICT F2-4.2, F3-4.1]

EXPECTATION	P30-B3.2sts.1.	Evaluate an electromagnetic technology, such as magnetic resonance imaging (MRI), positron emission tomography (PET), transformers, alternating current (AC) and direct current (DC) motors, AC and DC generators, speakers, telephones
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British Columbia Curriculum  
Mathematics  
Grade 11 - Adopted: 2018

CURRICULUM ORGANIZER / COURSE	BC.MA.C S11.	MATHEMATICS – Computer Science
PRESCRIBED LEARNING OUTCOME / ORGANIZER	CS11.C C.	Curricular Competencies
EXPECTATION / SUB ORGANIZER		Students are expected to do the following:
PRESCRIBED LEARNING OUTCOME	CS11.C C.1.	Reasoning and modelling

OUTCOME	CS11.CC .1.3.	Model with mathematics in situational contexts
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OUTCOME	CS11.CC .1.4.	Think creatively and with curiosity and wonder when exploring problems
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CURRICULUM ORGANIZER / COURSE	BC.MA.C S11.	MATHEMATICS – Computer Science
PRESCRIBED LEARNING OUTCOME / ORGANIZER	CS11.C C.	Curricular Competencies
EXPECTATION / SUB ORGANIZER		Students are expected to do the following:
PRESCRIBED LEARNING OUTCOME	CS11.C C.2.	Understanding and solving

OUTCOME	CS11.CC .23.	Apply flexible and strategic approaches to solve problems
OUTCOME	CS11.CC .24.	Solve problems with persistence and a positive disposition
OUTCOME	CS11.CC .25.	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.C S11.</b>	<b>MATHEMATICS – Computer Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>CS11.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>CS11.C C.3.</b>	<b>Communicating and representing</b>

OUTCOME	CS11.CC .31.	Explain and justify mathematical ideas and decisions in many ways
OUTCOME	CS11.CC .34.	Take risks when offering ideas in classroom discourse

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.C S11.</b>	<b>MATHEMATICS – Computer Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>CS11.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>CS11.C C.4.</b>	<b>Connecting and reflecting</b>

OUTCOME	CS11.CC .41.	Reflect on mathematical and computational thinking
OUTCOME	CS11.CC .43.	Use mistakes as opportunities to advance learning

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.F M11.</b>	<b>MATHEMATICS – Foundations of Mathematics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>FM11.BI .</b>	<b>Big Ideas</b>

EXPECTATION / SUB ORGANIZER FM11.BI.3. Logical reasoning helps us discover and describe mathematical truths.

<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.F M11.	<b>MATHEMATICS – Foundations of Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	FM11.C C.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	FM11.C C.1.	<b>Reasoning and modelling</b>
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OUTCOME FM11.CC .1.1. Develop thinking strategies to solve puzzles and play games

OUTCOME FM11.CC .1.2. Explore, analyze, and apply mathematical ideas using reason, technology, and other tools

OUTCOME FM11.CC .1.4. Model with mathematics in situational contexts

OUTCOME FM11.CC .1.5. Think creatively and with curiosity and wonder when exploring problems

<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.F M11.	<b>MATHEMATICS – Foundations of Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	FM11.C C.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	FM11.C C.2.	<b>Understanding and solving</b>
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OUTCOME FM11.CC .2.1. Develop, demonstrate, and apply mathematical understanding through play, story, inquiry, and problem solving

OUTCOME FM11.CC .2.2. Visualize to explore and illustrate mathematical concepts and relationships

OUTCOME FM11.CC .2.3. Apply flexible and strategic approaches to solve problems

OUTCOME FM11.CC .2.4. Solve problems with persistence and a positive disposition

OUTCOME	FM11.CC .25.	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures
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<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.F M11.	<b>MATHEMATICS – Foundations of Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	FM11.C C.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	FM11.C C.3.	<b>Communicating and representing</b>
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OUTCOME	FM11.CC .31.	Explain and justify mathematical ideas and decisions in many ways
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OUTCOME	FM11.CC .32.	Represent mathematical ideas in concrete, pictorial, and symbolic forms
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OUTCOME	FM11.CC .34.	Take risks when offering ideas in classroom discourse
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<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.F M11.	<b>MATHEMATICS – Foundations of Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	FM11.C C.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	FM11.C C.4.	<b>Connecting and reflecting</b>
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OUTCOME	FM11.CC .41.	Reflect on mathematical thinking
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OUTCOME	FM11.CC .43.	Use mistakes as opportunities to advance learning
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<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.F M11.	<b>MATHEMATICS – Foundations of Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	FM11.C.	<b>Content</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>
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PRESCRIBED LEARNING OUTCOME FM11.C.1 Forms of mathematical reasoning

<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.H M11.	<b>MATHEMATICS – History of Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	HM11.C C.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	HM11.C C.1.	<b>Reasoning and modelling</b>
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OUTCOME HM11.CC .1.1. Develop thinking strategies to solve historical puzzles and play games

OUTCOME HM11.CC .1.3. Think creatively and with curiosity and wonder when exploring problems

<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.H M11.	<b>MATHEMATICS – History of Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	HM11.C C.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	HM11.C C.2.	<b>Understanding and solving</b>
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OUTCOME HM11.CC .2.2. Develop, demonstrate, and apply conceptual understanding of mathematical ideas through play, story, inquiry, and problem solving

OUTCOME HM11.CC .2.3. Visualize to explore and illustrate mathematical concepts and relationships

OUTCOME HM11.CC .2.4. Apply flexible and strategic approaches to solve problems

OUTCOME HM11.CC .2.5. Solve problems with persistence and a positive disposition

<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.H M11.	<b>MATHEMATICS – History of Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	HM11.C C.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>HM11.C C.3.</b>	<b>Communicating and representing</b>
OUTCOME	HM11.CC .3.1.	Explain and justify mathematical ideas and decisions in many ways
OUTCOME	HM11.CC .3.4.	Take risks when offering ideas in classroom discourse
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.H M11.</b>	<b>MATHEMATICS – History of Mathematics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>HM11.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>HM11.C C.4.</b>	<b>Connecting and reflecting</b>
OUTCOME	HM11.CC .4.1.	Reflect on mathematical thinking
OUTCOME	HM11.CC .4.4.	Use mistakes as opportunities to advance learning
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.P1 1.</b>	<b>MATHEMATICS – Pre-calculus</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P11.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P11.CC. 1.</b>	<b>Reasoning and modelling</b>
OUTCOME	P11.CC.1 .1.	Develop thinking strategies to solve puzzles and play games
OUTCOME	P11.CC.1 .2.	Explore, analyze, and apply mathematical ideas using reason, technology, and other tools
OUTCOME	P11.CC.1 .4.	Model with mathematics in situational contexts
OUTCOME	P11.CC.1 .5.	Think creatively and with curiosity and wonder when exploring problems

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.P1 1.</b>	<b>MATHEMATICS – Pre-calculus</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P11.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>

<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P11.CC. 2.</b>	<b>Understanding and solving</b>
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OUTCOME	P11.CC.2 .1.	Develop, demonstrate, and apply conceptual understanding of mathematical ideas through play, story, inquiry, and problem solving
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OUTCOME	P11.CC.2 .2.	Visualize to explore and illustrate mathematical concepts and relationships
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OUTCOME	P11.CC.2 .3.	Apply flexible and strategic approaches to solve problems
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OUTCOME	P11.CC.2 .4.	Solve problems with persistence and a positive disposition
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OUTCOME	P11.CC.2 .5.	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.P1 1.</b>	<b>MATHEMATICS – Pre-calculus</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P11.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>

<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P11.CC. 3.</b>	<b>Communicating and representing</b>
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OUTCOME	P11.CC.3 .1.	Explain and justify mathematical ideas and decisions in many ways
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OUTCOME	P11.CC.3 .2.	Represent mathematical ideas in concrete, pictorial, and symbolic forms
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OUTCOME	P11.CC.3 .4.	Take risks when offering ideas in classroom discourse
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.P11.1.</b>	<b>MATHEMATICS – Pre-calculus</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P11.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P11.CC.4.</b>	<b>Connecting and reflecting</b>

OUTCOME P11.CC.4 .1. Reflect on mathematical thinking

OUTCOME P11.CC.4 .3. Use mistakes as opportunities to advance learning

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.W M11.</b>	<b>MATHEMATICS – Workplace Mathematics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>WM11.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>WM11.C C.1.</b>	<b>Reasoning and modelling</b>

OUTCOME WM11.C C.1.1. Develop thinking strategies to solve puzzles and play games

OUTCOME WM11.C C.1.2. Explore, analyze, and apply mathematical ideas using reason, technology, and other tools

OUTCOME WM11.C C.1.4. Model with mathematics in situational contexts

OUTCOME WM11.C C.1.5. Think creatively and with curiosity and wonder when exploring problems

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.W M11.</b>	<b>MATHEMATICS – Workplace Mathematics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>WM11.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>WM11.C C.2.</b>	<b>Understanding and solving</b>

OUTCOME	WM11.C C.2.1.	Develop, demonstrate, and apply mathematical understanding through play, story, inquiry, and problem solving
OUTCOME	WM11.C C.2.2.	Visualize to explore and illustrate mathematical concepts and relationships
OUTCOME	WM11.C C.2.3.	Apply flexible and strategic approaches to solve problems
OUTCOME	WM11.C C.2.4.	Solve problems with persistence and a positive disposition
OUTCOME	WM11.C C.2.5.	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.W M11.</b>	<b>MATHEMATICS – Workplace Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>WM11.C C.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>WM11.C C.3.</b>	<b>Communicating and representing</b>
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OUTCOME	WM11.C C.3.1.	Explain and justify mathematical ideas and decisions in many ways
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OUTCOME	WM11.C C.3.2.	Represent mathematical ideas in concrete, pictorial, and symbolic forms
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OUTCOME	WM11.C C.3.4.	Take risks when offering ideas in classroom discourse
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.W M11.</b>	<b>MATHEMATICS – Workplace Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>WM11.C C.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>WM11.C C.4.</b>	<b>Connecting and reflecting</b>
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OUTCOME	WM11.C C.4.1.	Reflect on mathematical thinking
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OUTCOME WM11.C Use mistakes as opportunities to advance learning  
C.4.3.

**British Columbia Curriculum  
Mathematics  
Grade 12 - Adopted: 2018**

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.A M12.</b>	<b>MATHEMATICS – Apprenticeship Mathematics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>AM12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>AM12.C C.1.</b>	<b>Reasoning and modelling</b>

OUTCOME AM12.CC Develop thinking strategies to solve puzzles and play games  
.1.1.

OUTCOME AM12.CC Explore, analyze, and apply mathematical ideas using reason, technology, and other tools  
.1.2.

OUTCOME AM12.CC Model with mathematics in situational contexts  
.1.4.

OUTCOME AM12.CC Think creatively and with curiosity and wonder when exploring problems  
.1.5.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.A M12.</b>	<b>MATHEMATICS – Apprenticeship Mathematics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>AM12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>AM12.C C.2.</b>	<b>Understanding and solving</b>

OUTCOME AM12.CC Develop, demonstrate, and apply conceptual understanding of mathematical ideas through play, story, inquiry, and  
.2.1. problem solving

OUTCOME AM12.CC Visualize to explore and illustrate mathematical concepts and relationships  
.2.2.

OUTCOME AM12.CC Apply flexible and strategic approaches to solve problems  
.2.3.

OUTCOME	AM12.CC .2.4.	Solve problems with persistence and a positive disposition
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OUTCOME	AM12.CC .2.5.	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.A M12.</b>	<b>MATHEMATICS – Apprenticeship Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>AM12.C C.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>AM12.C C.3.</b>	<b>Communicating and representing</b>
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OUTCOME	AM12.CC .3.1.	Explain and justify mathematical ideas and decisions in many ways
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OUTCOME	AM12.CC .3.2.	Represent mathematical ideas in concrete, pictorial, and symbolic forms
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OUTCOME	AM12.CC .3.4.	Take risks when offering ideas in classroom discourse
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.A M12.</b>	<b>MATHEMATICS – Apprenticeship Mathematics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>AM12.C C.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>AM12.C C.4.</b>	<b>Connecting and reflecting</b>
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OUTCOME	AM12.CC .4.1.	Reflect on mathematical thinking
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OUTCOME	AM12.CC .4.3.	Use mistakes as opportunities to advance learning
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.C1 2.</b>	<b>MATHEMATICS – Calculus</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>C12.CC.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>C12.CC.1.</b>	<b>Reasoning and modelling</b>
OUTCOME	C12.CC.1	Develop thinking strategies to solve puzzles and play games .1.
OUTCOME	C12.CC.1	Explore, analyze, and apply mathematical ideas using reason, technology, and other tools .2.
OUTCOME	C12.CC.1	Model with mathematics in situational contexts .4.
OUTCOME	C12.CC.1	Think creatively and with curiosity and wonder when exploring problems .5.
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.C12.</b>	<b>MATHEMATICS – Calculus</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>C12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>C12.CC.2.</b>	<b>Understanding and solving</b>
OUTCOME	C12.CC.2	Develop, demonstrate, and apply conceptual understanding of mathematical ideas through experimentation, inquiry, and problem solving .1.
OUTCOME	C12.CC.2	Visualize to explore and illustrate mathematical concepts and relationships .2.
OUTCOME	C12.CC.2	Apply flexible and strategic approaches to solve problems .3.
OUTCOME	C12.CC.2	Solve problems with persistence and a positive disposition .4.
OUTCOME	C12.CC.2	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures .5.
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.C12.</b>	<b>MATHEMATICS – Calculus</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>C12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>



<b>PRESCRIBED LEARNING OUTCOME</b>	<b>C12.CC.3.</b>	<b>Communicating and representing</b>
OUTCOME	C12.CC.3	Explain and justify mathematical ideas and decisions in many ways .1.
OUTCOME	C12.CC.3	Represent mathematical ideas in concrete, pictorial, and symbolic forms .2.
OUTCOME	C12.CC.3	Take risks when offering ideas in classroom discourse .4.
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.C12.</b>	<b>MATHEMATICS – Calculus</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>C12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>C12.CC.4.</b>	<b>Connecting and reflecting</b>
OUTCOME	C12.CC.4	Reflect on mathematical thinking .1.
OUTCOME	C12.CC.4	Use mistakes as opportunities to advance learning .3.
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.CS12.</b>	<b>MATHEMATICS – Computer Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>CS12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>CS12.CC.1.</b>	<b>Reasoning and modelling</b>
OUTCOME	CS12.CC	Model with mathematics in situational contexts .1.3.
OUTCOME	CS12.CC	Think creatively and with curiosity and wonder when exploring problems .1.4.
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.CS12.</b>	<b>MATHEMATICS – Computer Science</b>

<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>CS12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>CS12.C C.2.</b>	<b>Understanding and solving</b>
OUTCOME	CS12.CC .2.3.	Apply flexible and strategic approaches to solve problems
OUTCOME	CS12.CC .2.4.	Solve problems with persistence and a positive disposition
OUTCOME	CS12.CC .2.5.	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.C S12.</b>	<b>MATHEMATICS – Computer Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>CS12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>CS12.C C.3.</b>	<b>Communicating and representing</b>
OUTCOME	CS12.CC .3.4.	Take risks when offering ideas in classroom discourse
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.C S12.</b>	<b>MATHEMATICS – Computer Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>CS12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>CS12.C C.4.</b>	<b>Connecting and reflecting</b>
OUTCOME	CS12.CC .4.1.	Reflect on mathematical and computational thinking
OUTCOME	CS12.CC .4.3.	Use mistakes as opportunities to advance learning
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.F M12.</b>	<b>MATHEMATICS – Foundations of Mathematics</b>

<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>FM12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>FM12.C C.1.</b>	<b>Reasoning and modelling</b>
OUTCOME	FM12.CC .1.1.	Develop thinking strategies to solve puzzles and play games
OUTCOME	FM12.CC .1.2.	Explore, analyze, and apply mathematical ideas using reason, technology, and other tools
OUTCOME	FM12.CC .1.4.	Model with mathematics in situational contexts
OUTCOME	FM12.CC .1.5.	Think creatively and with curiosity and wonder when exploring problems
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.F M12.</b>	<b>MATHEMATICS – Foundations of Mathematics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>FM12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>FM12.C C.2.</b>	<b>Understanding and solving</b>
OUTCOME	FM12.CC .2.1.	Develop, demonstrate, and apply conceptual understanding of mathematical ideas through play, story, inquiry, and problem solving
OUTCOME	FM12.CC .2.2.	Visualize to explore and illustrate mathematical concepts and relationships
OUTCOME	FM12.CC .2.3.	Apply flexible and strategic approaches to solve problems
OUTCOME	FM12.CC .2.4.	Solve problems with persistence and a positive disposition
OUTCOME	FM12.CC .2.5.	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.F M12.</b>	<b>MATHEMATICS – Foundations of Mathematics</b>

<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>FM12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>FM12.C C.3.</b>	<b>Communicating and representing</b>
OUTCOME	FM12.CC .3.1.	Explain and justify mathematical ideas and decisions in many ways
OUTCOME	FM12.CC .3.2.	Represent mathematical ideas in concrete, pictorial, and symbolic forms
OUTCOME	FM12.CC .3.4.	Take risks when offering ideas in classroom discourse
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.F M12.</b>	<b>MATHEMATICS – Foundations of Mathematics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>FM12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>FM12.C C.4.</b>	<b>Connecting and reflecting</b>
OUTCOME	FM12.CC .4.1.	Reflect on mathematical thinking
OUTCOME	FM12.CC .4.3.	Use mistakes as opportunities to advance learning
<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.G 12.</b>	<b>MATHEMATICS – Geometry</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>G12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>G12.CC. 1.</b>	<b>Reasoning and modelling</b>
OUTCOME	G12.CC.1 .1.	Develop thinking strategies to solve puzzles and play games
OUTCOME	G12.CC.1 .3.	Explore, analyze, and apply mathematical ideas using reason, technology, and other tools

OUTCOME	G12.CC.1	Model with mathematics in situational contexts .5.
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OUTCOME	G12.CC.1	Think creatively and with curiosity and wonder when exploring problems .6.
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.G 12.</b>	<b>MATHEMATICS – Geometry</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>G12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>G12.CC. 2.</b>	<b>Understanding and solving</b>

OUTCOME	G12.CC.2	Develop, demonstrate, and apply conceptual understanding of mathematical ideas through play, story, inquiry, and problem solving .1.
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OUTCOME	G12.CC.2	Visualize to explore and illustrate geometric concepts and relationships .2.
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OUTCOME	G12.CC.2	Apply flexible and strategic approaches to solve problems .3.
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OUTCOME	G12.CC.2	Solve problems with persistence and a positive disposition .4.
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OUTCOME	G12.CC.2	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures .5.
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.G 12.</b>	<b>MATHEMATICS – Geometry</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>G12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>G12.CC. 3.</b>	<b>Communicating and representing</b>

OUTCOME	G12.CC.3	Represent mathematical ideas in concrete, pictorial, and symbolic forms .2.
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OUTCOME	G12.CC.3	Take risks when offering ideas in classroom discourse .4.
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.G 12.</b>	<b>MATHEMATICS – Geometry</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>G12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>G12.CC. 4.</b>	<b>Connecting and reflecting</b>

OUTCOME G12.CC.4 Reflect on geometric thinking  
.1.

OUTCOME G12.CC.4 Use mistakes as opportunities to advance learning  
.3.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.P1 2.</b>	<b>MATHEMATICS – Pre-calculus</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P12.CC. 1.</b>	<b>Reasoning and modelling</b>

OUTCOME P12.CC.1 Develop thinking strategies to solve puzzles and play games  
.1.

OUTCOME P12.CC.1 Explore, analyze, and apply mathematical ideas using reason, technology, and other tools  
.2.

OUTCOME P12.CC.1 Model with mathematics in situational contexts  
.4.

OUTCOME P12.CC.1 Think creatively and with curiosity and wonder when exploring problems  
.5.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.P1 2.</b>	<b>MATHEMATICS – Pre-calculus</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P12.CC. 2.</b>	<b>Understanding and solving</b>

OUTCOME	P12.CC.2 .1.	Develop, demonstrate, and apply conceptual understanding of mathematical ideas through play, story, inquiry, and problem solving
OUTCOME	P12.CC.2 .2.	Visualize to explore and illustrate mathematical concepts and relationships
OUTCOME	P12.CC.2 .3.	Apply flexible and strategic approaches to solve problems
OUTCOME	P12.CC.2 .4.	Solve problems with persistence and a positive disposition
OUTCOME	P12.CC.2 .5.	Engage in problem-solving experiences connected with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.P12.</b>	<b>MATHEMATICS – Pre-calculus</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P12.CC.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P12.CC.3.</b>	<b>Communicating and representing</b>
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OUTCOME	P12.CC.3 .1.	Explain and justify mathematical ideas and decisions in many ways
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OUTCOME	P12.CC.3 .2.	Represent mathematical ideas in concrete, pictorial, and symbolic forms
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OUTCOME	P12.CC.3 .4.	Take risks when offering ideas in classroom discourse
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.MA.P12.</b>	<b>MATHEMATICS – Pre-calculus</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P12.CC.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P12.CC.4.</b>	<b>Connecting and reflecting</b>
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OUTCOME	P12.CC.4 .1.	Reflect on mathematical thinking
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OUTCOME	P12.CC.4 .3.	Use mistakes as opportunities to advance learning
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<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.S1 2.	<b>MATHEMATICS – Statistics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	S12.CC.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	S12.CC. 1.	<b>Reasoning and modelling</b>
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OUTCOME	S12.CC.1 .1.	Develop thinking strategies to solve puzzles and play games
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OUTCOME	S12.CC.1 .2.	Explore, analyze, and apply mathematical ideas using reason, technology, and other tools
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OUTCOME	S12.CC.1 .4.	Model with mathematics in situational contexts
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OUTCOME	S12.CC.1 .5.	Think creatively and with curiosity and wonder when exploring problems
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<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.S1 2.	<b>MATHEMATICS – Statistics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	S12.CC.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	S12.CC. 3.	<b>Communicating and representing</b>
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OUTCOME	S12.CC.3 .4.	Take risks when offering ideas in classroom discourse
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<b>CURRICULUM ORGANIZER / COURSE</b>	BC.MA.S1 2.	<b>MATHEMATICS – Statistics</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	S12.CC.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>S12.CC.4.</b>	<b>Connecting and reflecting</b>
OUTCOME	S12.CC.4.1.	Reflect on statistical thinking
OUTCOME	S12.CC.4.3.	Use mistakes as opportunities to advance learning

**British Columbia Curriculum  
Science  
Grade 11 - Adopted: 2018**

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.C11.</b>	<b>SCIENCE – Chemistry</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>C11.BI.</b>	<b>Big Ideas</b>
EXPECTATION / SUB ORGANIZER	C11.BI.2.	Organic chemistry and its applications have significant implications for human health, society, and the environment.
EXPECTATION / SUB ORGANIZER	C11.BI.4.	Matter and energy are conserved in chemical reactions.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.C11.</b>	<b>SCIENCE – Chemistry</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>C11.C.</b>	<b>Content</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>

PRESCRIBED LEARNING OUTCOME	C11.C.6.	Applications of organic chemistry
PRESCRIBED LEARNING OUTCOME	C11.C.9.	Reactions
PRESCRIBED LEARNING OUTCOME	C11.C.12.	Green chemistry

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.E S11.</b>	<b>SCIENCE – Earth Sciences</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>ES11.BI.</b>	<b>Big Ideas</b>

EXPECTATION / SUB ORGANIZER ES11.BI.1 Earth materials are changed as they cycle through the geosphere and are used as resources, with economic and environmental implications.

<b>CURRICULUM ORGANIZER / COURSE</b>	BC.SC.ES11.	<b>SCIENCE – Earth Sciences</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	ES11.CC.	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	ES11.CC.5.	<b>Applying and innovating</b>
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OUTCOME ES11.CC.5.1. Contribute to care for self, others, community, and world through individual or collaborative approaches

<b>CURRICULUM ORGANIZER / COURSE</b>	BC.SC.ES11.	<b>SCIENCE – Earth Sciences</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	ES11.C.	<b>Content</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	ES11.C.1.	<b>Properties of earth materials:</b>
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OUTCOME ES11.C.1.5. Geologic resources

<b>CURRICULUM ORGANIZER / COURSE</b>	BC.SC.ES11.	<b>SCIENCE – Earth Sciences</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	ES11.C.	<b>Content</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>
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PRESCRIBED LEARNING OUTCOME ES11.C.3. Economic and environmental implications of geologic resources within B.C. and globally

PRESCRIBED LEARNING OUTCOME ES11.C.8. Changes in the composition of the atmosphere due to natural and human causes

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.EN11.</b>	<b>SCIENCE – Environmental Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>EN11.BI</b>	<b>Big Ideas</b>

EXPECTATION / SUB ORGANIZER EN11.BI.3 Human practices affect the sustainability of ecosystems.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.EN11.</b>	<b>SCIENCE – Environmental Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>EN11.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>EN11.C C.5.</b>	<b>Applying and innovating</b>

OUTCOME EN11.CC.5.1. Contribute to care for self, others, community, and world through individual or collaborative approaches

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.EN11.</b>	<b>SCIENCE – Environmental Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>EN11.C.</b>	<b>Content</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>

PRESCRIBED LEARNING OUTCOME EN11.C.9. Human actions and their impact on ecosystem integrity

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.P11.</b>	<b>SCIENCE – Physics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P11.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P11.CC.5.</b>	<b>Applying and innovating</b>

OUTCOME P11.CC.5.2. Co-operatively design projects with local and/or global connections and applications

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.P11.1.</b>	<b>SCIENCE – Physics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P11.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P11.CC.6.</b>	<b>Communicating</b>
OUTCOME	P11.CC.6.2.	Communicate scientific ideas and information, and perhaps a suggested course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations
OUTCOME	P11.CC.6.3.	Express and reflect on a variety of experiences, perspectives, and worldviews through place

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SFC11.</b>	<b>SCIENCE – Science for Citizens</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SFC11.BI.</b>	<b>Big Ideas</b>
EXPECTATION / SUB ORGANIZER	SFC11.BI.2.	Scientific knowledge can be used to develop procedures, techniques, and technologies that have implications for places of employment.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SFC11.</b>	<b>SCIENCE – Science for Citizens</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SFC11.C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SFC11.C.2.</b>	<b>Planning and conducting</b>
OUTCOME	SFC11.C.2.3.	Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SFC11.</b>	<b>SCIENCE – Science for Citizens</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SFC11.C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>

<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SFC11.C C.3.</b>	<b>Processing and analyzing data and information</b>
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OUTCOME SFC11.C Analyze cause-and-effect relationships C.3.6.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SF C11.</b>	<b>SCIENCE – Science for Citizens</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SFC11.C C.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SFC11.C C.4.</b>	<b>Evaluating</b>
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OUTCOME SFC11.C Critically analyze the validity of information in primary and secondary sources and evaluate the approaches used to solve problems C.4.9.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SF C11.</b>	<b>SCIENCE – Science for Citizens</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SFC11.C C.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SFC11.C C.5.</b>	<b>Applying and innovating</b>
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OUTCOME SFC11.C Contribute to care for self, others, community, and world through individual or collaborative approaches C.5.1.

OUTCOME SFC11.C Co-operatively design projects with local and/or global connections and applications C.5.2.

OUTCOME SFC11.C Implement multiple strategies to solve problems in real-life, applied, and conceptual situations C.5.4.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SF C11.</b>	<b>SCIENCE – Science for Citizens</b>
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<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SFC11.C C.</b>	<b>Curricular Competencies</b>
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<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
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<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SFC11.C C.6.</b>	<b>Communicating</b>
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OUTCOME	SFC11.C C.6.2.	Communicate scientific ideas and information, and perhaps a suggested course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations
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OUTCOME	SFC11.C C.6.3.	Express and reflect on a variety of experiences, perspectives, and worldviews through place
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SF C11.</b>	<b>SCIENCE – Science for Citizens</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SFC11.C</b>	<b>Content</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>

PRESCRIBED LEARNING OUTCOME	SFC11.C. 3.	Impact of technologies
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SF C11.</b>	<b>SCIENCE – Science for Citizens</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SFC11.C</b>	<b>Content</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>

<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SFC11.C .12.</b>	<b>Human impact on Earth's systems:</b>
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OUTCOME	SFC11.C. 12.1.	Natural resources
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OUTCOME	SFC11.C. 12.2.	Effects of climate change
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SF C11.</b>	<b>SCIENCE – Science for Citizens</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SFC11.C</b>	<b>Content</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>

PRESCRIBED LEARNING OUTCOME	SFC11.C. 13.	Actions and decisions affecting the local and global environment, including those of First Peoples
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<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.C12.</b>	<b>SCIENCE – Chemistry</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>C12.C.</b>	<b>Content</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>

PRESCRIBED LEARNING OUTCOME C12.C.3. Energy change during a chemical reaction

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.EN12.</b>	<b>SCIENCE – Environmental Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>EN12.BI</b>	<b>Big Ideas</b>

EXPECTATION / SUB ORGANIZER EN12.BI.2 Human activities cause changes in the global climate system.

EXPECTATION / SUB ORGANIZER EN12.BI.4. Living sustainably supports the well-being of self, community, and Earth.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.EN12.</b>	<b>SCIENCE – Environmental Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>EN12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>EN12.C C.5.</b>	<b>Applying and innovating</b>

OUTCOME EN12.CC.5.1. Contribute to care for self, others, community, and world through individual or collaborative approaches

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.EN12.</b>	<b>SCIENCE – Environmental Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>EN12.C.</b>	<b>Content</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>

PRESCRIBED LEARNING OUTCOME	EN12.C.4. Changes to climate systems
PRESCRIBED LEARNING OUTCOME	EN12.C.5. Impacts of global warming
PRESCRIBED LEARNING OUTCOME	EN12.C.6. Mitigation and adaptations

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.G12.</b>	<b>SCIENCE – Geology</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>G12.BI.</b>	<b>Big Ideas</b>

EXPECTATION / SUB ORGANIZER G12.BI.1. Minerals, rocks, and earth materials form in response to conditions within and on the Earth's surface and are the foundation of many resource-based industries.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.G12.</b>	<b>SCIENCE – Geology</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>G12.C.</b>	<b>Content</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to know the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>G12.C.3.</b>	<b>B.C. resource deposits and others:</b>

OUTCOME G12.C.3.1 Origin and formation

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.P12.</b>	<b>SCIENCE – Physics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P12.CC.5.</b>	<b>Applying and innovating</b>

OUTCOME P12.CC.5.2. Co-operatively design projects with local and/or global connections and applications



<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.P12.</b>	<b>SCIENCE – Physics</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>P12.CC.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>P12.CC.6.</b>	<b>Communicating</b>

OUTCOME P12.CC.6.2. Communicate scientific ideas and information, and perhaps a suggested course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations

OUTCOME P12.CC.6.3. Express and reflect on a variety of experiences, perspectives, and worldviews through place

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.S SC12.</b>	<b>SCIENCE – Specialized Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SSC12.BI.</b>	<b>Big Ideas</b>

EXPECTATION / SUB ORGANIZER SSC12.B I.2. Climate change impacts biodiversity and ecosystem health. (adapted from Environmental Science 12)

EXPECTATION / SUB ORGANIZER SSC12.B I.5. Chemical reactions are due to energy changes that result from the breaking and re-formation of bonds. (adapted from Chemistry 11)

EXPECTATION / SUB ORGANIZER SSC12.B I.9. Geologic materials can change as they cycle through the geosphere and can be used as resources. (adapted from Earth Sciences 11)

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SS C12.</b>	<b>SCIENCE – Specialized Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SSC12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SSC12.C C.2.</b>	<b>Planning and conducting</b>

OUTCOME SSC12.C C.2.3. Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SS C12.</b>	<b>SCIENCE – Specialized Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SSC12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SSC12.C C.3.</b>	<b>Processing and analyzing data and information</b>

OUTCOME      SSC12.C    Analyze cause-and-effect relationships  
C.3.6.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SS C12.</b>	<b>SCIENCE – Specialized Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SSC12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SSC12.C C.4.</b>	<b>Evaluating</b>

OUTCOME      SSC12.C    Critically analyze the validity of information in primary and secondary sources and evaluate the approaches used to solve problems  
C.4.9.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SS C12.</b>	<b>SCIENCE – Specialized Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SSC12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SSC12.C C.5.</b>	<b>Applying and innovating</b>

OUTCOME      SSC12.C    Contribute to care for self, others, community, and world through individual or collaborative approaches  
C.5.1.

OUTCOME      SSC12.C    Co-operatively design projects with local and/or global connections and applications  
C.5.2.

OUTCOME      SSC12.C    Implement multiple strategies to solve problems in real-life, applied, and conceptual situations  
C.5.4.

<b>CURRICULUM ORGANIZER / COURSE</b>	<b>BC.SC.SS C12.</b>	<b>SCIENCE – Specialized Science</b>
<b>PRESCRIBED LEARNING OUTCOME / ORGANIZER</b>	<b>SSC12.C C.</b>	<b>Curricular Competencies</b>
<b>EXPECTATION / SUB ORGANIZER</b>		<b>Students are expected to be able to do the following:</b>
<b>PRESCRIBED LEARNING OUTCOME</b>	<b>SSC12.C C.6.</b>	<b>Communicating</b>

OUTCOME SSC12.C C.6.2. Communicate scientific ideas and information, and perhaps a suggested course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations

OUTCOME SSC12.C C.6.3. Express and reflect on a variety of experiences, perspectives, and worldviews through place

**Manitoba Curriculum Frameworks  
Mathematics  
Grade 11 - Adopted: 2014**

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.30S-E.11.</b>	<b>Grade 11 Essential Mathematics (30S)</b>
<b>STRAND / SPECIFIC OUTCOME</b>	<b>11E4.R.</b>	<b>Relations and Patterns (Half Course IV): Develop proportional reasoning.</b>

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL 11E4.R.5. Demonstrate an understanding of linear relations by recognizing patterns and trends; graphing; creating tables of values; writing equations; interpolating and extrapolating; solving problems [CN, PS, R, T, V]

**Manitoba Curriculum Frameworks  
Science  
Grade 11 - Adopted: 2006**

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.GLO-A.</b>	<b>Foundation A: Nature of Science and Technology</b>
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STRAND / SPECIFIC OUTCOME GLO-A3. Distinguish critically between science and technology in terms of their respective contexts, goals, methods, products, and values

STRAND / SPECIFIC OUTCOME GLO-A5. Recognize that science and technology interact with and advance one another

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.GLO-B.</b>	<b>Foundation B: Science, Technology, Society, and Environment (STSE)</b>
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STRAND / SPECIFIC OUTCOME	GLO-B1.	Describe scientific and technological developments, past and present, and appreciate their impact on individuals, societies and the environment, both locally and globally.
STRAND / SPECIFIC OUTCOME	GLO-B2.	Recognize that scientific and technological endeavors have been and continue to be influenced by human needs and the societal context of the time
STRAND / SPECIFIC OUTCOME	GLO-B5.	Identify and demonstrate actions that promote a sustainable environment, society and economy, both locally and globally

STRAND / COURSE / GENERAL OUTCOME	MB.GLO- C.	<b>Foundation C: Scientific and Technological Skills and Attitudes</b>
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STRAND / SPECIFIC OUTCOME	GLO-C3.	Demonstrate appropriate problem-solving skills while seeking solutions to technological challenges
STRAND / SPECIFIC OUTCOME	GLO-C4.	Demonstrate appropriate critical thinking and decision-making skills when choosing a course of action based on scientific and technological information
STRAND / SPECIFIC OUTCOME	GLO-C5.	Demonstrate curiosity, scepticism, creativity, open-mindedness, accuracy, precision, honesty, and persistence, and appreciate their importance as scientific and technological habits of mind
STRAND / SPECIFIC OUTCOME	GLO-C6.	Employ effective communication skills and utilize information technology to gather and share scientific and technological ideas and data

STRAND / COURSE / GENERAL OUTCOME	MB.C11- 0.	<b>Chemistry, Cluster 0: Overall Skills and Attitudes - Specific Learning Outcomes</b>
STRAND / SPECIFIC OUTCOME	C11-0- A.	<b>Attitudes</b>

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	C11-0- A2.	Value skepticism, honesty, accuracy, precision, perseverance, and open-mindedness as scientific and technological habits of mind.
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STRAND / COURSE / GENERAL OUTCOME	MB.C11- 5.	<b>Chemistry, Topic 5: Organic Chemistry - Specific Learning Outcomes</b>
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STRAND / SPECIFIC OUTCOME	C11-5- 23.	Describe how the products of organic chemistry have influenced quality of life.
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STRAND / SPECIFIC OUTCOME	C11-5-24.	Use the decision-making process to investigate an issue related to organic chemistry.
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**Manitoba Curriculum Frameworks**

**Science**

Grade 12 - Adopted: 2006

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.GLO-A.</b>	<b>Foundation A: Nature of Science and Technology</b>
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STRAND / SPECIFIC OUTCOME	GLO-A3.	Distinguish critically between science and technology in terms of their respective contexts, goals, methods, products, and values
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STRAND / SPECIFIC OUTCOME	GLO-A5.	Recognize that science and technology interact with and advance one another
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<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.GLO-B.</b>	<b>Foundation B: Science, Technology, Society, and Environment (STSE)</b>
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STRAND / SPECIFIC OUTCOME	GLO-B1.	Describe scientific and technological developments, past and present, and appreciate their impact on individuals, societies and the environment, both locally and globally.
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STRAND / SPECIFIC OUTCOME	GLO-B2.	Recognize that scientific and technological endeavors have been and continue to be influenced by human needs and the societal context of the time
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STRAND / SPECIFIC OUTCOME	GLO-B5.	Identify and demonstrate actions that promote a sustainable environment, society and economy, both locally and globally
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<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.GLO-C.</b>	<b>Foundation C: Scientific and Technological Skills and Attitudes</b>
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STRAND / SPECIFIC OUTCOME	GLO-C3.	Demonstrate appropriate problem-solving skills while seeking solutions to technological challenges
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STRAND / SPECIFIC OUTCOME	GLO-C4.	Demonstrate appropriate critical thinking and decision-making skills when choosing a course of action based on scientific and technological information
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STRAND / SPECIFIC OUTCOME	GLO-C5.	Demonstrate curiosity, scepticism, creativity, open-mindedness, accuracy, precision, honesty, and persistence, and appreciate their importance as scientific and technological habits of mind
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STRAND / SPECIFIC OUTCOME	GLO-C6.	Employ effective communication skills and utilize information technology to gather and share scientific and technological ideas and data
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<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.IT.</b>	<b>Grade 12 Interdisciplinary Topics in Science 40S</b>
<b>STRAND / SPECIFIC OUTCOME</b>	<b>GLO.B.</b>	<b>Science, Technology, Society and the Environment - Explore problems and issues that demonstrate interdependence among science, technology, society and the environment within the context of sustainability</b>

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	SLO.B1.	Identify and explore a current STSE issue.
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	SLO.B2.	Recognize that decisions reflect values and consider their own values and those of others when making a decision.
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	SLO.B3.	Evaluate implications of possible alternatives or positions related to an STSE issue.
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	SLO.B5.	Propose a course of action related to an STSE issue.
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	SLO.B6.	Reflect on the process used by themselves or others to arrive at an STSE decision.

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.IT.</b>	<b>Grade 12 Interdisciplinary Topics in Science 40S</b>
<b>STRAND / SPECIFIC OUTCOME</b>	<b>GLO.C.</b>	<b>Scientific and Technological Skills and Attitudes - Demonstrate appropriate inquiry, problem-solving, and decision-making skills and attitudes, for exploring scientific and/or technological issues and problems.</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL</b>		<b>Research / Information Management</b>

SPECIFIC OUTCOME / ACHIEVEMENT INDICATOR	SLO.C14.	Communicate information in a variety of forms appropriate to the purpose, audience and context.
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<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.IT.</b>	<b>Grade 12 Interdisciplinary Topics in Science 40S</b>
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<b>STRAND / SPECIFIC OUTCOME</b>	<b>GLO.C.</b>	<b>Scientific and Technological Skills and Attitudes - Demonstrate appropriate inquiry, problem-solving, and decision-making skills and attitudes, for exploring scientific and/or technological issues and problems.</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL</b>		<b>Collaboration</b>

SPECIFIC  
OUTCOME /  
ACHIEVEMENT  
INDICATOR

SLO.C19. Elicit, clarify and respond to questions, ideas, and diverse points of view in discussions.

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.IT .</b>	<b>Grade 12 Interdisciplinary Topics in Science 40S</b>
<b>STRAND / SPECIFIC OUTCOME</b>	<b>GLO.C.</b>	<b>Scientific and Technological Skills and Attitudes - Demonstrate appropriate inquiry, problem-solving, and decision-making skills and attitudes, for exploring scientific and/or technological issues and problems.</b>
<b>GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL</b>		<b>Attitudes and Scientific Habits of Mind</b>

SPECIFIC  
OUTCOME /  
ACHIEVEMENT  
INDICATOR

SLO.C22. Value skepticism, honesty, accuracy, precision, perseverance, and open-mindedness as scientific and technological habits of mind.

Grade 12 - Adopted: 2006

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.CT.</b>	<b>Senior 3 Current Topics in the Sciences 30S</b>
<b>STRAND / SPECIFIC OUTCOME</b>	<b>GLO.A.</b>	<b>Nature of Science and Technology - Differentiate between science and technology, recognizing their strengths and limitations in furthering our understanding of the world, and appreciate the relationship between culture and technology.</b>

GENERAL  
OUTCOME /  
SPECIFIC  
OUTCOME /  
SKILL

SLO.A1. Distinguish critically between science and technology in terms of their respective contexts, goals, methods, products, and values.

GENERAL  
OUTCOME /  
SPECIFIC  
OUTCOME /  
SKILL

SLO.A4. Recognize that science and technology interact and evolve, often advancing one another.

GENERAL  
OUTCOME /  
SPECIFIC  
OUTCOME /  
SKILL

SLO.A5. Describe and explain disciplinary and interdisciplinary processes used to enable us to investigate and understand natural phenomena and develop technological solutions.

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.CT.</b>	<b>Senior 3 Current Topics in the Sciences 30S</b>
<b>STRAND / SPECIFIC OUTCOME</b>	<b>GLO.B.</b>	<b>Science, Technology, Society, and the Environment - Explore problems and issues that demonstrate interdependence among science, technology, society, and the environment.</b>

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL

SLO.B1. Describe scientific and technological developments, past and present, and appreciate their impact on individuals, societies, and the environment, both locally and globally.

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL

SLO.B2. Recognize that scientific and technological endeavours have been, and continue to be, influenced by human needs and by societal and historical contexts.

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL

SLO.B5. Identify and demonstrate actions that promote a sustainable environment, society, and economy, both locally and globally

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.CT.</b>	<b>Senior 3 Current Topics in the Sciences 30S</b>
<b>STRAND / SPECIFIC OUTCOME</b>	<b>GLO.C.</b>	<b>Scientific and Technological Skills and Attitudes - Demonstrate appropriate inquiry, problem-solving, and decision-making skills and attitudes for exploring scientific and/or technological issues and problems.</b>

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL

SLO.C2. Demonstrate appropriate technological problem-solving skills and attitudes when seeking solutions to challenges and problems related to human needs.

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL

SLO.C3. Demonstrate appropriate critical thinking and decision-making skills and attitudes when choosing a course of action based on scientific and technological information.

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL

SLO.C4. Employ effective communication skills and use a variety of resources to gather and share scientific and technological ideas and data.

Grade 12 - Adopted: 2011

<b>STRAND / COURSE / GENERAL OUTCOME</b>	<b>MB.B12-0.</b>	<b>Biology, Cluster 0: Skills and Attitudes</b>
<b>STRAND / SPECIFIC OUTCOME</b>	<b>B12-0-P.</b>	<b>Personal Perspectives/Reflection</b>



GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	B12-0-P5.	Appreciate that developments in and use of technology can create ethical dilemmas that challenge personal and societal decision making. (GLOs: B1, B2)
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Grade 12 - Adopted: 2013

STRAND / COURSE / GENERAL OUTCOME	MB.C12-0.	Chemistry Grade 12, Cluster 0: Skills and Attitudes
STRAND / SPECIFIC OUTCOME	C12-0-T.	STSE

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	C12-0-T1.	Describe examples of the relationship between chemical principles and applications of chemistry.
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GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	C12-0-T2.	Explain how scientific research and technology interact in the production and distribution of beneficial materials.
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GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	C12-0-T3.	Provide examples of how chemical principles are applied in products and processes, in scientific studies, and in daily life.
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**New Brunswick Curriculum**

**Mathematics**

Grade 11 - Adopted: 2012

DOCUMENT/GENERAL LEARNING OUTCOME		Financial and Workplace Mathematics 110
CATEGORY		MATHEMATICAL PROCESSES

SECTION/SPECIFIC LEARNING OUTCOME	C.	communicate in order to learn and express their understanding of mathematics (Communications: C)
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SECTION/SPECIFIC LEARNING OUTCOME	PS.	develop and apply new mathematical knowledge through problem solving (Problem Solving: PS)
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SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).
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SECTION/SPECIFIC LEARNING OUTCOME	R.	develop mathematical reasoning (Reasoning: R)
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Financial and Workplace Mathematics 110</b>
<b>CATEGORY</b>	<b>N.</b>	<b>Number (N): Develop number sense and critical thinking skills.</b>

SECTION/SPECIFIC LEARNING OUTCOME N1. Analyze puzzles and games that involve numerical reasoning, using problem-solving strategies. [C, CN, PS, R]

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Foundations of Mathematics 110</b>
<b>CATEGORY</b>		<b>MATHEMATICAL PROCESSES</b>

SECTION/SPECIFIC LEARNING OUTCOME C. communicate in order to learn and express their understanding of mathematics (Communications: C)

SECTION/SPECIFIC LEARNING OUTCOME PS. develop and apply new mathematical knowledge through problem solving (Problem Solving: PS)

SECTION/SPECIFIC LEARNING OUTCOME V. develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).

SECTION/SPECIFIC LEARNING OUTCOME R. develop mathematical reasoning (Reasoning: R)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Foundations of Mathematics 110</b>
<b>CATEGORY</b>	<b>LR.</b>	<b>Logical Reasoning (LR): Develop Logical Reasoning</b>

SECTION/SPECIFIC LEARNING OUTCOME LR1. Analyze and prove conjectures using logical reasoning, to solve problems. [C, CN, PS, R]

SECTION/SPECIFIC LEARNING OUTCOME LR2. Analyze puzzles and games that involve numerical reasoning, using problem-solving strategies. [CN, PS, R, V]

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Pre-Calculus 110</b>
<b>CATEGORY</b>		<b>MATHEMATICAL PROCESSES</b>

SECTION/SPECIFIC LEARNING OUTCOME C. communicate in order to learn and express their understanding of mathematics (Communications: C)

SECTION/SPECIFIC LEARNING OUTCOME	PS.	develop and apply new mathematical knowledge through problem solving (Problem Solving: PS)
SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).
SECTION/SPECIFIC LEARNING OUTCOME	R.	develop mathematical reasoning (Reasoning: R)

**New Brunswick Curriculum  
Mathematics  
Grade 12 - Adopted: 2013**

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Financial and Workplace Mathematics 120</b>
<b>CATEGORY</b>		<b>MATHEMATICAL PROCESSES</b>

SECTION/SPECIFIC LEARNING OUTCOME	C.	communicate in order to learn and express their understanding of mathematics (Communications: C)
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SECTION/SPECIFIC LEARNING OUTCOME	PS.	develop and apply new mathematical knowledge through problem solving (Problem Solving: PS)
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SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).
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SECTION/SPECIFIC LEARNING OUTCOME	R.	develop mathematical reasoning (Reasoning: R)
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Financial and Workplace Mathematics 120</b>
<b>CATEGORY</b>	<b>N.</b>	<b>Number (N): Develop number sense and critical thinking skills.</b>

SECTION/SPECIFIC LEARNING OUTCOME	N1.	Analyse puzzles and games that involve logical reasoning, using problem-solving strategies. [C, CN, PS, R]
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Financial and Workplace Mathematics 120</b>
<b>CATEGORY</b>	<b>A.</b>	<b>Algebra (A): Develop algebraic reasoning.</b>

SECTION/SPECIFIC LEARNING OUTCOME	A1.	Demonstrate an understanding of linear relations by recognizing patterns and trends, graphing, creating tables of values, writing equations, interpolating and extrapolating, and solving problems. [CN, PS, R, T, V]
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Foundations of Mathematics 120</b>
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<b>CATEGORY</b>		<b>MATHEMATICAL PROCESSES</b>
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SECTION/SPECIFIC LEARNING OUTCOME	C.	communicate in order to learn and express their understanding of mathematics (Communications: C)
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SECTION/SPECIFIC LEARNING OUTCOME	PS.	develop and apply new mathematical knowledge through problem solving (Problem Solving: PS)
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SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).
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SECTION/SPECIFIC LEARNING OUTCOME	R.	develop mathematical reasoning (Reasoning: R)
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Foundations of Mathematics 120</b>
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<b>CATEGORY</b>	<b>LR.</b>	<b>Logical Reasoning (LR): Develop logical reasoning.</b>
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SECTION/SPECIFIC LEARNING OUTCOME	LR1.	Analyze puzzles and games that involve numerical and logical reasoning, using problem-solving strategies. [CN, ME, PS, R]
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Pre-Calculus A 120</b>
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<b>CATEGORY</b>		<b>MATHEMATICAL PROCESSES</b>
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SECTION/SPECIFIC LEARNING OUTCOME	C.	communicate in order to learn and express their understanding of mathematics (Communications: C)
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SECTION/SPECIFIC LEARNING OUTCOME	PS.	develop and apply new mathematical knowledge through problem solving (Problem Solving: PS)
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SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).
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SECTION/SPECIFIC LEARNING OUTCOME	R.	develop mathematical reasoning (Reasoning: R)
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Pre-Calculus B 120</b>
<b>CATEGORY</b>		<b>MATHEMATICAL PROCESSES</b>
SECTION/SPECIFIC LEARNING OUTCOME	C.	communicate in order to learn and express their understanding of mathematics (Communications: C)
SECTION/SPECIFIC LEARNING OUTCOME	PS.	develop and apply new mathematical knowledge through problem solving (Problem Solving: PS)
SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).
SECTION/SPECIFIC LEARNING OUTCOME	R.	develop mathematical reasoning (Reasoning: R)

Grade 12 - Adopted: 2014

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Calculus 120</b>
<b>CATEGORY</b>		<b>MATHEMATICAL PROCESSES</b>
SECTION/SPECIFIC LEARNING OUTCOME	C.	communicate in order to learn and express their understanding of mathematics (Communications: C)
SECTION/SPECIFIC LEARNING OUTCOME	PS.	develop and apply new mathematical knowledge through problem solving (Problem Solving: PS)
SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).
SECTION/SPECIFIC LEARNING OUTCOME	R.	develop mathematical reasoning (Reasoning: R)

New Brunswick Curriculum  
Science

Grade 11 - Adopted: 2009/Implemented 2009

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 111-112 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 2 – Stoichiometry</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Applications of Stoichiometry</b>

UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: compare processes used in science with those used in technology. (114-7)
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UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: analyse society's influence on science and technology. (117-2)
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UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: identify various constraints that result in trade-offs during the development and improvement of technologies. (114-4)
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Grade 11 - Adopted: 2009

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 121-122 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 1 – Thermochemistry</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Science Decisions Involving Thermochemistry</b>

UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: use library and electronic research tools to collect information on a given topic. (213-6)
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UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: select and integrate information from various print and electronic sources or from several parts of the same source. (213-7)
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UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: identify multiple perspectives that influence a science-related decision or issue involving thermochemistry. (215-4)
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 121-122 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 1 – Thermochemistry</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Enthalpy Changes (1)</b>

UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: define endothermic reaction, exothermic reaction, specific heat capacity, enthalpy, bond energy, heat of reaction, and molar enthalpy. (324-2)
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DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 1 – Thermochemistry
SECTION/SPECIFIC LEARNING OUTCOME		Enthalpy Changes (2)
UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: illustrate changes in energy of various chemical reactions, using potential energy diagrams. (324-5)

SPECIFIC LEARNING OUTCOME

identify exothermic and endothermic processes from the sign of  $\Delta H$ , from thermochemical equations, and from labeled enthalpy/potential energy diagrams.

DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 1 – Thermochemistry
SECTION/SPECIFIC LEARNING OUTCOME		Enthalpy Changes (2)
UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: compile and display evidence and information on heats of formation in a variety of formats, including diagrams, flow charts, tables, and graphs. (214-3)

SPECIFIC LEARNING OUTCOME

write thermochemical equations including the quantity of energy exchanged given either the value of  $\Delta H$  or a labeled enthalpy diagram, and vice versa.

DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 1 – Thermochemistry
SECTION/SPECIFIC LEARNING OUTCOME		Enthalpy Changes (3)
UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: compare the molar enthalpies of several combustion reactions involving organic compounds. (324-7)

UNIT/SPECIFIC LEARNING OUTCOME

NB Prescribed Outcomes

Students will be expected to: write and balance chemical equations for combustion reactions of alkanes, including energy amounts. (324-1)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 121-122 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 1 – Thermochemistry</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Thermochemistry Experimentation</b>

UNIT/SPECIFIC LEARNING OUTCOME NB Prescribed Outcomes Students will be expected to: work cooperatively with team members to develop and carry out thermochemistry experiments (215-6)

UNIT/SPECIFIC LEARNING OUTCOME NB Prescribed Outcomes Students will be expected to: determine experimentally the changes in energy of various chemical reactions (324-6)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 121-122 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 1 – Thermochemistry</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Thermochemistry Experimentation</b>
<b>UNIT/SPECIFIC LEARNING OUTCOME</b>	<b>NB Prescribed Outcomes</b>	<b>Students will be expected to: propose alternative solutions to solving energy problems and identify the potential strengths and weaknesses of each (214-15)</b>

SPECIFIC LEARNING OUTCOME explain, in simple terms, the energy changes of bond breaking and bond formation

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 121-122 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 4 – Organic Chemistry</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Influences of Organic Compounds on Society</b>

UNIT/SPECIFIC LEARNING OUTCOME NB Prescribed Outcomes Students will be expected to: analyse natural and technological systems to interpret and explain the influence of organic compounds on society. (116-7)

UNIT/SPECIFIC LEARNING OUTCOME NB Prescribed Outcomes Students will be expected to: distinguish between scientific questions and technological problems. (115-1)



<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 121-122 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 4 – Organic Chemistry</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Writing and Balancing Chemical Equations</b>
<b>UNIT/SPECIFIC LEARNING OUTCOME</b>	<b>NB Prescribed Outcomes</b>	<b>Students will be expected to: write and balance chemical equations to predict the reactions of selected organic compounds. (319-8)</b>

SPECIFIC LEARNING OUTCOME

iv. draw structural diagrams of all organic reactants and products involved in: complete combustion

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 121-122 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 4 – Organic Chemistry</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Writing and Balancing Chemical Equations</b>
<b>UNIT/SPECIFIC LEARNING OUTCOME</b>	<b>NB Prescribed Outcomes</b>	<b>Students will be expected to: (Chemistry 121) write and balance chemical equations to predict the reactions of selected organic compounds. (319-8)</b>

SPECIFIC LEARNING OUTCOME

i. draw structural diagrams of all organic reactants and products involved in: incomplete combustion

Grade 11 - Adopted: 2012/Implemented 2012

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>		<b>UNIT 1 – An Overview of Environmental Science</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>The Issues</b>

UNIT/SPECIFIC LEARNING OUTCOME

It is expected the student will: explore and communicate current understanding of local, regional and global environmental issues.

UNIT/SPECIFIC LEARNING OUTCOME

It is expected the student will: identify links between personal behavior and local, regional and global environmental issues.

UNIT/SPECIFIC LEARNING OUTCOME

It is expected the student will: identify ways to measure environmentally sustainable behaviours, and describe links to economic and social factors.

UNIT/SPECIFIC  
LEARNING  
OUTCOME

It is expected the student will: identify individual impacts on the environment using the concept of ecological footprint.

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>	<b>UNIT 2 – Sustainable Development</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>Ecology</b>

UNIT/SPECIFIC  
LEARNING  
OUTCOME

It is expected the student will: recognize that humans are just one part of a complex system of living things, with a inordinate impact on the biosphere, often accelerated by the use of technology

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>	<b>UNIT 2 – Sustainable Development</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>Environmental Awareness</b>

UNIT/SPECIFIC  
LEARNING  
OUTCOME

It is expected the student will: describe the development of attitudes towards the environment in NB by Europeans and later settlers to NB, from colonization times to today.

UNIT/SPECIFIC  
LEARNING  
OUTCOME

It is expected the student will: discuss the increasing awareness of environmental issues and understanding of ecology in New Brunswick.

UNIT/SPECIFIC  
LEARNING  
OUTCOME

It is expected the student will: explore the people and ideas involved in the development of the Western environmental movement

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>	<b>UNIT 2 – Sustainable Development</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>Sustainable Ecosystems and Communities</b>

UNIT/SPECIFIC  
LEARNING  
OUTCOME

It is expected the student will: demonstrate an understanding of the relationships between ecosystems and communities locally, regionally, and global.

UNIT/SPECIFIC  
LEARNING  
OUTCOME

It is expected the student will: find examples of development that is sustainable and is not sustainable – ecologically, economically, socially, and culturally.

UNIT/SPECIFIC LEARNING OUTCOME      It is expected the student will: understand stewardship in relation to sustainability.

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>		<b>UNIT 3 – Investigating Environmental Issues</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>2. Forests</b>

UNIT/SPECIFIC LEARNING OUTCOME      It is expected the student will: design and carry out an experiment to test the impact of forestry on the environment.

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>		<b>UNIT 3 – Investigating Environmental Issues</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>5. Energy Resources</b>

UNIT/SPECIFIC LEARNING OUTCOME      It is expected the student will: describe energy use in NB, its impact on the environment and the factors that might affect its future.

UNIT/SPECIFIC LEARNING OUTCOME      It is expected the student will: design and carry out an experiment to test energy use and effect of efficiency measures.

UNIT/SPECIFIC LEARNING OUTCOME      It is expected the student will: demonstrate the effective and critical use of a variety of investigation and research methods.

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>		<b>UNIT 3 – Investigating Environmental Issues</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>6. Climate Change</b>

UNIT/SPECIFIC LEARNING OUTCOME      It is expected the student will: distinguish between the greenhouse effect, global warming, and climate change.

UNIT/SPECIFIC LEARNING OUTCOME      It is expected the student will: identify possible effects of climate change on NB. Include ecosystem changes, community effects, economic impact, cultural and social impacts.

UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: demonstrate the effective and critical use of a variety of investigation and research methods.
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UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: design and carry out an experiment to test an impact that climate change could have on the environment.
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>	<b>UNIT 3 – Investigating Environmental Issues</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>7. Air and Water Pollution</b>

UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: research and report on prevention and cleanup strategies to reduce air and water pollution.
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UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: demonstrate the effective and critical use of a variety of investigation and research methods
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Grade 11 - Adopted: 2017/Implement 2018

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Advanced Environmental Science 120</b>
<b>CATEGORY</b>	<b>GCO 1. Introduction to the human sphere: recognize and appreciate the variety of ways people understand and interact with the natural world</b>

SECTION/SPECIFIC LEARNING OUTCOME	SCO 1.2. Demonstrate an understanding of different views of the natural world.
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SECTION/SPECIFIC LEARNING OUTCOME	SCO 1.3. Recognize factors that influence local, regional and global environmental decision-making.
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Advanced Environmental Science 120</b>
<b>CATEGORY</b>	<b>GCO 1. Introduction to the human sphere: recognize and appreciate the variety of ways people understand and interact with the natural world</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>SCO 1.4. Briefly explore a range of current environmental issues.</b>

UNIT/SPECIFIC LEARNING OUTCOME	chemical changes to air, soil and water due to e.g., waste disposal, fertilizer use, leaching of tailing ponds, greenhouse gases, ozone depletion, endocrine disrupters, genetic mutations.
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Advanced Environmental Science 120</b>
<b>CATEGORY</b>	<b>GCO 2.</b>	<b>Earth Systems: Develop an understanding of issues impacting the dynamics of biotic and abiotic components of the environment</b>

SECTION/SPECIFIC LEARNING OUTCOME SCO 2.5. Examine and demonstrate an understanding of atmosphere composition and dynamics, and current issues in air pollution and global warming

Grade 11 - Adopted: 2003

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Kinematics</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Vector Analysis</b>

UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to identify and investigate questions that arise from practical problems/issues involving motion (212-1)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Kinematics</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Mathematical Analysis</b>

UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to analyze and describe examples where scientific understanding was enhanced or revised as a result of the invention of technology (116-2)

UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to describe and evaluate the design of technological solutions and the way they function, using scientific principles (116-6)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Dynamics</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Dynamics Introduction</b>

UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to analyse the influence of society on scientific and technological endeavours in dynamics (117-2)

UNIT/SPECIFIC LEARNING OUTCOME      Students will be expected to describe and evaluate the design of technological solutions and the way they function, using scientific principles (116-6)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Work and Energy</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Transformation, Total Energy, and Conservation</b>

UNIT/SPECIFIC LEARNING OUTCOME      Students will be expected to analyse and describe examples where technological solutions were developed based on scientific understanding (116-4)

UNIT/SPECIFIC LEARNING OUTCOME      Students will be expected to distinguish between problems that can be solved by the application of physics-related technologies and those that cannot (118-8)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Waves</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Fundamental Properties</b>

UNIT/SPECIFIC LEARNING OUTCOME      Students will be expected to construct and test a prototype of a device and troubleshoot problems as they arise (214-14)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Dynamics Extension</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Technological Implications</b>

UNIT/SPECIFIC LEARNING OUTCOME      Students will be expected to analyse and describe examples where energy- and momentum-related technologies were developed and improved over time (115-5, 116-4)

UNIT/SPECIFIC LEARNING OUTCOME      Students will be expected to describe and evaluate the design of technological solutions and the way they function using principles of energy and momentum (116-6)

UNIT/SPECIFIC LEARNING OUTCOME      Students will be expected to explain the importance of using appropriate language and conventions when describing events related to momentum and energy (114-9)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Projectiles, Circular Motion and Universal Gravitation</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Projectiles</b>

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to describe and evaluate the design of technological solutions and the way they function, using scientific principles (116-6)

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to construct, test and evaluate a device or system on the basis of developed criteria (214-14,214-16)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Projectiles, Circular Motion and Universal Gravitation</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Universal Gravitation</b>

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to distinguish between scientific questions and technological problems (115-1)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Fields</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Generators and Motors</b>

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to compare and contrast the ways a motor and generator function, using the principles of electromagnetism (328-9)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Fields</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Generators and Motors</b>

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to describe and compare direct current and alternating current (ACP-4)

SPECIFIC LEARNING OUTCOME	illustrate the third hand rule for motors
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DOCUMENT/GENERAL LEARNING OUTCOME		Physics 12 Curriculum
CATEGORY	TOPIC	Fields
SECTION/SPECIFIC LEARNING OUTCOME	STRAND	Generators and Motors

UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to describe the historical development of a technology (115-4)
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UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to describe the functioning of domestic and industrial technologies, using scientific principles (116-5)
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UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to analyse natural and technological systems to interpret and explain their structure and dynamics (116-7)
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UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to select and integrate information from various print and electronic sources or from several parts of the same source (213-7)
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Grade 11 - Adopted: **unknown**

DOCUMENT/GENERAL LEARNING OUTCOME		Physical Geography 110 – Portraits of a Planet
CATEGORY		Unit 4C: The Atmosphere (Climatological Emphasis)
SECTION/SPECIFIC LEARNING OUTCOME		What is the composition and structure of earth's atmosphere? How does the sun heat the earth and its atmosphere?
UNIT/SPECIFIC LEARNING OUTCOME		Students will be able to:

SPECIFIC LEARNING OUTCOME	5. describe and explain how human activities influence the global heat balance. Explain the processes which produce these changes.
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New Brunswick Curriculum  
Science

Grade 12 - Adopted: **2009/Implemented 2009**

DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 111-112 Curriculum
CATEGORY	TOPIC	Unit 2 – Stoichiometry



<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Applications of Stoichiometry</b>
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UNIT/SPECIFIC LEARNING OUTCOME NB  
 Prescribed Outcomes  
 Students will be expected to: compare processes used in science with those used in technology. (114-7)

UNIT/SPECIFIC LEARNING OUTCOME NB  
 Prescribed Outcomes  
 Students will be expected to: analyse society's influence on science and technology. (117-2)

UNIT/SPECIFIC LEARNING OUTCOME NB  
 Prescribed Outcomes  
 Students will be expected to: identify various constraints that result in trade-offs during the development and improvement of technologies. (114-4)

Grade 12 - Adopted: 2009

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 121-122 Curriculum</b>
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<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 1 – Thermochemistry</b>
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<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Science Decisions Involving Thermochemistry</b>
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UNIT/SPECIFIC LEARNING OUTCOME NB  
 Prescribed Outcomes  
 Students will be expected to: use library and electronic research tools to collect information on a given topic. (213-6)

UNIT/SPECIFIC LEARNING OUTCOME NB  
 Prescribed Outcomes  
 Students will be expected to: select and integrate information from various print and electronic sources or from several parts of the same source. (213-7)

UNIT/SPECIFIC LEARNING OUTCOME NB  
 Prescribed Outcomes  
 Students will be expected to: identify multiple perspectives that influence a science-related decision or issue involving thermochemistry. (215-4)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Chemistry 121-122 Curriculum</b>
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<b>CATEGORY</b>	<b>TOPIC</b>	<b>Unit 1 – Thermochemistry</b>
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<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Enthalpy Changes (1)</b>
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UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: define endothermic reaction, exothermic reaction, specific heat capacity, enthalpy, bond energy, heat of reaction, and molar enthalpy. (324-2)
DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 1 – Thermochemistry
SECTION/SPECIFIC LEARNING OUTCOME		Enthalpy Changes (2)
UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: illustrate changes in energy of various chemical reactions, using potential energy diagrams. (324-5)

SPECIFIC LEARNING OUTCOME

identify exothermic and endothermic processes from the sign of  $\Delta H$ , from thermochemical equations, and from labeled enthalpy/potential energy diagrams.

DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 1 – Thermochemistry
SECTION/SPECIFIC LEARNING OUTCOME		Enthalpy Changes (2)
UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: compile and display evidence and information on heats of formation in a variety of formats, including diagrams, flow charts, tables, and graphs. (214-3)

SPECIFIC LEARNING OUTCOME

write thermochemical equations including the quantity of energy exchanged given either the value of  $\Delta H$  or a labeled enthalpy diagram, and vice versa.

DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 1 – Thermochemistry
SECTION/SPECIFIC LEARNING OUTCOME		Enthalpy Changes (3)

UNIT/SPECIFIC LEARNING OUTCOME

NB Prescribed Outcomes

Students will be expected to: compare the molar enthalpies of several combustion reactions involving organic compounds. (324-7)

UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: write and balance chemical equations for combustion reactions of alkanes, including energy amounts. (324-1)
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DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 1 – Thermochemistry
SECTION/SPECIFIC LEARNING OUTCOME		Thermochemistry Experimentation

UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: work cooperatively with team members to develop and carry out thermochemistry experiments (215-6)
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UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: determine experimentally the changes in energy of various chemical reactions (324-6)
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DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 1 – Thermochemistry
SECTION/SPECIFIC LEARNING OUTCOME		Thermochemistry Experimentation
UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: propose alternative solutions to solving energy problems and identify the potential strengths and weaknesses of each (214-15)

SPECIFIC LEARNING OUTCOME explain, in simple terms, the energy changes of bond breaking and bond formation

DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 4 – Organic Chemistry
SECTION/SPECIFIC LEARNING OUTCOME		Influences of Organic Compounds on Society

UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: analyse natural and technological systems to interpret and explain the influence of organic compounds on society. (116-7)
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UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: distinguish between scientific questions and technological problems. (115-1)
DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 4 – Organic Chemistry
SECTION/SPECIFIC LEARNING OUTCOME		Writing and Balancing Chemical Equations
UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: write and balance chemical equations to predict the reactions of selected organic compounds. (319-8)

SPECIFIC LEARNING OUTCOME

iv. draw structural diagrams of all organic reactants and products involved in: complete combustion

DOCUMENT/GENERAL LEARNING OUTCOME		Chemistry 121-122 Curriculum
CATEGORY	TOPIC	Unit 4 – Organic Chemistry
SECTION/SPECIFIC LEARNING OUTCOME		Writing and Balancing Chemical Equations
UNIT/SPECIFIC LEARNING OUTCOME	NB Prescribed Outcomes	Students will be expected to: (Chemistry 121) write and balance chemical equations to predict the reactions of selected organic compounds. (319-8)

SPECIFIC LEARNING OUTCOME

i. draw structural diagrams of all organic reactants and products involved in: incomplete combustion

Grade 12 - Adopted: 2012/Implemented 2012

DOCUMENT/GENERAL LEARNING OUTCOME		Introduction to Environmental Science 120 Curriculum
CATEGORY		UNIT 1 – An Overview of Environmental Science
SECTION/SPECIFIC LEARNING OUTCOME		The Issues

UNIT/SPECIFIC LEARNING OUTCOME

It is expected the student will: explore and communicate current understanding of local, regional and global environmental issues.

UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: identify links between personal behavior and local, regional and global environmental issues.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: identify ways to measure environmentally sustainable behaviours, and describe links to economic and social factors.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: identify individual impacts on the environment using the concept of ecological footprint.
<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>		<b>UNIT 2 – Sustainable Development</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Ecology</b>
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: recognize that humans are just one part of a complex system of living things, with a inordinate impact on the biosphere, often accelerated by the use of technology
<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>		<b>UNIT 2 – Sustainable Development</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Environmental Awareness</b>
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: describe the development of attitudes towards the environment in NB by Europeans and later settlers to NB, from colonization times to today.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: discuss the increasing awareness of environmental issues and understanding of ecology in New Brunswick.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: explore the people and ideas involved in the development of the Western environmental movement
<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>		<b>UNIT 2 – Sustainable Development</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>		<b>Sustainable Ecosystems and Communities</b>

UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: demonstrate an understanding of the relationships between ecosystems and communities locally, regionally, and global.
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UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: find examples of development that is sustainable and is not sustainable – ecologically, economically, socially, and culturally.
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UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: understand stewardship in relation to sustainability.
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>	<b>UNIT 3 – Investigating Environmental Issues</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>2. Forests</b>

UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: design and carry out an experiment to test the impact of forestry on the environment.
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>	<b>UNIT 3 – Investigating Environmental Issues</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>5. Energy Resources</b>

UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: describe energy use in NB, its impact on the environment and the factors that might affect its future.
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UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: design and carry out an experiment to test energy use and effect of efficiency measures.
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UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: demonstrate the effective and critical use of a variety of investigation and research methods.
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>	<b>UNIT 3 – Investigating Environmental Issues</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>6. Climate Change</b>

UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: distinguish between the greenhouse effect, global warming, and climate change.
UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: identify possible effects of climate change on NB. Include ecosystem changes, community effects, economic impact, cultural and social impacts.
UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: demonstrate the effective and critical use of a variety of investigation and research methods.
UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: design and carry out an experiment to test an impact that climate change could have on the environment.

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Introduction to Environmental Science 120 Curriculum</b>
<b>CATEGORY</b>	<b>UNIT 3 – Investigating Environmental Issues</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>7. Air and Water Pollution</b>

UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: research and report on prevention and cleanup strategies to reduce air and water pollution.
UNIT/SPECIFIC LEARNING OUTCOME	It is expected the student will: demonstrate the effective and critical use of a variety of investigation and research methods

**Grade 12 - Adopted: 2017/Implement 2018**

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Advanced Environmental Science 120</b>
<b>CATEGORY</b>	<b>GCO 1. Introduction to the human sphere: recognize and appreciate the variety of ways people understand and interact with the natural world</b>

SECTION/SPECIFIC LEARNING OUTCOME	SCO 1.2. Demonstrate an understanding of different views of the natural world.
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SECTION/SPECIFIC LEARNING OUTCOME	SCO 1.3. Recognize factors that influence local, regional and global environmental decision-making.
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>	<b>Advanced Environmental Science 120</b>
<b>CATEGORY</b>	<b>GCO 1. Introduction to the human sphere: recognize and appreciate the variety of ways people understand and interact with the natural world</b>

<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>SCO 1.4.</b>	<b>Briefly explore a range of current environmental issues.</b>
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UNIT/SPECIFIC LEARNING OUTCOME

chemical changes to air, soil and water due to e.g., waste disposal, fertilizer use, leaching of tailing ponds, greenhouse gases, ozone depletion, endocrine disrupters, genetic mutations.

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Advanced Environmental Science 120</b>
<b>CATEGORY</b>	<b>GCO 2.</b>	<b>Earth Systems: Develop an understanding of issues impacting the dynamics of biotic and abiotic components of the environment</b>

SECTION/SPECIFIC LEARNING OUTCOME

SCO 2.5. Examine and demonstrate an understanding of atmosphere composition and dynamics, and current issues in air pollution and global warming

Grade 12 - Adopted: 2003

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Kinematics</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Vector Analysis</b>

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to identify and investigate questions that arise from practical problems/issues involving motion (212-1)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Kinematics</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Mathematical Analysis</b>

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to analyze and describe examples where scientific understanding was enhanced or revised as a result of the invention of technology (116-2)

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to describe and evaluate the design of technological solutions and the way they function, using scientific principles (116-6)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Dynamics</b>



<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Dynamics Introduction</b>
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UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to analyse the influence of society on scientific and technological endeavours in dynamics (117-2)

UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to describe and evaluate the design of technological solutions and the way they function, using scientific principles (116-6)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
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<b>CATEGORY</b>	<b>TOPIC</b>	<b>Work and Energy</b>
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<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Transformation, Total Energy, and Conservation</b>
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UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to analyse and describe examples where technological solutions were developed based on scientific understanding (116-4)

UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to distinguish between problems that can be solved by the application of physics-related technologies and those that cannot (118-8)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 11 Curriculum</b>
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<b>CATEGORY</b>	<b>TOPIC</b>	<b>Waves</b>
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<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Fundamental Properties</b>
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UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to construct and test a prototype of a device and troubleshoot problems as they arise (214-14)

<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
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<b>CATEGORY</b>	<b>TOPIC</b>	<b>Dynamics Extension</b>
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<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Technological Implications</b>
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UNIT/SPECIFIC LEARNING OUTCOME Students will be expected to analyse and describe examples where energy- and momentum-related technologies were developed and improved over time (115-5, 116-4)

UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to describe and evaluate the design of technological solutions and the way they function using principles of energy and momentum (116-6)
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UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to explain the importance of using appropriate language and conventions when describing events related to momentum and energy (114-9)
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Projectiles, Circular Motion and Universal Gravitation</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Projectiles</b>

UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to describe and evaluate the design of technological solutions and the way they function, using scientific principles (116-6)
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UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to construct, test and evaluate a device or system on the basis of developed criteria (214-14,214-16)
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Projectiles, Circular Motion and Universal Gravitation</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Universal Gravitation</b>

UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to distinguish between scientific questions and technological problems (115-1)
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
<b>CATEGORY</b>	<b>TOPIC</b>	<b>Fields</b>
<b>SECTION/SPECIFIC LEARNING OUTCOME</b>	<b>STRAND</b>	<b>Generators and Motors</b>

UNIT/SPECIFIC LEARNING OUTCOME	Students will be expected to compare and contrast the ways a motor and generator function, using the principles of electromagnetism (328-9)
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<b>DOCUMENT/GENERAL LEARNING OUTCOME</b>		<b>Physics 12 Curriculum</b>
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CATEGORY	TOPIC	Fields
SECTION/SPECIFIC LEARNING OUTCOME	STRAND	Generators and Motors
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to describe and compare direct current and alternating current (ACP-4)

SPECIFIC LEARNING OUTCOME

illustrate the third hand rule for motors

DOCUMENT/GENERAL LEARNING OUTCOME		Physics 12 Curriculum
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CATEGORY	TOPIC	Fields
SECTION/SPECIFIC LEARNING OUTCOME	STRAND	Generators and Motors

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to describe the historical development of a technology (115-4)

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to describe the functioning of domestic and industrial technologies, using scientific principles (116-5)

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to analyse natural and technological systems to interpret and explain their structure and dynamics (116-7)

UNIT/SPECIFIC LEARNING OUTCOME

Students will be expected to select and integrate information from various print and electronic sources or from several parts of the same source (213-7)

Grade 12 - Adopted: **unknown**

DOCUMENT/GENERAL LEARNING OUTCOME		Physical Geography 110 – Portraits of a Planet
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CATEGORY		Unit 4C: The Atmosphere (Climatological Emphasis)
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SECTION/SPECIFIC LEARNING OUTCOME		What is the composition and structure of earth's atmosphere? How does the sun heat the earth and its atmosphere?
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UNIT/SPECIFIC LEARNING OUTCOME		Students will be able to:
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SPECIFIC LEARNING OUTCOME

5. describe and explain how human activities influence the global heat balance. Explain the processes which produce these changes.

<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>OUTCOME / INDICATOR</b>	<b>RF3.</b>	<b>Demonstrate an understanding of slope with respect to: rise and run; line segments and lines; rate of change; parallel lines; perpendicular lines. [PS, R,V]</b>
INDICATOR	RF3.6.	Draw a line, given its slope and a point on the line.

INDICATOR	RF3.7.	Determine another point on a line, given the slope and a point on the line.
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<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>OUTCOME / INDICATOR</b>	<b>RF5.</b>	<b>Determine the characteristics of the graphs of linear relations, including the: intercepts; rate of change; domain; range. [CN, PS, R, V]</b>
INDICATOR	RF5.6.	Solve a contextual problem that involves intercepts, rate of change, domain or range of a linear relation.

INDICATOR	RF5.7.	Sketch a linear relation that has one intercept, two intercepts or an infinite number of intercepts.
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<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>OUTCOME / INDICATOR</b>	<b>RF6.</b>	<b>Relate linear relations expressed in: slope-intercept form <math>y = mx + b</math>; general form <math>Ax + By + C = 0</math>; slope-point form; <math>y - y_1 = m(x - x_1)</math> to their graphs. [CN, R, T, V]</b>
INDICATOR	RF6.2.	Generalize and explain strategies for graphing a linear relation in slope-intercept, general or slope-point form.

INDICATOR	RF6.3.	Graph, with and without technology, a linear relation given in slope-intercept, general or slope-point form, and explain the strategy used to create the graph.
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INDICATOR	RF6.4.	Match a set of linear relations to their graphs.
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<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>OUTCOME / INDICATOR</b>	<b>RF7.</b>	<b>Determine the equation of a linear relation, given: a graph; a point and the slope; two points; a point and the equation of a parallel or perpendicular line to solve problems. [CN, PS, R, V].</b>
INDICATOR	RF7.2.	Write the equation of a linear relation, given its slope and the coordinates of a point on the line, and explain the reasoning.

INDICATOR	RF7.4.	Graph linear data generated from a context, and write the equation of the resulting line.
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INDICATOR	RF7.5.	Solve a problem, using the equation of a linear relation.
INDICATOR	RF7.6.	Write the equation of a linear relation, given the coordinates of a point on the line and the equation of a parallel or perpendicular line, and explain the reasoning.

<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>OUTCOME / INDICATOR</b>	<b>RF8.</b>	<b>Represent a linear function, using function notation. [CN, ME, V]</b>

INDICATOR RF8.4. Determine the related domain value, given a range value for a linear function; e.g., if  $g(t) = 7 + t$ , determine  $t$  so that  $g(t)=15$ .

INDICATOR RF8.5. Sketch the graph of a linear function expressed in function notation.

<b>COURSE / STRAND</b>	<b>NL.1202.</b>	<b>Applied Mathematics 1202</b>
<b>STRAND / GCO</b>	<b>1202.A.</b>	<b>Algebra</b>
<b>GCO / SCO</b>		<b>Develop algebraic reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>A1.</b>	<b>Solve problems that require the manipulation and application of formulas related to: perimeter; area; the Pythagorean theorem; primary trigonometric ratios; income. [C, CN, ME, PS, R]</b>

INDICATOR A1.1. Create and solve a contextual problem that involves a formula.

<b>COURSE / STRAND</b>	<b>NL.1202.</b>	<b>Applied Mathematics 1202</b>
<b>STRAND / GCO</b>	<b>1202.G.</b>	<b>Geometry</b>
<b>GCO / SCO</b>		<b>Develop spatial sense.</b>
<b>OUTCOME / INDICATOR</b>	<b>G1.</b>	<b>Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies. [C, CN, PS, R]</b>

INDICATOR G1.1. Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternative approaches.

INDICATOR G1.2. Identify and correct errors in the solution to a puzzle or in a strategy for winning a game.

INDICATOR G1.3. Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

Grade 11 - Adopted: 2016

<b>COURSE / STRAND</b>	<b>NL.2201.</b>	<b>Academic Mathematics 2201</b>
<b>STRAND / GCO</b>	<b>2201.NL.</b>	<b>Number and Logic</b>
<b>GCO / SCO</b>		<b>Develop number sense and logical reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>NL1.</b>	<b>Analyze and prove conjectures, using inductive and deductive reasoning, to solve problems. [C, CN, PS, R]</b>

INDICATOR	NL1.7.	Compare, using examples, inductive and deductive reasoning.
INDICATOR	NL1.9.	Solve a contextual problem that involves inductive or deductive reasoning.
<b>COURSE / STRAND</b>	<b>NL.2201.</b>	<b>Academic Mathematics 2201</b>
<b>STRAND / GCO</b>	<b>2201.NL.</b>	<b>Number and Logic</b>
<b>GCO / SCO</b>		<b>Develop number sense and logical reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>NL2.</b>	<b>Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies. [CN, PS, R, V]</b>
INDICATOR	NL2.1.	Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternative approaches
INDICATOR	NL2.2.	Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.
INDICATOR	NL2.3.	Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.

Grade 11 - Adopted: 2012

<b>COURSE / STRAND</b>	<b>NL.2202.</b>	<b>Applied Mathematics 2202</b>
<b>STRAND / GCO</b>	<b>2202.N.</b>	<b>Number</b>
<b>GCO / SCO</b>		<b>Develop number sense and critical thinking skills.</b>
<b>OUTCOME / INDICATOR</b>	<b>N1.</b>	<b>Analyze puzzles and games that involve numerical reasoning, using problem-solving strategies. [C, CN, PS, R]</b>
INDICATOR	N1.1.	Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternative approaches.
INDICATOR	N1.2.	Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.
INDICATOR	N1.3.	Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

<b>COURSE / STRAND</b>	<b>NL.2202.</b>	<b>Applied Mathematics 2202</b>
<b>STRAND / GCO</b>	<b>2202.A.</b>	<b>Algebra</b>
<b>GCO / SCO</b>		<b>Develop algebraic reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>A1.</b>	<b>Solve problems that require the manipulation and application of formulas related to: volume and capacity; surface area; slope and rate of change; simple interest; finance charges. [CN, ME, PS, R]</b>
INDICATOR	A1.1.	Solve a contextual problem involving the application of a formula that does not require manipulation.
INDICATOR	A1.2.	Solve a contextual problem involving the application of a formula that requires manipulation.
INDICATOR	A1.4.	Create and solve a contextual problem that involves a formula.

<b>COURSE / STRAND</b>	<b>NL.2202.</b>	<b>Applied Mathematics 2202</b>
<b>STRAND / GCO</b>	<b>2202.A.</b>	<b>Algebra</b>
<b>GCO / SCO</b>		<b>Develop algebraic reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>A2.</b>	<b>Demonstrate an understanding of slope: as rise over run; as rate of change; by solving problems. [C, CN, PS, V]</b>

INDICATOR A2.9. Solve a contextual problem that involves slope or rate of change.

Grade 11 - Adopted: 2016

<b>COURSE / STRAND</b>	<b>NL.3201.</b>	<b>Academic Mathematics 3201</b>
<b>STRAND / GCO</b>	<b>3201.LR.</b>	<b>Logical Reasoning</b>
<b>GCO / SCO</b>		<b>Develop logical reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>LR1.</b>	<b>Analyze puzzles and games that involve numerical and logical reasoning, using problem-solving strategies. [C, CN, ME, PS, R]</b>

INDICATOR LR1.1. Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternative approaches.

INDICATOR LR1.2. Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.

INDICATOR LR1.3. Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

Grade 11 - Adopted: 2013

<b>COURSE / STRAND</b>	<b>NL.3202.</b>	<b>Applied Mathematics 3202</b>
<b>STRAND / GCO</b>	<b>3202.A.</b>	<b>Algebra</b>
<b>GCO / SCO</b>		<b>Develop algebraic reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>A1.</b>	<b>Demonstrate an understanding of linear relations by: recognizing patterns and trends; graphing; creating tables of values; writing equations; interpolating and extrapolating; solving problems. [CN, PS, R, T, V]</b>

INDICATOR A1.2. Solve a contextual problem that requires interpolation or extrapolation of information.

INDICATOR A1.12. Solve a contextual problem that involves the application of a formula for a linear relation.

**Newfoundland and Labrador Curriculum Guides  
Mathematics**

Grade 12 - Adopted: 2015

<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>OUTCOME / INDICATOR</b>	<b>RF3.</b>	<b>Demonstrate an understanding of slope with respect to: rise and run; line segments and lines; rate of change; parallel lines; perpendicular lines. [PS, R,V]</b>

INDICATOR RF3.6. Draw a line, given its slope and a point on the line.

INDICATOR	RF3.7.	Determine another point on a line, given the slope and a point on the line.
<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>OUTCOME / INDICATOR</b>	<b>RF5.</b>	<b>Determine the characteristics of the graphs of linear relations, including the: intercepts; rate of change; domain; range. [CN, PS, R, V]</b>

INDICATOR	RF5.6.	Solve a contextual problem that involves intercepts, rate of change, domain or range of a linear relation.
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INDICATOR	RF5.7.	Sketch a linear relation that has one intercept, two intercepts or an infinite number of intercepts.
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<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>OUTCOME / INDICATOR</b>	<b>RF6.</b>	<b>Relate linear relations expressed in: slope-intercept form <math>y = mx + b</math>; general form <math>Ax + By + C = 0</math>; slope-point form; <math>y - y_1 = m(x - x_1)</math> to their graphs. [CN, R, T, V]</b>

INDICATOR	RF6.2.	Generalize and explain strategies for graphing a linear relation in slope-intercept, general or slope-point form.
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INDICATOR	RF6.3.	Graph, with and without technology, a linear relation given in slope-intercept, general or slope-point form, and explain the strategy used to create the graph.
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INDICATOR	RF6.4.	Match a set of linear relations to their graphs.
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<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>
<b>OUTCOME / INDICATOR</b>	<b>RF7.</b>	<b>Determine the equation of a linear relation, given: a graph; a point and the slope; two points; a point and the equation of a parallel or perpendicular line to solve problems. [CN, PS, R, V].</b>

INDICATOR	RF7.2.	Write the equation of a linear relation, given its slope and the coordinates of a point on the line, and explain the reasoning.
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INDICATOR	RF7.4.	Graph linear data generated from a context, and write the equation of the resulting line.
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INDICATOR	RF7.5.	Solve a problem, using the equation of a linear relation.
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INDICATOR	RF7.6.	Write the equation of a linear relation, given the coordinates of a point on the line and the equation of a parallel or perpendicular line, and explain the reasoning.
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<b>COURSE / STRAND</b>	<b>NL.1201.</b>	<b>Mathematics 1201</b>
<b>STRAND / GCO</b>	<b>1201.RF.</b>	<b>Relations and Functions</b>
<b>GCO / SCO</b>		<b>Develop algebraic and graphical reasoning through the study of relations.</b>



<b>OUTCOME / INDICATOR</b>	<b>RF8.</b>	<b>Represent a linear function, using function notation. [CN, ME, V]</b>
INDICATOR	RF8.4.	Determine the related domain value, given a range value for a linear function; e.g., If $g(t) = 7 + t$ , determine $t$ so that $g(t)=15$ .

INDICATOR RF8.5. Sketch the graph of a linear function expressed in function notation.

<b>COURSE / STRAND</b>	<b>NL.1202.</b>	<b>Applied Mathematics 1202</b>
<b>STRAND / GCO</b>	<b>1202.A.</b>	<b>Algebra</b>
<b>GCO / SCO</b>		<b>Develop algebraic reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>A1.</b>	<b>Solve problems that require the manipulation and application of formulas related to: perimeter; area; the Pythagorean theorem; primary trigonometric ratios; income. [C, CN, ME, PS, R]</b>

INDICATOR A1.1. Create and solve a contextual problem that involves a formula.

<b>COURSE / STRAND</b>	<b>NL.1202.</b>	<b>Applied Mathematics 1202</b>
<b>STRAND / GCO</b>	<b>1202.G.</b>	<b>Geometry</b>
<b>GCO / SCO</b>		<b>Develop spatial sense.</b>
<b>OUTCOME / INDICATOR</b>	<b>G1.</b>	<b>Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies. [C, CN, PS, R]</b>

INDICATOR G1.1. Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternative approaches.

INDICATOR G1.2. Identify and correct errors in the solution to a puzzle or in a strategy for winning a game.

INDICATOR G1.3. Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

Grade 12 - Adopted: 2016

<b>COURSE / STRAND</b>	<b>NL.2201.</b>	<b>Academic Mathematics 2201</b>
<b>STRAND / GCO</b>	<b>2201.NL.</b>	<b>Number and Logic</b>
<b>GCO / SCO</b>		<b>Develop number sense and logical reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>NL1.</b>	<b>Analyze and prove conjectures, using inductive and deductive reasoning, to solve problems. [C, CN, PS, R]</b>

INDICATOR NL1.7. Compare, using examples, inductive and deductive reasoning.

INDICATOR NL1.9. Solve a contextual problem that involves inductive or deductive reasoning.

<b>COURSE / STRAND</b>	<b>NL.2201.</b>	<b>Academic Mathematics 2201</b>
<b>STRAND / GCO</b>	<b>2201.NL.</b>	<b>Number and Logic</b>
<b>GCO / SCO</b>		<b>Develop number sense and logical reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>NL2.</b>	<b>Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies. [CN, PS, R, V]</b>

INDICATOR	NL2.1.	Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternative approaches
INDICATOR	NL2.2.	Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.
INDICATOR	NL2.3.	Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.

Grade 12 - Adopted: 2012

<b>COURSE / STRAND</b>	<b>NL.2202.</b>	<b>Applied Mathematics 2202</b>
<b>STRAND / GCO</b>	<b>2202.N.</b>	<b>Number</b>
<b>GCO / SCO</b>		<b>Develop number sense and critical thinking skills.</b>
<b>OUTCOME / INDICATOR</b>	<b>N1.</b>	<b>Analyze puzzles and games that involve numerical reasoning, using problem-solving strategies. [C, CN, PS, R]</b>

INDICATOR N1.1. Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternative approaches.

INDICATOR N1.2. Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.

INDICATOR N1.3. Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

<b>COURSE / STRAND</b>	<b>NL.2202.</b>	<b>Applied Mathematics 2202</b>
<b>STRAND / GCO</b>	<b>2202.A.</b>	<b>Algebra</b>
<b>GCO / SCO</b>		<b>Develop algebraic reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>A1.</b>	<b>Solve problems that require the manipulation and application of formulas related to: volume and capacity; surface area; slope and rate of change; simple interest; finance charges. [CN, ME, PS, R]</b>

INDICATOR A1.1. Solve a contextual problem involving the application of a formula that does not require manipulation.

INDICATOR A1.2. Solve a contextual problem involving the application of a formula that requires manipulation.

INDICATOR A1.4. Create and solve a contextual problem that involves a formula.

<b>COURSE / STRAND</b>	<b>NL.2202.</b>	<b>Applied Mathematics 2202</b>
<b>STRAND / GCO</b>	<b>2202.A.</b>	<b>Algebra</b>
<b>GCO / SCO</b>		<b>Develop algebraic reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>A2.</b>	<b>Demonstrate an understanding of slope: as rise over run; as rate of change; by solving problems. [C, CN, PS, V]</b>

INDICATOR A2.9. Solve a contextual problem that involves slope or rate of change.

Grade 12 - Adopted: 2016

<b>COURSE / STRAND</b>	<b>NL.3201.</b>	<b>Academic Mathematics 3201</b>
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<b>STRAND / GCO</b>	<b>3201.LR.</b>	<b>Logical Reasoning</b>
<b>GCO / SCO</b>		<b>Develop logical reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>LR1.</b>	<b>Analyze puzzles and games that involve numerical and logical reasoning, using problem-solving strategies. [C, CN, ME, PS, R]</b>
INDICATOR	LR1.1.	Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternative approaches.
INDICATOR	LR1.2.	Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.
INDICATOR	LR1.3.	Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

Grade 12 - Adopted: 2013

<b>COURSE / STRAND</b>	<b>NL.3202.</b>	<b>Applied Mathematics 3202</b>
<b>STRAND / GCO</b>	<b>3202.A.</b>	<b>Algebra</b>
<b>GCO / SCO</b>		<b>Develop algebraic reasoning.</b>
<b>OUTCOME / INDICATOR</b>	<b>A1.</b>	<b>Demonstrate an understanding of linear relations by: recognizing patterns and trends; graphing; creating tables of values; writing equations; interpolating and extrapolating; solving problems. [CN, PS, R, T, V]</b>
INDICATOR	A1.2.	Solve a contextual problem that requires interpolation or extrapolation of information.
INDICATOR	A1.12.	Solve a contextual problem that involves the application of a formula for a linear relation.

**Newfoundland and Labrador Curriculum Guides**  
**Science**

Grade 11 - Adopted: 2018

<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH. GCO.1.</b>	<b>Science, Technology, Society, and the Environment – Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>
INDICATOR	CH.GCO.1.5.	Evaluate social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives

<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH. GCO.3.</b>	<b>Knowledge – Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR	CH.GCO. 3.1.	Identify and explain the diversity of organic compounds and their impact on the environment
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INDICATOR	CH.GCO. 3.6.	Predict and explain energy transfers in chemical reactions
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<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH. GCO.4.</b>	<b>Attitudes – Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>

<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>
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INDICATOR	CH.GCO. 4.11.	Have a sense of personal and shared responsibility for maintaining a sustainable environment
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INDICATOR	CH.GCO. 4.13.	Want to take action for maintaining a sustainable environment
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<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH.S CO.i.</b>	<b>Unit i: Integrated Skills</b>

<b>OUTCOME / INDICATOR</b>		<b>Performing and Recording</b>
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INDICATOR	CH.SCO.i .6.0.	Implement appropriate sampling procedures [GCO 2]
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<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH.S CO.2.</b>	<b>Unit 2: From Structures to Properties</b>

<b>OUTCOME / INDICATOR</b>		<b>Material Properties and Society</b>
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INDICATOR	CH.SCO. 2.62.0.	Analyze from a variety of perspectives the risks and benefits to society and the environment of applying scientific knowledge or introducing a particular technology [GCO 1]
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Grade 11 - Adopted: 2019

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
<b>STRAND / GCO</b>		<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>GCO 1: Science, Technology, Society, and the Environment: Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.</b>

<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>
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INDICATOR evaluate social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
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<b>STRAND / GCO</b>		<b>General Curriculum Outcomes</b>
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<b>GCO / SCO</b>		<b>GCO 3: Knowledge: Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.</b>
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<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>
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INDICATOR identify and explain the diversity of organic compounds and their impact on the environment

INDICATOR predict and explain energy transfers in chemical reactions

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
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<b>STRAND / GCO</b>		<b>General Curriculum Outcomes</b>
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<b>GCO / SCO</b>		<b>GCO 4: Attitudes: Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
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<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>
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INDICATOR have a sense of personal and shared responsibility for maintaining a sustainable environment

INDICATOR want to take action for maintaining a sustainable environment

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
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<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
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<b>GCO / SCO</b>		<b>Unit 1: From Kinetics to Equilibrium</b>
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<b>OUTCOME / INDICATOR</b>		<b>Applications of Kinetics</b>
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INDICATOR Unit 1.37.0 analyze and describe examples where technologies were developed based upon scientific understanding [GCO 1]

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
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<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
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<b>GCO / SCO</b>		<b>Unit 3: Thermochemistry</b>
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<b>OUTCOME / INDICATOR</b>		<b>Enthalpy Changes</b>
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INDICATOR Unit 3.63.0 define endothermic reaction, exothermic reaction, enthalpy, bond energy, heat of reaction, and molar enthalpy [GCO 3]

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>Unit 3: Thermochemistry</b>
<b>OUTCOME / INDICATOR</b>		<b>Applications of Heat Technology</b>
INDICATOR	Unit 3.66.0	analyze and describe examples where technologies were developed based on scientific understanding [GCO 1]
INDICATOR	Unit 3.67.0	analyze from a variety of perspectives the risks and benefits to society and the environment of applying scientific knowledge or introducing a particular technology [GCO 1]
INDICATOR	Unit 3.68.0	propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability [GCO 1]
INDICATOR	Unit 3.72.0	analyze the knowledge and skills acquired in their study of science to identify areas of further study related to science and technology [GCO 1]
INDICATOR	Unit 3.30.0	identify multiple perspectives that influence a science-related decision or issue [GCO 2]

Grade 11 - Adopted: 2005

<b>COURSE / STRAND</b>	<b>NL.HS.ES 3209.</b>	<b>Earth Systems 3209</b>
<b>STRAND / GCO</b>	<b>ES3209. 2.</b>	<b>Unit 2: Historical Geology</b>
<b>GCO / SCO</b>	<b>ES3209. 2.1.</b>	<b>Historical Developments and Geologic Time: Students will be expected to:</b>

OUTCOME / INDICATOR ES3209.2 .1.24. Analyse and describe examples where scientific understanding was enhanced or revised as a result of the invention of a technology. (116-2)

OUTCOME / INDICATOR ES3209.2 .1.25. Analyse and describe examples where technologies were developed based on scientific understanding. (116-4)

<b>COURSE / STRAND</b>	<b>NL.HS.ES 3209.</b>	<b>Earth Systems 3209</b>
<b>STRAND / GCO</b>	<b>ES3209. 5.</b>	<b>Unit 5: Earth Resources: Real-Life Applications</b>
<b>GCO / SCO</b>	<b>ES3209. 5.3.</b>	<b>Energy Resources -- Petroleum Formation: Students will be expected to:</b>

OUTCOME / INDICATOR ES3209.5 .3.1. Describe the processes and techniques involved in extracting and refining hydrocarbons. (330-10)

OUTCOME / INDICATOR ES3209.5 .3.4. Define hydrocarbons.

OUTCOME / INDICATOR ES3209.5 .3.7. Describe the processes and techniques involved in extracting and refining hydrocarbons. (330-10)

OUTCOME / INDICATOR	ES3209.5 .3.8.	Define kerogen.
OUTCOME / INDICATOR	ES3209.5 .3.11.	Analyse and describe examples where scientific understanding was enhanced or revised as a result of the invention of technology. (116-2)
OUTCOME / INDICATOR	ES3209.5 .3.15.	Describe the processes and techniques involved in extracting and refining hydrocarbons. (330-10)
OUTCOME / INDICATOR	ES3209.5 .3.17.	Describe the distribution of petroleum in a reservoir.

<b>COURSE / STRAND</b>	<b>NL.HS.ES 3209.</b>	<b>Earth Systems 3209</b>
<b>STRAND / GCO</b>	<b>ES3209.5.</b>	<b>Unit 5: Earth Resources: Real-Life Applications</b>
<b>GCO / SCO</b>	<b>ES3209.5.5.</b>	<b>Energy Resources -- Moving Towards a Sustainable Future: Students will be expected to:</b>

OUTCOME / INDICATOR ES3209.5 .5.1. Analyse from a variety of perspectives, the risks and benefits to society and the environment of applying scientific knowledge, or introducing a particular technology. (118-2)

OUTCOME / INDICATOR ES3209.5 .5.2. Identify factors involved in developing Earth's resources in a sustainable manner. (330-11)

OUTCOME / INDICATOR ES3209.5 .5.5. Identify and describe core components involved in the sustainable development of Earth resources.

Grade 11 - Adopted: 2010

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV3205.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV3205.1.1.</b>	<b>The Biosphere: Students will be expected to:</b>

OUTCOME / INDICATOR ENV3205 .1.1.2. Identify that humans are one part of a complex system of living thing that can have a great impact on the other systems.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV3205.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV3205.1.4.</b>	<b>Environmental Issues and Human Needs: Students will be expected to:</b>

OUTCOME / INDICATOR ENV3205 .1.4.1. Identify that anthropocentric attitudes have contributed to many of today's environmental issues.

OUTCOME / INDICATOR ENV3205 .1.4.3. Define sustainability as a human practice to maintain ecosystem stability.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.5.</b>	<b>Conservation, Sustainability and Stewardship: Students will be expected to:</b>

OUTCOME / INDICATOR ENV3205 Define environmental Conservation.  
.1.5.1.

OUTCOME / INDICATOR ENV3205 Define stewardship in relation to sustainability.  
.1.5.2.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.5.</b>	<b>Conservation, Sustainability and Stewardship: Students will be expected to:</b>

**OUTCOME / INDICATOR ENV320 5.1.5.3. Identify the factors that influence sustainability. Include:**

INDICATOR ENV3205 Ecological  
.1.5.3.i.

INDICATOR ENV3205 Social  
.1.5.3.ii.

INDICATOR ENV3205 Economic  
.1.5.3.iii.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.6.</b>	<b>Our Ecological Footprint: Students will be expected to:</b>

**OUTCOME / INDICATOR ENV320 5.1.6.1. Recognize some widely-held misconceptions related to sustainability. Include:**

INDICATOR ENV3205 Environment damage is permanent  
.1.6.1.i.

INDICATOR ENV3205 One person cannot make a difference  
.1.6.1.iii.

INDICATOR ENV3205 Science can solve all of our problems  
.1.6.1.iv.

INDICATOR ENV3205 All human activity in nature is bad  
.1.6.1.vi.



<b>COURSE / STRAND</b>	NL.HS.EN V3205.	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	ENV320 5.1.	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	ENV320 5.1.6.	<b>Our Ecological Footprint: Students will be expected to:</b>

OUTCOME / INDICATOR ENV3205 .1.6.2. Identify individual impacts on the environment using the concept of ecological footprint.

<b>COURSE / STRAND</b>	NL.HS.EN V3205.	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	ENV320 5.1.	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	ENV320 5.1.6.	<b>Our Ecological Footprint: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	ENV320 5.1.6.4.	<b>Describe environmental responsibility. Include the role of:</b>

INDICATOR ENV3205 .1.6.4.i. Individuals

INDICATOR ENV3205 .1.6.4.ii. Community

INDICATOR ENV3205 .1.6.4.iii. Industry

<b>COURSE / STRAND</b>	NL.HS.EN V3205.	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	ENV320 5.5.	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	ENV320 5.5.1.	<b>Introduction to the Atmosphere: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	ENV320 5.5.1.2.	<b>List the major functions of Earth's atmosphere. Include:</b>

INDICATOR ENV3205 .5.1.2.ii. Traps heat

<b>COURSE / STRAND</b>	NL.HS.EN V3205.	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	ENV320 5.5.	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	ENV320 5.5.4.	<b>Air Quality and Airborne Pollutants: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	ENV320 5.5.4.1.	<b>Describe critical air contaminants effects on air quality. Include:</b>

INDICATOR ENV3205 .5.4.1.v. Carbon monoxide (CO)

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.5.</b>	<b>Persistent Organic Pollutants: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.5.1.</b>	<b>Describe how persistent organic pollutants affect air quality. Include:</b>

INDICATOR ENV3205 Sources in Newfoundland and Labrador  
.5.5.1.i.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.8.</b>	<b>Improving Air Quality: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.8.1.</b>	<b>Identify ways to improve air quality. Include:</b>

INDICATOR ENV3205 Individual  
.5.8.1.i.

INDICATOR ENV3205 Community  
.5.8.1.ii.

INDICATOR ENV3205 Provincial  
.5.8.1.iii.

INDICATOR ENV3205 National  
.5.8.1.iv.

INDICATOR ENV3205 International  
.5.8.1.v.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.8.</b>	<b>Improving Air Quality: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.8.2.</b>	<b>Identify methods to improve air quality. Include:</b>

INDICATOR ENV3205 Cleaner burning fuels  
.5.8.2.i.

INDICATOR ENV3205 End of pipe technology  
.5.8.2.ii.

INDICATOR ENV3205 Catalytic converters  
.5.8.2.iii.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.11.</b>	<b>Climate Change: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.11.1.</b>	<b>Identify that climate change can have a catastrophic affect on Earth. Include:</b>

INDICATOR ENV3205 Natural sources of green house gasses  
.5.11.1.i.

INDICATOR ENV3205 Anthropogenic sources of greenhouse gases  
.5.11.1.ii.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.1.</b>	<b>Describe the impacts of climate change in Canada on wildlife and natural ecosystems. Include:</b>

INDICATOR ENV3205 Types of vegetation  
.5.12.1.i.

INDICATOR ENV3205 Shifting ecosystem boundaries  
.5.12.1.ii.

INDICATOR ENV3205 Biodiversity of species  
.5.12.1.iii.

INDICATOR ENV3205 Adaptation of species  
.5.12.1.iv.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>

OUTCOME / INDICATOR ENV3205 Describe the impacts of climate change in forests.  
.5.12.2.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>

<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.3.</b>	<b>Describe the impacts of climate change in Canada on agriculture. Include:</b>
INDICATOR	ENV3205 .5.12.3.i.	Length of growing season
INDICATOR	ENV3205 .5.12.3.ii.	Extreme weather events
INDICATOR	ENV3205 .5.12.3.iii.	Types of crops
INDICATOR	ENV3205 .5.12.3.iv.	Precipitation variability

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>

<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.4.</b>	<b>Describe the impacts of climate change in Canada on fishery. Include:</b>
INDICATOR	ENV3205 .5.12.4.i.	Water temperature effects
INDICATOR	ENV3205 .5.12.4.ii.	Species distribution
INDICATOR	ENV3205 .5.12.4.iii.	Growth rates

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>

<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.5.</b>	<b>Describe the impacts of climate change in Canada on coastal zones (sea level changes and areas of human habitat). Include:</b>
INDICATOR	ENV3205 .5.12.5.i.	Coastal erosion
INDICATOR	ENV3205 .5.12.5.ii.	Flooding due to expansion of ocean water caused by melting ice
INDICATOR	ENV3205 .5.12.5.iii.	Tectonic subsidence to
INDICATOR	ENV3205 .5.12.5.iv.	Newfoundland and Labrador locations at risk

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.6.</b>	<b>Describe the impacts of climate change in Canada on extreme weather events. Include:</b>

INDICATOR	ENV3205 .5.12.6.i.	Frequency
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INDICATOR	ENV3205 .5.12.6.ii.	Intensity
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INDICATOR	ENV3205 .5.12.6.iii.	Vulnerable areas in Newfoundland and Labrador
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<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.7.</b>	<b>Describe the impacts of climate change in Canada on human health. Include:</b>

INDICATOR	ENV3205 .5.12.7.i.	Heat stress
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INDICATOR	ENV3205 .5.12.7.ii.	Migration of diseases
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<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.13.</b>	<b>Actions to Address Climate Change: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.13.1.</b>	<b>Describe efforts made to address climate change Include:</b>

INDICATOR	ENV3205 .5.13.1.i.	Individual
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INDICATOR	ENV3205 .5.13.1.ii.	Industries
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INDICATOR	ENV3205 .5.13.1.iii.	Provincial governments
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INDICATOR	ENV3205 .5.13.1.iv.	Federal governments
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INDICATOR	ENV3205 5.13.1.v.	International agreements such as the Rio Declaration and the Kyoto Protocol.
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Grade 11 - Adopted: 2018

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC GCO.1.</b>	<b>Science, Technology, Society, and the Environment – Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR	SC.GCO. 1.3.	Analyze and explain how science and technology interact with and advance one another
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INDICATOR	SC.GCO. 1.5.	Evaluate social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives
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<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC GCO.2.</b>	<b>Skills – Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR	SC.GCO. 2.4.	Work as a member of a team in addressing problems, and apply the skills and conventions of science in communicating information and ideas and in assessing results
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<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC GCO.3.</b>	<b>Knowledge – Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR	SC.GCO. 3.4.	Chemistry: Identify and explain the diversity of organic compounds and their impact on the environment
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<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC GCO.4.</b>	<b>Attitudes – Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR	SC.GCO. 4.2.	Appreciate that the applications of science and technology can raise ethical dilemmas
INDICATOR	SC.GCO. 4.7.	Confidently evaluate evidence and consider alternative perspectives, ideas, and explanations
INDICATOR	SC.GCO. 4.11.	Have a sense of personal and shared responsibility for maintaining a sustainable environment
INDICATOR	SC.GCO. 4.12.	Project the personal and shared social, and environmental consequences of proposed action
INDICATOR	SC.GCO. 4.13.	Want to take action for maintaining a sustainable environment
INDICATOR	SC.GCO. 4.15.	Be aware of the direct and indirect consequences of their actions

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.i.</b>	<b>Unit i: Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Initiating and Planning</b>

INDICATOR	SC.SCO.i .6.0.	Evaluate and select appropriate instruments for collecting evidence and appropriate processes for problem solving, inquiring, and decision making [GCO 2]
INDICATOR	SC.SCO.i .7.0.	Develop appropriate sampling procedures [GCO 2]

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.i.</b>	<b>Unit i: Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Performing and Recording</b>

INDICATOR	SC.SCO.i .8.0.	Carry out procedures controlling the major variables and adapting or extending procedures where required [GCO 2]
INDICATOR	SC.SCO.i .9.0.	Use instruments effectively and accurately for collecting data [GCO 2]

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>

<b>GCO / SCO</b>	<b>HS.SC.S CO.i.</b>	<b>Unit i: Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Communication and Teamwork</b>
INDICATOR	SC.SCO.i .25.0.	Communicate questions, ideas, and intentions, and receive, interpret, understand, support, and respond to the ideas of others [GCO 2]
INDICATOR	SC.SCO.i .27.0.	Identify multiple perspectives that influence a science-related decision or issue [GCO 2]

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.1.</b>	<b>Unit 1: Weather Dynamics</b>
<b>OUTCOME / INDICATOR</b>		<b>Climate Change</b>
INDICATOR	SC.SCO. 1.39.0.	Explain how scientific knowledge evolves as new evidence comes to light [GCO 1]

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.1.</b>	<b>Unit 1: Weather Dynamics</b>
<b>OUTCOME / INDICATOR</b>		<b>Impact of Climate Change</b>
INDICATOR	SC.SCO. 1.12.0.	Use library and electronic research tools to collect information on a given topic [GCO 2]
INDICATOR	SC.SCO. 1.24.0.	Identify new questions or problems that arise from what was learned [GCO 2]
INDICATOR	SC.SCO. 1.28.0.	Develop, present, and defend a position or course of action, based on findings [GCO 2]

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.2.</b>	<b>Unit 2: Chemical Reactions</b>
<b>OUTCOME / INDICATOR</b>		<b>Chemical Reactions</b>
INDICATOR	SC.SCO. 2.45.0.	Classify chemical reactions based on type [GCO 3]



INDICATOR SC.SCO. Describe and apply classification systems and nomenclatures used in the sciences [GCO 2]  
2.16.0.

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.3.</b>	<b>Unit 3: Motion</b>
<b>OUTCOME / INDICATOR</b>		<b>Motion in Daily Life</b>

INDICATOR SC.SCO. Identify possible areas of further study related to science and technology [GCO 1]  
3.54.0.

INDICATOR SC.SCO. Distinguish between scientific questions and technological problems [GCO 1]  
3.55.0.

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.3.</b>	<b>Unit 3: Motion</b>
<b>OUTCOME / INDICATOR</b>		<b>Motion Technologies</b>

INDICATOR SC.SCO. Evaluate the role of continued testing in the development and improvement of technologies [GCO 1]  
3.63.0.

INDICATOR SC.SCO. Evaluate the design of a technology and the way it functions on the basis of identified criteria such as safety, cost, availability, and impact on everyday life and the environment [GCO 1]  
3.64.0.

INDICATOR SC.SCO. Analyze natural and technological systems to interpret and explain their structure and dynamics [GCO 1]  
3.65.0.

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.4.</b>	<b>Unit 4: Sustainability of Ecosystems</b>
<b>OUTCOME / INDICATOR</b>		<b>Factors That Affect the Sustainability of Ecosystems</b>

INDICATOR SC.SCO. Analyze the impact of external factors on an ecosystem [GCO 3]  
4.71.0.

INDICATOR SC.SCO. Select and integrate information from various print and electronic sources or from several parts of the same source [GCO 2]  
4.13.0.

INDICATOR SC.SCO. Propose a course of action on social issues related to science and technology, taking into account human and environmental needs [GCO 1]  
4.72.0.

INDICATOR	SC.SCO. 4.51.0.	Defend a decision or judgment and demonstrate that relevant arguments can arise from different perspectives [GCO 1]
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<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.4.</b>	<b>Unit 4: Sustainability of Ecosystems</b>
<b>OUTCOME / INDICATOR</b>		<b>Biodiversity and Sustainability</b>

INDICATOR	SC.SCO. 4.74.0.	Explain why different ecosystems respond differently to short-term stresses and long-term changes [GCO 3]
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<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.4.</b>	<b>Unit 4: Sustainability of Ecosystems</b>
<b>OUTCOME / INDICATOR</b>		<b>Sustainable Development</b>

INDICATOR	SC.SCO. 4.78.0.	Compare the risks and benefits to society and the environment of applying scientific knowledge or introducing a technology [GCO 1]
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Grade 11 - Adopted: 2004

<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
<b>STRAND / GCO</b>	<b>SC2200. 1.</b>	<b>Unit 1: Ecosystems</b>
<b>GCO / SCO</b>	<b>SC2200. 1.1.</b>	<b>Diversity in Ecosystems: Students will be expected to:</b>

OUTCOME / INDICATOR	SC2200. 1.1.1.	Explain how a paradigm shift, with respect to environmental attitudes, can change scientific world views in understanding sustainability. (114-1)
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OUTCOME / INDICATOR	SC2200. 1.1.6.	Define sustainability.
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<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
<b>STRAND / GCO</b>	<b>SC2200. 1.</b>	<b>Unit 1: Ecosystems</b>
<b>GCO / SCO</b>	<b>SC2200. 1.2.</b>	<b>Change and Stability in Ecosystems: Students will be expected to:</b>

OUTCOME / INDICATOR	SC2200. 1.2.17.	Describe global warming and its impact on our local environment. (215-1)
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OUTCOME / INDICATOR	SC2200. 1.2.19.	Pollution (e.g., excess CO2)
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OUTCOME / INDICATOR	SC2200. 1.2.20.	Weather change.
OUTCOME / INDICATOR	SC2200. 1.2.34.	Describe the significance of global warming.
OUTCOME / INDICATOR	SC2200. 1.2.41.	Plan changes to predict the effects of, and analyze the impact of external factors on an ecosystem. (331-6, 213-8, 212-4, 118-5, 118-9)
OUTCOME / INDICATOR	SC2200. 1.2.56.	Analyze the impact of external factors on the ecosystem. (331-6) Include:
OUTCOME / INDICATOR	SC2200. 1.2.57.	Pollution (e.g., acid rain).
OUTCOME / INDICATOR	SC2200. 1.2.60.	Weather change (e.g., global warming).
OUTCOME / INDICATOR	SC2200. 1.2.62.	Communicate questions, ideas and intentions, and receive, interpret, understand, support and respond to the ideas of others in preparing a report or presentation on the impact of external factors on ecosystem biomes. (214-3, 215-1, 215-4)

<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
<b>STRAND / GCO</b>	<b>SC2200. 1.</b>	<b>Unit 1: Ecosystems</b>
<b>GCO / SCO</b>	<b>SC2200. 1.3.</b>	<b>Sustaining Ecosystems: Students will be expected to:</b>

OUTCOME / INDICATOR SC2200. 1.3.8. Select and display evidence and information, from a variety of sources, to explain how external factors such as global warming or other human activities may have an impact on the distribution of biomes within Canada. (213-7, 214-3, 215-4)

OUTCOME / INDICATOR SC2200. 1.3.26. Compare the risks and benefits to the biosphere of applying new scientific knowledge and technology to industrial processes. (118-1)

<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
<b>STRAND / GCO</b>	<b>SC2200. 2.</b>	<b>Unit 2: Earth and Space Science: Weather Dynamics</b>
<b>GCO / SCO</b>	<b>SC2200. 2.2.</b>	<b>Global Weather: Students will be expected to:</b>

OUTCOME / INDICATOR SC2200. 2.2.23. Identify the distribution of common atmospheric gases (oxygen, nitrogen, water vapour, carbon dioxide).

<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
<b>STRAND / GCO</b>	<b>SC2200. 2.</b>	<b>Unit 2: Earth and Space Science: Weather Dynamics</b>
<b>GCO / SCO</b>	<b>SC2200. 2.3.</b>	<b>Extreme Weather Events: Students will be expected to:</b>

OUTCOME / INDICATOR	SC2200. 2.3.9.	Describe how human activities can impact global weather patterns.
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OUTCOME / INDICATOR	SC2200. 2.3.10.	Describe the causes and impact of the greenhouse effect.
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Grade 11 - Adopted: 2005

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.1.</b>	<b>Chemistry Around You: Students will be expected to:</b>

OUTCOME / INDICATOR	SC3200. 1.1.1.	Provide examples of how science and technology are an integral part of their lives and their community by investigating common examples of combustion. (117-5)
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OUTCOME / INDICATOR	SC3200. 1.1.4.	Identify examples of chemistry and technology around them in everyday life.
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<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.3.</b>	<b>Periodic Table, Atoms, &amp; Ions: Students will be expected to:</b>

OUTCOME / INDICATOR	SC3200. 1.3.10.	Provide examples of how chemistry is an integral part of our lives. (117-5)
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<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.6.</b>	<b>Introduction to Chemical Reactions: Students will be expected to:</b>

OUTCOME / INDICATOR	SC3200. 1.6.7.	List several examples of important chemical reactions. Include:
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INDICATOR	SC3200. 1.6.7.ii.	Burning of fossil fuels
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<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.6.</b>	<b>Introduction to Chemical Reactions: Students will be expected to:</b>

OUTCOME / INDICATOR	SC3200. 1.6.9.	Define in terms of the chemicals involved five types of chemical reactions. Include:
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INDICATOR	SC3200. 1.6.9.v.	Combustion
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<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.6.</b>	<b>Introduction to Chemical Reactions: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>SC3200. 1.6.10.</b>	<b>Given reactants and the reaction type, predict the products of chemical reactions using word equations and chemical symbol equations. Include:</b>

INDICATOR SC3200. 1.6.10.v. Combustion

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.7.</b>	<b>Balancing Chemical Reactions: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>SC3200. 1.7.3.</b>	<b>Write and balance a variety of chemical reactions. Include:</b>

INDICATOR SC3200. 1.7.3.iv. Combustion

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 2.</b>	<b>Unit 2: Motion and its Applications</b>
<b>GCO / SCO</b>	<b>SC3200. 2.1.</b>	<b>Distance and Speed: Students will be expected to:</b>

OUTCOME / INDICATOR SC3200. 2.1.9. Analyze the benefits to society of applying scientific knowledge on motion and introduction of a particular technology. (118-2).

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 2.</b>	<b>Unit 2: Motion and its Applications</b>
<b>GCO / SCO</b>	<b>SC3200. 2.1.</b>	<b>Distance and Speed: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>SC3200. 2.1.22.</b>	<b>List the factors to be considered when purchasing an automobile. Include:</b>

INDICATOR SC3200. 2.1.22.i. Owner needs

INDICATOR SC3200. 2.1.22.ii. Engine size and efficiency

INDICATOR SC3200. 2.1.22.iii. Vehicle size

INDICATOR	SC3200. 2.1.22.iv.	Fuel type and consumption
INDICATOR	SC3200. 2.1.22.v.	Cost
INDICATOR	SC3200. 2.1.22.vi.	Safety
INDICATOR	SC3200. 2.1.22.vii.	Durability/reliability
INDICATOR	SC3200. 2.1.22.viii.	Style

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 2.</b>	<b>Unit 2: Motion and its Applications</b>
<b>GCO / SCO</b>	<b>SC3200. 2.1.</b>	<b>Distance and Speed: Students will be expected to:</b>

OUTCOME / INDICATOR SC3200. 2.1.27. Analyze the benefits of applying scientific knowledge on motion and introduction of hybrid electric vehicle technology. (118-2)

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 2.</b>	<b>Unit 2: Motion and its Applications</b>
<b>GCO / SCO</b>	<b>SC3200. 2.2.</b>	<b>Displacement and Velocity: Students will be expected to:</b>

OUTCOME / INDICATOR SC3200. 2.2.6. Describe and evaluate the design of a technological device and the way it functions, using scientific principles. (116-6)

OUTCOME / INDICATOR SC3200. 2.2.9. Develop, present, and defend a position or course of action, based on findings. (215-5)

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 2.</b>	<b>Unit 2: Motion and its Applications</b>
<b>GCO / SCO</b>	<b>SC3200. 2.3.</b>	<b>Displacement, Velocity and Acceleration: Students will be expected to:</b>

OUTCOME / INDICATOR SC3200. 2.3.44. Identify examples where scientific understanding was enhanced or revised as a result of the invention of a technology. (116-1)

OUTCOME / INDICATOR SC3200. 2.3.51. Analyze the benefits to society of applying scientific knowledge on motion and introduction of a particular technology. (118-2)

OUTCOME / INDICATOR SC3200. 2.3.58. Describe the motion of domestic and industrial technologies, using scientific principles. (116-5)

<b>COURSE / STRAND</b>	<b>NL.HS.PH</b>	<b>Physics 2204</b>
<b>STRAND / GCO</b>	<b>NL.HS.P H.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.PH. GCO.2.</b>	<b>Skills – Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR PH.GCO. Work as a member of a team in addressing problems, and apply the skills and conventions of science in  
2.4. communicating information and ideas and in assessing results

<b>COURSE / STRAND</b>	<b>NL.HS.PH</b>	<b>Physics 2204</b>
<b>STRAND / GCO</b>	<b>NL.HS.P H.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.PH. GCO.4.</b>	<b>Attitudes – Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR PH.GCO. Confidently evaluate evidence and consider alternative perspectives, ideas, and explanations  
4.7.

INDICATOR PH.GCO. Have a sense of personal and shared responsibility for maintaining a sustainable environment  
4.11.

INDICATOR PH.GCO. Want to take action for maintaining a sustainable environment  
4.13.

<b>COURSE / STRAND</b>	<b>NL.HS.PH</b>	<b>Physics 2204</b>
<b>STRAND / GCO</b>	<b>NL.HS.P H.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.PH.S CO.i.</b>	<b>Unit i: Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Initiating and Planning</b>

INDICATOR PH.SCO.i Implement appropriate sampling procedures [GCO 2]  
.5.0.

<b>COURSE / STRAND</b>	<b>NL.HS.PH</b>	<b>Physics 2204</b>
<b>STRAND / GCO</b>	<b>NL.HS.P H.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.PH.S CO.i.</b>	<b>Unit i: Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Analyzing and Interpreting</b>

INDICATOR	PH.SCO.i .18.0.	Construct and test a prototype of a device or system and troubleshoot problems as they arise [GCO 2]
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INDICATOR	PH.SCO.i .20.0.	Evaluate a personally designed and constructed device on the basis of criteria they have developed themselves [GCO 2]
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<b>COURSE / STRAND</b>	<b>NL.HS.PH</b>	<b>Physics 2204</b>
<b>STRAND / GCO</b>	<b>NL.HS.P H.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.PH.S CO.i.</b>	<b>Unit i: Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Communication and Teamwork</b>

INDICATOR	PH.SCO.i .26.0.	Evaluate individual and group processes used in planning, problem solving and decision making, and completing a task [GCO 2]
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Grade 11 - Adopted: 2019

<b>COURSE / STRAND</b>		<b>Physics 3204</b>
<b>STRAND / GCO</b>		<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>GCO 2: Skills: Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>

INDICATOR		work as a member of a team in addressing problems, and apply the skills and conventions of science in communicating information and ideas and in assessing results
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<b>COURSE / STRAND</b>		<b>Physics 3204</b>
<b>STRAND / GCO</b>		<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>GCO 4: Attitudes: Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>

INDICATOR		confidently evaluate evidence and consider alternative perspectives, ideas, and explanations
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INDICATOR		have a sense of personal and shared responsibility for maintaining a sustainable environment
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INDICATOR		want to take action for maintaining a sustainable environment
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<b>COURSE / STRAND</b>		<b>Physics 3204</b>
<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Communication and Teamwork</b>



INDICATOR	18.0.	communicate questions, ideas, and intentions, and receive, interpret, understand, support, and respond to the ideas of others [GCO 2]
<b>COURSE / STRAND</b>		<b>Physics 3204</b>
<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>Unit 3: Fields</b>
<b>OUTCOME / INDICATOR</b>		<b>Motors and Generators</b>
INDICATOR	Unit 3.47.0	analyze technological systems to interpret and explain their structure and dynamics [GCO 1]
INDICATOR	Unit 3.48.0	compare and contrast the way a motor and a generator function, using the principles of electromagnetism [GCO 3]
INDICATOR	Unit 3.49.0	identify various constraints that result in tradeoffs during the development and improvement of technologies [GCO 1]

Grade 11 - Adopted: 2020

<b>COURSE / STRAND</b>		<b>Biology 2201</b>
<b>STRAND / GCO</b>		<b>Curriculum Outcomes Framework</b>
<b>GCO / SCO</b>	<b>GCO 1:</b>	<b>Science, Technology, Society, and the Environment – Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>

INDICATOR evaluate social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives.

<b>COURSE / STRAND</b>		<b>Biology 2201</b>
<b>STRAND / GCO</b>		<b>Curriculum Outcomes Framework</b>
<b>GCO / SCO</b>	<b>GCO 4:</b>	<b>Attitudes – Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>

INDICATOR appreciate that the applications of science and technology can raise ethical dilemmas;

INDICATOR have a sense of personal and shared responsibility for maintaining a sustainable environment;

INDICATOR project the personal and shared social, and environmental consequences of proposed action;

INDICATOR want to take action for maintaining a sustainable environment;

<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH. GCO.1.</b>	<b>Science, Technology, Society, and the Environment – Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR CH.GCO. Evaluate social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives  
1.5.

<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH. GCO.3.</b>	<b>Knowledge – Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR CH.GCO. Identify and explain the diversity of organic compounds and their impact on the environment  
3.1.

INDICATOR CH.GCO. Predict and explain energy transfers in chemical reactions  
3.6.

<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH. GCO.4.</b>	<b>Attitudes – Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR CH.GCO. Have a sense of personal and shared responsibility for maintaining a sustainable environment  
4.11.

INDICATOR CH.GCO. Want to take action for maintaining a sustainable environment  
4.13.

<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH.S CO.i.</b>	<b>Unit i: Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Performing and Recording</b>

INDICATOR	CH.SCO.i .6.0.	Implement appropriate sampling procedures [GCO 2]
<b>COURSE / STRAND</b>	<b>NL.HS.CH</b>	<b>Chemistry 2202</b>
<b>STRAND / GCO</b>	<b>NL.HS.C H.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.CH.S CO.2.</b>	<b>Unit 2: From Structures to Properties</b>
<b>OUTCOME / INDICATOR</b>		<b>Material Properties and Society</b>

INDICATOR CH.SCO. 2.62.0. Analyze from a variety of perspectives the risks and benefits to society and the environment of applying scientific knowledge or introducing a particular technology [GCO 1]

Grade 12 - Adopted: 2019

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
<b>STRAND / GCO</b>		<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>GCO 1: Science, Technology, Society, and the Environment: Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>

INDICATOR evaluate social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
<b>STRAND / GCO</b>		<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>GCO 3: Knowledge: Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>

INDICATOR identify and explain the diversity of organic compounds and their impact on the environment

INDICATOR predict and explain energy transfers in chemical reactions

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
<b>STRAND / GCO</b>		<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>GCO 4: Attitudes: Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>

INDICATOR have a sense of personal and shared responsibility for maintaining a sustainable environment

INDICATOR want to take action for maintaining a sustainable environment

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>Unit 1: From Kinetics to Equilibrium</b>
<b>OUTCOME / INDICATOR</b>		<b>Applications of Kinetics</b>

INDICATOR Unit 1.37.0 analyze and describe examples where technologies were developed based upon scientific understanding [GCO 1]

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>Unit 3: Thermochemistry</b>
<b>OUTCOME / INDICATOR</b>		<b>Enthalpy Changes</b>

INDICATOR Unit 3.63.0 define endothermic reaction, exothermic reaction, enthalpy, bond energy, heat of reaction, and molar enthalpy [GCO 3]

<b>COURSE / STRAND</b>		<b>Chemistry 3202</b>
<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>Unit 3: Thermochemistry</b>
<b>OUTCOME / INDICATOR</b>		<b>Applications of Heat Technology</b>

INDICATOR Unit 3.66.0 analyze and describe examples where technologies were developed based on scientific understanding [GCO 1]

INDICATOR Unit 3.67.0 analyze from a variety of perspectives the risks and benefits to society and the environment of applying scientific knowledge or introducing a particular technology [GCO 1]

INDICATOR Unit 3.68.0 propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability [GCO 1]

INDICATOR Unit 3.72.0 analyze the knowledge and skills acquired in their study of science to identify areas of further study related to science and technology [GCO 1]

INDICATOR Unit 3.30.0 identify multiple perspectives that influence a science-related decision or issue [GCO 2]

Grade 12 - Adopted: 2005

<b>COURSE / STRAND</b>	<b>NL.HS.ES 3209.</b>	<b>Earth Systems 3209</b>
<b>STRAND / GCO</b>	<b>ES3209. 2.</b>	<b>Unit 2: Historical Geology</b>
<b>GCO / SCO</b>	<b>ES3209. 2.1.</b>	<b>Historical Developments and Geologic Time: Students will be expected to:</b>

OUTCOME / INDICATOR	ES3209.2 .1.24.	Analyse and describe examples where scientific understanding was enhanced or revised as a result of the invention of a technology. (116-2)
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OUTCOME / INDICATOR	ES3209.2 .1.25.	Analyse and describe examples where technologies were developed based on scientific understanding. (116-4)
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<b>COURSE / STRAND</b>	<b>NL.HS.ES 3209.</b>	<b>Earth Systems 3209</b>
<b>STRAND / GCO</b>	<b>ES3209.5.</b>	<b>Unit 5: Earth Resources: Real-Life Applications</b>
<b>GCO / SCO</b>	<b>ES3209.5.3.</b>	<b>Energy Resources -- Petroleum Formation: Students will be expected to:</b>

OUTCOME / INDICATOR	ES3209.5 .3.1.	Describe the processes and techniques involved in extracting and refining hydrocarbons. (330-10)
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OUTCOME / INDICATOR	ES3209.5 .3.4.	Define hydrocarbons.
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OUTCOME / INDICATOR	ES3209.5 .3.7.	Describe the processes and techniques involved in extracting and refining hydrocarbons. (330-10)
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OUTCOME / INDICATOR	ES3209.5 .3.8.	Define kerogen.
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OUTCOME / INDICATOR	ES3209.5 .3.11.	Analyse and describe examples where scientific understanding was enhanced or revised as a result of the invention of technology. (116-2)
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OUTCOME / INDICATOR	ES3209.5 .3.15.	Describe the processes and techniques involved in extracting and refining hydrocarbons. (330-10)
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OUTCOME / INDICATOR	ES3209.5 .3.17.	Describe the distribution of petroleum in a reservoir.
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<b>COURSE / STRAND</b>	<b>NL.HS.ES 3209.</b>	<b>Earth Systems 3209</b>
<b>STRAND / GCO</b>	<b>ES3209.5.</b>	<b>Unit 5: Earth Resources: Real-Life Applications</b>
<b>GCO / SCO</b>	<b>ES3209.5.5.</b>	<b>Energy Resources -- Moving Towards a Sustainable Future: Students will be expected to:</b>

OUTCOME / INDICATOR	ES3209.5 .5.1.	Analyse from a variety of perspectives, the risks and benefits to society and the environment of applying scientific knowledge, or introducing a particular technology. (118-2)
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OUTCOME / INDICATOR	ES3209.5 .5.2.	Identify factors involved in developing Earth's resources in a sustainable manner. (330-11)
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OUTCOME / INDICATOR	ES3209.5 .5.5.	Identify and describe core components involved in the sustainable development of Earth resources.
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Grade 12 - Adopted: 2010

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
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<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.1.</b>	<b>The Biosphere: Students will be expected to:</b>

OUTCOME / INDICATOR ENV3205 .1.1.2. Identify that humans are one part of a complex system of living thing that can have a great impact on the other systems.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.4.</b>	<b>Environmental Issues and Human Needs: Students will be expected to:</b>

OUTCOME / INDICATOR ENV3205 .1.4.1. Identify that anthropocentric attitudes have contributed to many of today's environmental issues.

OUTCOME / INDICATOR ENV3205 .1.4.3. Define sustainability as a human practice to maintain ecosystem stability.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.5.</b>	<b>Conservation, Sustainability and Stewardship: Students will be expected to:</b>

OUTCOME / INDICATOR ENV3205 .1.5.1. Define environmental Conservation.

OUTCOME / INDICATOR ENV3205 .1.5.2. Define stewardship in relation to sustainability.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.5.</b>	<b>Conservation, Sustainability and Stewardship: Students will be expected to:</b>

**OUTCOME / INDICATOR ENV3205 5.1.5.3. Identify the factors that influence sustainability. Include:**

INDICATOR ENV3205 .1.5.3.i. Ecological

INDICATOR ENV3205 .1.5.3.ii. Social

INDICATOR ENV3205 .1.5.3.iii. Economic

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
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<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.6.</b>	<b>Our Ecological Footprint: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.1.6.1.</b>	<b>Recognize some widely-held misconceptions related to sustainability. Include:</b>

INDICATOR	ENV3205 .1.6.1.i.	Environment damage is permanent
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INDICATOR	ENV3205 .1.6.1.iii.	One person cannot make a difference
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INDICATOR	ENV3205 .1.6.1.iv.	Science can solve all of our problems
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INDICATOR	ENV3205 .1.6.1.vi.	All human activity in nature is bad
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<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.6.</b>	<b>Our Ecological Footprint: Students will be expected to:</b>

OUTCOME / INDICATOR	ENV3205 .1.6.2.	Identify individual impacts on the environment using the concept of ecological footprint.
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<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.1.</b>	<b>Unit 1: Introduction to Environmental Science</b>
<b>GCO / SCO</b>	<b>ENV320 5.1.6.</b>	<b>Our Ecological Footprint: Students will be expected to:</b>

<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.1.6.4.</b>	<b>Describe environmental responsibility. Include the role of:</b>
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INDICATOR	ENV3205 .1.6.4.i.	Individuals
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INDICATOR	ENV3205 .1.6.4.ii.	Community
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INDICATOR	ENV3205 .1.6.4.iii.	Industry
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<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.1.</b>	<b>Introduction to the Atmosphere: Students will be expected to:</b>

<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.1.2.</b>	<b>List the major functions of Earth's atmosphere. Include:</b>
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INDICATOR ENV3205 Traps heat  
.5.1.2.ii.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
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<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
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<b>GCO / SCO</b>	<b>ENV320 5.5.4.</b>	<b>Air Quality and Airborne Pollutants: Students will be expected to:</b>
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<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.4.1.</b>	<b>Describe critical air contaminants effects on air quality. Include:</b>
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INDICATOR ENV3205 Carbon monoxide (CO)  
.5.4.1.v.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
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<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
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<b>GCO / SCO</b>	<b>ENV320 5.5.5.</b>	<b>Persistent Organic Pollutants: Students will be expected to:</b>
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<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.5.1.</b>	<b>Describe how persistent organic pollutants affect air quality. Include:</b>
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INDICATOR ENV3205 Sources in Newfoundland and Labrador  
.5.5.1.i.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
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<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
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<b>GCO / SCO</b>	<b>ENV320 5.5.8.</b>	<b>Improving Air Quality: Students will be expected to:</b>
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<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.8.1.</b>	<b>Identify ways to improve air quality. Include:</b>
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INDICATOR ENV3205 Individual  
.5.8.1.i.

INDICATOR ENV3205 Community  
.5.8.1.ii.

INDICATOR ENV3205 Provincial  
.5.8.1.iii.

INDICATOR ENV3205 National  
.5.8.1.iv.

INDICATOR ENV3205 International  
.5.8.1.v.



<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.8.</b>	<b>Improving Air Quality: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.8.2.</b>	<b>Identify methods to improve air quality. Include:</b>

INDICATOR ENV3205 Cleaner burning fuels  
.5.8.2.i.

INDICATOR ENV3205 End of pipe technology  
.5.8.2.ii.

INDICATOR ENV3205 Catalytic converters  
.5.8.2.iii.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.11.</b>	<b>Climate Change: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.11.1.</b>	<b>Identify that climate change can have a catastrophic affect on Earth. Include:</b>

INDICATOR ENV3205 Natural sources of green house gasses  
.5.11.1.i.

INDICATOR ENV3205 Anthropogenic sources of greenhouse gases  
.5.11.1.ii.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.1.</b>	<b>Describe the impacts of climate change in Canada on wildlife and natural ecosystems. Include:</b>

INDICATOR ENV3205 Types of vegetation  
.5.12.1.i.

INDICATOR ENV3205 Shifting ecosystem boundaries  
.5.12.1.ii.

INDICATOR ENV3205 Biodiversity of species  
.5.12.1.iii.

INDICATOR ENV3205 Adaptation of species  
.5.12.1.iv.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>

OUTCOME / INDICATOR ENV3205 Describe the impacts of climate change in forests.  
.5.12.2.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.3.</b>	<b>Describe the impacts of climate change in Canada on agriculture. Include:</b>

INDICATOR ENV3205 Length of growing season  
.5.12.3.i.

INDICATOR ENV3205 Extreme weather events  
.5.12.3.ii.

INDICATOR ENV3205 Types of crops  
.5.12.3.iii.

INDICATOR ENV3205 Precipitation variability  
.5.12.3.iv.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.4.</b>	<b>Describe the impacts of climate change in Canada on fishery. Include:</b>

INDICATOR ENV3205 Water temperature effects  
.5.12.4.i.

INDICATOR ENV3205 Species distribution  
.5.12.4.ii.

INDICATOR ENV3205 Growth rates  
.5.12.4.iii.

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.5.</b>	<b>Describe the impacts of climate change in Canada on coastal zones (sea level changes and areas of human habitat). Include:</b>
INDICATOR	ENV3205 .5.12.5.i.	Coastal erosion
INDICATOR	ENV3205 .5.12.5.ii.	Flooding due to expansion of ocean water caused by melting ice
INDICATOR	ENV3205 .5.12.5.iii.	Tectonic subsidence to
INDICATOR	ENV3205 .5.12.5.iv.	Newfoundland and Labrador locations at risk

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.6.</b>	<b>Describe the impacts of climate change in Canada on extreme weather events. Include:</b>
INDICATOR	ENV3205 .5.12.6.i.	Frequency
INDICATOR	ENV3205 .5.12.6.ii.	Intensity
INDICATOR	ENV3205 .5.12.6.iii.	Vulnerable areas in Newfoundland and Labrador

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.12.</b>	<b>Climate Change Impacts: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.12.7.</b>	<b>Describe the impacts of climate change in Canada on human health. Include:</b>
INDICATOR	ENV3205 .5.12.7.i.	Heat stress
INDICATOR	ENV3205 .5.12.7.ii.	Migration of diseases

<b>COURSE / STRAND</b>	<b>NL.HS.EN V3205.</b>	<b>Environmental Science 3205</b>
<b>STRAND / GCO</b>	<b>ENV320 5.5.</b>	<b>Unit 5: The Atmosphere and the Environment</b>
<b>GCO / SCO</b>	<b>ENV320 5.5.13.</b>	<b>Actions to Address Climate Change: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>ENV320 5.5.13.1.</b>	<b>Describe efforts made to address climate change Include:</b>
INDICATOR	ENV3205 .5.13.1.i.	Individual
INDICATOR	ENV3205 .5.13.1.ii.	Industries
INDICATOR	ENV3205 .5.13.1.iii.	Provincial governments
INDICATOR	ENV3205 .5.13.1.iv.	Federal governments
INDICATOR	ENV3205 .5.13.1.v.	International agreements such as the Rio Declaration and the Kyoto Protocol.

Grade 12 - Adopted: 2018

<b>COURSE / STRAND</b>	<b>NL.HS.SC .</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC. GCO.1.</b>	<b>Science, Technology, Society, and the Environment – Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR	SC.GCO. 1.3.	Analyze and explain how science and technology interact with and advance one another
INDICATOR	SC.GCO. 1.5.	Evaluate social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives

<b>COURSE / STRAND</b>	<b>NL.HS.SC .</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC. GCO.2.</b>	<b>Skills – Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR	SC.GCO. 2.4.	Work as a member of a team in addressing problems, and apply the skills and conventions of science in communicating information and ideas and in assessing results
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<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC. GCO.3.</b>	<b>Knowledge – Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR SC.GCO. Chemistry: Identify and explain the diversity of organic compounds and their impact on the environment 3.4.

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.GCO.</b>	<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC. GCO.4.</b>	<b>Attitudes – Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>

INDICATOR SC.GCO. Appreciate that the applications of science and technology can raise ethical dilemmas 4.2.

INDICATOR SC.GCO. Confidently evaluate evidence and consider alternative perspectives, ideas, and explanations 4.7.

INDICATOR SC.GCO. Have a sense of personal and shared responsibility for maintaining a sustainable environment 4.11.

INDICATOR SC.GCO. Project the personal and shared social, and environmental consequences of proposed action 4.12.

INDICATOR SC.GCO. Want to take action for maintaining a sustainable environment 4.13.

INDICATOR SC.GCO. Be aware of the direct and indirect consequences of their actions 4.15.

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.i.</b>	<b>Unit i: Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Initiating and Planning</b>

INDICATOR SC.SCO.i Evaluate and select appropriate instruments for collecting evidence and appropriate processes for problem solving, 6.0. inquiring, and decision making [GCO 2]

INDICATOR SC.SCO.i Develop appropriate sampling procedures [GCO 2]  
.7.0.

<b>COURSE / STRAND</b>	NL.HS.SC	Science 1206
<b>STRAND / GCO</b>	NL.HS.S C.SCO.	Specific Curriculum Outcomes
<b>GCO / SCO</b>	HS.SC.S CO.i.	Unit i: Integrated Skills
<b>OUTCOME / INDICATOR</b>		Performing and Recording

INDICATOR SC.SCO.i Carry out procedures controlling the major variables and adapting or extending procedures where required [GCO 2]  
.8.0.

INDICATOR SC.SCO.i Use instruments effectively and accurately for collecting data [GCO 2]  
.9.0.

<b>COURSE / STRAND</b>	NL.HS.SC	Science 1206
<b>STRAND / GCO</b>	NL.HS.S C.SCO.	Specific Curriculum Outcomes
<b>GCO / SCO</b>	HS.SC.S CO.i.	Unit i: Integrated Skills
<b>OUTCOME / INDICATOR</b>		Communication and Teamwork

INDICATOR SC.SCO.i Communicate questions, ideas, and intentions, and receive, interpret, understand, support, and respond to the ideas of others [GCO 2]  
.25.0.

INDICATOR SC.SCO.i Identify multiple perspectives that influence a science-related decision or issue [GCO 2]  
.27.0.

<b>COURSE / STRAND</b>	NL.HS.SC	Science 1206
<b>STRAND / GCO</b>	NL.HS.S C.SCO.	Specific Curriculum Outcomes
<b>GCO / SCO</b>	HS.SC.S CO.1.	Unit 1: Weather Dynamics
<b>OUTCOME / INDICATOR</b>		Climate Change

INDICATOR SC.SCO. Explain how scientific knowledge evolves as new evidence comes to light [GCO 1]  
1.39.0.

<b>COURSE / STRAND</b>	NL.HS.SC	Science 1206
<b>STRAND / GCO</b>	NL.HS.S C.SCO.	Specific Curriculum Outcomes
<b>GCO / SCO</b>	HS.SC.S CO.1.	Unit 1: Weather Dynamics
<b>OUTCOME / INDICATOR</b>		Impact of Climate Change

INDICATOR	SC.SCO. 1.12.0.	Use library and electronic research tools to collect information on a given topic [GCO 2]
INDICATOR	SC.SCO. 1.24.0.	Identify new questions or problems that arise from what was learned [GCO 2]
INDICATOR	SC.SCO. 1.28.0.	Develop, present, and defend a position or course of action, based on findings [GCO 2]

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.2.</b>	<b>Unit 2: Chemical Reactions</b>
<b>OUTCOME / INDICATOR</b>		<b>Chemical Reactions</b>

INDICATOR	SC.SCO. 2.45.0.	Classify chemical reactions based on type [GCO 3]
INDICATOR	SC.SCO. 2.16.0.	Describe and apply classification systems and nomenclatures used in the sciences [GCO 2]

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.3.</b>	<b>Unit 3: Motion</b>
<b>OUTCOME / INDICATOR</b>		<b>Motion in Daily Life</b>

INDICATOR	SC.SCO. 3.54.0.	Identify possible areas of further study related to science and technology [GCO 1]
INDICATOR	SC.SCO. 3.55.0.	Distinguish between scientific questions and technological problems [GCO 1]

<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.3.</b>	<b>Unit 3: Motion</b>
<b>OUTCOME / INDICATOR</b>		<b>Motion Technologies</b>

INDICATOR	SC.SCO. 3.63.0.	Evaluate the role of continued testing in the development and improvement of technologies [GCO 1]
INDICATOR	SC.SCO. 3.64.0.	Evaluate the design of a technology and the way it functions on the basis of identified criteria such as safety, cost, availability, and impact on everyday life and the environment [GCO 1]

INDICATOR	SC.SCO. 3.65.0.	Analyze natural and technological systems to interpret and explain their structure and dynamics [GCO 1]
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<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.4.</b>	<b>Unit 4: Sustainability of Ecosystems</b>
<b>OUTCOME / INDICATOR</b>		<b>Factors That Affect the Sustainability of Ecosystems</b>

INDICATOR	SC.SCO. 4.71.0.	Analyze the impact of external factors on an ecosystem [GCO 3]
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INDICATOR	SC.SCO. 4.13.0.	Select and integrate information from various print and electronic sources or from several parts of the same source [GCO 2]
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INDICATOR	SC.SCO. 4.72.0.	Propose a course of action on social issues related to science and technology, taking into account human and environmental needs [GCO 1]
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INDICATOR	SC.SCO. 4.51.0.	Defend a decision or judgment and demonstrate that relevant arguments can arise from different perspectives [GCO 1]
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<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.4.</b>	<b>Unit 4: Sustainability of Ecosystems</b>
<b>OUTCOME / INDICATOR</b>		<b>Biodiversity and Sustainability</b>

INDICATOR	SC.SCO. 4.74.0.	Explain why different ecosystems respond differently to short-term stresses and long-term changes [GCO 3]
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<b>COURSE / STRAND</b>	<b>NL.HS.SC</b>	<b>Science 1206</b>
<b>STRAND / GCO</b>	<b>NL.HS.S C.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>	<b>HS.SC.S CO.4.</b>	<b>Unit 4: Sustainability of Ecosystems</b>
<b>OUTCOME / INDICATOR</b>		<b>Sustainable Development</b>

INDICATOR	SC.SCO. 4.78.0.	Compare the risks and benefits to society and the environment of applying scientific knowledge or introducing a technology [GCO 1]
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Grade 12 - Adopted: 2004

<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
<b>STRAND / GCO</b>	<b>SC2200. 1.</b>	<b>Unit 1: Ecosystems</b>



<b>GCO / SCO</b>	<b>SC2200.1.1.</b>	<b>Diversity in Ecosystems: Students will be expected to:</b>
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OUTCOME / INDICATOR SC2200.1.1.1. Explain how a paradigm shift, with respect to environmental attitudes, can change scientific world views in understanding sustainability. (114-1)

OUTCOME / INDICATOR SC2200.1.1.6. Define sustainability.

<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
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<b>STRAND / GCO</b>	<b>SC2200.1.</b>	<b>Unit 1: Ecosystems</b>
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<b>GCO / SCO</b>	<b>SC2200.1.2.</b>	<b>Change and Stability in Ecosystems: Students will be expected to:</b>
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OUTCOME / INDICATOR SC2200.1.2.17. Describe global warming and its impact on our local environment. (215-1)

OUTCOME / INDICATOR SC2200.1.2.19. Pollution (e.g., excess CO<sub>2</sub>)

OUTCOME / INDICATOR SC2200.1.2.20. Weather change.

OUTCOME / INDICATOR SC2200.1.2.34. Describe the significance of global warming.

OUTCOME / INDICATOR SC2200.1.2.41. Plan changes to predict the effects of, and analyze the impact of external factors on an ecosystem. (331-6, 213-8, 212-4, 118-5, 118-9)

OUTCOME / INDICATOR SC2200.1.2.56. Analyze the impact of external factors on the ecosystem. (331-6) Include:

OUTCOME / INDICATOR SC2200.1.2.57. Pollution (e.g., acid rain).

OUTCOME / INDICATOR SC2200.1.2.60. Weather change (e.g., global warming).

OUTCOME / INDICATOR SC2200.1.2.62. Communicate questions, ideas and intentions, and receive, interpret, understand, support and respond to the ideas of others in preparing a report or presentation on the impact of external factors on ecosystem biomes. (214-3, 215-1, 215-4)

<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
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<b>STRAND / GCO</b>	<b>SC2200.1.</b>	<b>Unit 1: Ecosystems</b>
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<b>GCO / SCO</b>	<b>SC2200.1.3.</b>	<b>Sustaining Ecosystems: Students will be expected to:</b>
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OUTCOME / INDICATOR	SC2200. 1.3.8.	Select and display evidence and information, from a variety of sources, to explain how external factors such as global warming or other human activities may have an impact on the distribution of biomes within Canada. (213-7, 214-3, 215-4)
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OUTCOME / INDICATOR	SC2200. 1.3.26.	Compare the risks and benefits to the biosphere of applying new scientific knowledge and technology to industrial processes. (118-1)
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<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
<b>STRAND / GCO</b>	<b>SC2200. 2.</b>	<b>Unit 2: Earth and Space Science: Weather Dynamics</b>
<b>GCO / SCO</b>	<b>SC2200. 2.2.</b>	<b>Global Weather: Students will be expected to:</b>

OUTCOME / INDICATOR	SC2200. 2.2.23.	Identify the distribution of common atmospheric gases (oxygen, nitrogen, water vapour, carbon dioxide).
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<b>COURSE / STRAND</b>	<b>NL.HS.SC 2200.</b>	<b>Science 2200</b>
<b>STRAND / GCO</b>	<b>SC2200. 2.</b>	<b>Unit 2: Earth and Space Science: Weather Dynamics</b>
<b>GCO / SCO</b>	<b>SC2200. 2.3.</b>	<b>Extreme Weather Events: Students will be expected to:</b>

OUTCOME / INDICATOR	SC2200. 2.3.9.	Describe how human activities can impact global weather patterns.
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OUTCOME / INDICATOR	SC2200. 2.3.10.	Describe the causes and impact of the greenhouse effect.
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Grade 12 - Adopted: 2005

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.1.</b>	<b>Chemistry Around You: Students will be expected to:</b>

OUTCOME / INDICATOR	SC3200. 1.1.1.	Provide examples of how science and technology are an integral part of their lives and their community by investigating common examples of combustion. (117-5)
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OUTCOME / INDICATOR	SC3200. 1.1.4.	Identify examples of chemistry and technology around them in everyday life.
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<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.3.</b>	<b>Periodic Table, Atoms, &amp; Ions: Students will be expected to:</b>

OUTCOME / INDICATOR	SC3200. 1.3.10.	Provide examples of how chemistry is an integral part of our lives. (117-5)
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<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.6.</b>	<b>Introduction to Chemical Reactions: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>SC3200. 1.6.7.</b>	<b>List several examples of important chemical reactions. Include:</b>

INDICATOR SC3200. 1.6.7.ii. Burning of fossil fuels

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.6.</b>	<b>Introduction to Chemical Reactions: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>SC3200. 1.6.9.</b>	<b>Define in terms of the chemicals involved five types of chemical reactions. Include:</b>

INDICATOR SC3200. 1.6.9.v. Combustion

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.6.</b>	<b>Introduction to Chemical Reactions: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>SC3200. 1.6.10.</b>	<b>Given reactants and the reaction type, predict the products of chemical reactions using word equations and chemical symbol equations. Include:</b>

INDICATOR SC3200. 1.6.10.v. Combustion

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 1.</b>	<b>Unit 1: Chemical Reactions</b>
<b>GCO / SCO</b>	<b>SC3200. 1.7.</b>	<b>Balancing Chemical Reactions: Students will be expected to:</b>
<b>OUTCOME / INDICATOR</b>	<b>SC3200. 1.7.3.</b>	<b>Write and balance a variety of chemical reactions. Include:</b>

INDICATOR SC3200. 1.7.3.iv. Combustion

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
<b>STRAND / GCO</b>	<b>SC3200. 2.</b>	<b>Unit 2: Motion and its Applications</b>

<b>GCO / SCO</b>	<b>SC3200.2.1.</b>	<b>Distance and Speed: Students will be expected to:</b>
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OUTCOME / INDICATOR SC3200.2.1.9. Analyze the benefits to society of applying scientific knowledge on motion and introduction of a particular technology. (118-2).

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
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<b>STRAND / GCO</b>	<b>SC3200.2.</b>	<b>Unit 2: Motion and its Applications</b>
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<b>GCO / SCO</b>	<b>SC3200.2.1.</b>	<b>Distance and Speed: Students will be expected to:</b>
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<b>OUTCOME / INDICATOR</b>	<b>SC3200.2.1.22.</b>	<b>List the factors to be considered when purchasing an automobile. Include:</b>
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INDICATOR SC3200.2.1.22.i. Owner needs

INDICATOR SC3200.2.1.22.ii. Engine size and efficiency

INDICATOR SC3200.2.1.22.iii. Vehicle size

INDICATOR SC3200.2.1.22.iv. Fuel type and consumption

INDICATOR SC3200.2.1.22.v. Cost

INDICATOR SC3200.2.1.22.vi. Safety

INDICATOR SC3200.2.1.22.vii. Durability/reliability

INDICATOR SC3200.2.1.22.viii. Style

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
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<b>STRAND / GCO</b>	<b>SC3200.2.</b>	<b>Unit 2: Motion and its Applications</b>
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<b>GCO / SCO</b>	<b>SC3200.2.1.</b>	<b>Distance and Speed: Students will be expected to:</b>
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OUTCOME / INDICATOR SC3200.2.1.27. Analyze the benefits of applying scientific knowledge on motion and introduction of hybrid electric vehicle technology. (118-2)

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
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<b>STRAND / GCO</b>	<b>SC3200.2.</b>	<b>Unit 2: Motion and its Applications</b>
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<b>GCO / SCO</b>	<b>SC3200.2.2.</b>	<b>Displacement and Velocity: Students will be expected to:</b>
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OUTCOME / INDICATOR SC3200.2.2.6. Describe and evaluate the design of a technological device and the way it functions, using scientific principles. (116-6)

OUTCOME / INDICATOR SC3200.2.2.9. Develop, present, and defend a position or course of action, based on findings. (215-5)

<b>COURSE / STRAND</b>	<b>NL.HS.SC 3200.</b>	<b>Science 3200</b>
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<b>STRAND / GCO</b>	<b>SC3200.2.</b>	<b>Unit 2: Motion and its Applications</b>
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<b>GCO / SCO</b>	<b>SC3200.2.3.</b>	<b>Displacement, Velocity and Acceleration: Students will be expected to:</b>
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OUTCOME / INDICATOR SC3200.2.3.44. Identify examples where scientific understanding was enhanced or revised as a result of the invention of a technology. (116-1)

OUTCOME / INDICATOR SC3200.2.3.51. Analyze the benefits to society of applying scientific knowledge on motion and introduction of a particular technology. (118-2)

OUTCOME / INDICATOR SC3200.2.3.58. Describe the motion of domestic and industrial technologies, using scientific principles. (116-5)

Grade 12 - Adopted: 2018

<b>COURSE / STRAND</b>	<b>NL.HS.PH .</b>	<b>Physics 2204</b>
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<b>STRAND / GCO</b>	<b>NL.HS.P H.GCO.</b>	<b>General Curriculum Outcomes</b>
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<b>GCO / SCO</b>	<b>HS.PH. GCO.2.</b>	<b>Skills – Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.</b>
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<b>OUTCOME / INDICATOR</b>	<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>	
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INDICATOR PH.GCO.2.4. Work as a member of a team in addressing problems, and apply the skills and conventions of science in communicating information and ideas and in assessing results

<b>COURSE / STRAND</b>	<b>NL.HS.PH .</b>	<b>Physics 2204</b>
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<b>STRAND / GCO</b>	<b>NL.HS.P H.GCO.</b>	<b>General Curriculum Outcomes</b>
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<b>GCO / SCO</b>	<b>HS.PH. GCO.4.</b>	<b>Attitudes – Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
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<b>OUTCOME / INDICATOR</b>	<b>Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to</b>	
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INDICATOR PH.GCO.4.7. Confidently evaluate evidence and consider alternative perspectives, ideas, and explanations

INDICATOR PH.GCO.4.11. Have a sense of personal and shared responsibility for maintaining a sustainable environment

INDICATOR PH.GCO. Want to take action for maintaining a sustainable environment 4.13.

<b>COURSE / STRAND</b>	NL.HS.PH	Physics 2204
<b>STRAND / GCO</b>	NL.HS.P H.SCO.	Specific Curriculum Outcomes
<b>GCO / SCO</b>	HS.PH.S CO.i.	Unit i: Integrated Skills
<b>OUTCOME / INDICATOR</b>		Initiating and Planning

INDICATOR PH.SCO.i Implement appropriate sampling procedures [GCO 2] .5.0.

<b>COURSE / STRAND</b>	NL.HS.PH	Physics 2204
<b>STRAND / GCO</b>	NL.HS.P H.SCO.	Specific Curriculum Outcomes
<b>GCO / SCO</b>	HS.PH.S CO.i.	Unit i: Integrated Skills
<b>OUTCOME / INDICATOR</b>		Analyzing and Interpreting

INDICATOR PH.SCO.i Construct and test a prototype of a device or system and troubleshoot problems as they arise [GCO 2] .18.0.

INDICATOR PH.SCO.i Evaluate a personally designed and constructed device on the basis of criteria they have developed themselves [GCO 2] .20.0.

<b>COURSE / STRAND</b>	NL.HS.PH	Physics 2204
<b>STRAND / GCO</b>	NL.HS.P H.SCO.	Specific Curriculum Outcomes
<b>GCO / SCO</b>	HS.PH.S CO.i.	Unit i: Integrated Skills
<b>OUTCOME / INDICATOR</b>		Communication and Teamwork

INDICATOR PH.SCO.i Evaluate individual and group processes used in planning, problem solving and decision making, and completing a task [GCO 2] .26.0.

Grade 12 - Adopted: 2019

<b>COURSE / STRAND</b>		Physics 3204
<b>STRAND / GCO</b>		General Curriculum Outcomes
<b>GCO / SCO</b>		GCO 2: Skills: Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.
<b>OUTCOME / INDICATOR</b>		Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to

INDICATOR		work as a member of a team in addressing problems, and apply the skills and conventions of science in communicating information and ideas and in assessing results
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<b>COURSE / STRAND</b>		<b>Physics 3204</b>
<b>STRAND / GCO</b>		<b>General Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>GCO 4: Attitudes: Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>

INDICATOR		confidently evaluate evidence and consider alternative perspectives, ideas, and explanations
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INDICATOR		have a sense of personal and shared responsibility for maintaining a sustainable environment
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INDICATOR		want to take action for maintaining a sustainable environment
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<b>COURSE / STRAND</b>		<b>Physics 3204</b>
<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>Integrated Skills</b>
<b>OUTCOME / INDICATOR</b>		<b>Communication and Teamwork</b>

INDICATOR	18.0.	communicate questions, ideas, and intentions, and receive, interpret, understand, support, and respond to the ideas of others [GCO 2]
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<b>COURSE / STRAND</b>		<b>Physics 3204</b>
<b>STRAND / GCO</b>		<b>Specific Curriculum Outcomes</b>
<b>GCO / SCO</b>		<b>Unit 3: Fields</b>
<b>OUTCOME / INDICATOR</b>		<b>Motors and Generators</b>

INDICATOR	Unit 3.47.0	analyze technological systems to interpret and explain their structure and dynamics [GCO 1]
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INDICATOR	Unit 3.48.0	compare and contrast the way a motor and a generator function, using the principles of electromagnetism [GCO 3]
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INDICATOR	Unit 3.49.0	identify various constraints that result in tradeoffs during the development and improvement of technologies [GCO 1]
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Grade 12 - Adopted: 2020

<b>COURSE / STRAND</b>		<b>Biology 2201</b>
<b>STRAND / GCO</b>		<b>Curriculum Outcomes Framework</b>
<b>GCO / SCO</b>	<b>GCO 1:</b>	<b>Science, Technology, Society, and the Environment – Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.</b>

<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>
INDICATOR		evaluate social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives.
<b>COURSE / STRAND</b>		<b>Biology 2201</b>
<b>STRAND / GCO</b>		<b>Curriculum Outcomes Framework</b>
<b>GCO / SCO</b>	<b>GCO 4:</b>	<b>Attitudes – Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.</b>
<b>OUTCOME / INDICATOR</b>		<b>Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to</b>

INDICATOR		appreciate that the applications of science and technology can raise ethical dilemmas;
INDICATOR		have a sense of personal and shared responsibility for maintaining a sustainable environment;
INDICATOR		project the personal and shared social, and environmental consequences of proposed action;
INDICATOR		want to take action for maintaining a sustainable environment;

**Northern Territory Curriculum  
Mathematics  
Grade 11 - Adopted: 2015**

<b>STRAND / DOMAIN</b>	<b>ACMEM.</b>	<b>Essential Mathematics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACMEM. 3.</b>	<b>Unit 3</b>
<b>INDICATOR</b>	<b>ACMEM. 3.3.</b>	<b>Topic 3: Graphs</b>
<b>INDICATOR</b>	<b>ACMEM. 3.3.1.</b>	<b>Cartesian plane</b>

INDICATOR	ACMEM. 3.3.1.c.	Graph linear functions for all values of with pencil and paper and with graphing software. (ACMEM123)
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<b>STRAND / DOMAIN</b>	<b>ACMGM.</b>	<b>General Mathematics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACMGM. 2.</b>	<b>Unit 2</b>
<b>INDICATOR</b>	<b>ACMGM. 2.3.</b>	<b>Topic 3: Linear equations and their graphs</b>
<b>INDICATOR</b>	<b>ACMGM. 2.3.1.</b>	<b>Linear equations:</b>

INDICATOR	ACMGM. 2.3.1.a.	Identify and solve linear equations (ACMGM038)
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<b>STRAND / DOMAIN</b>	<b>ACMGM.</b>	<b>General Mathematics</b>
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<b>OUTCOME / INDICATOR</b>	<b>ACMGM. 2.</b>	<b>Unit 2</b>
<b>INDICATOR</b>	<b>ACMGM. 2.3.</b>	<b>Topic 3: Linear equations and their graphs</b>
<b>INDICATOR</b>	<b>ACMGM. 2.3.2.</b>	<b>Straight-line graphs and their applications:</b>
INDICATOR	ACMGM. 2.3.2.a.	Construct straight-line graphs both with and without the aid of technology (ACMGM040)
INDICATOR	ACMGM. 2.3.2.d.	Construct and analyse a straight-line graph to model a given linear relationship; for example, modelling the cost of filling a fuel tank of a car against the number of litres of petrol required. (ACMGM043)

<b>STRAND / DOMAIN</b>	<b>ACMMM.</b>	<b>Mathematical Methods</b>
<b>OUTCOME / INDICATOR</b>	<b>ACMMM. 1.</b>	<b>Unit 1</b>
<b>INDICATOR</b>	<b>ACMMM. 1.1.</b>	<b>Topic 1: Functions and graphs</b>
<b>INDICATOR</b>	<b>ACMMM. 1.1.3.</b>	<b>Lines and linear relationships:</b>
INDICATOR	ACMMM. 1.1.1.a.	Find the equation of a straight line given sufficient information; parallel and perpendicular lines (ACMMM004) solve linear equations. (ACMMM005)

Grade 11 - Adopted: 2017

<b>STRAND / DOMAIN</b>	<b>NTCET.M 1.</b>	<b>Mathematics - Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>M1.1.</b>	<b>Functions and Graphs</b>
<b>INDICATOR</b>	<b>M1.1.1.</b>	<b>Lines and Linear Relationships</b>
<b>INDICATOR</b>	<b>M1.1.1.1</b>	<b>How can all the points on a straight line be described mathematically?</b>
INDICATOR	M1.1.1.1. a.	The equation of a straight line: from two points; from a slope and a point; parallel and perpendicular to a given line through some other point

**Northern Territory Curriculum  
Mathematics**

Grade 12 - Adopted: 2015

<b>STRAND / DOMAIN</b>	<b>ACMEM.</b>	<b>Essential Mathematics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACMEM. 3.</b>	<b>Unit 3</b>
<b>INDICATOR</b>	<b>ACMEM. 3.3.</b>	<b>Topic 3: Graphs</b>
<b>INDICATOR</b>	<b>ACMEM. 3.3.1.</b>	<b>Cartesian plane</b>
INDICATOR	ACMEM. 3.3.1.c.	Graph linear functions for all values of with pencil and paper and with graphing software. (ACMEM123)

<b>STRAND / DOMAIN</b>	<b>ACMGM.</b>	<b>General Mathematics</b>
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<b>OUTCOME / INDICATOR</b>	<b>ACMGM. 2.</b>	<b>Unit 2</b>
<b>INDICATOR</b>	<b>ACMGM. 2.3.</b>	<b>Topic 3: Linear equations and their graphs</b>
<b>INDICATOR</b>	<b>ACMGM. 2.3.1.</b>	<b>Linear equations:</b>

INDICATOR ACMGM. 2.3.1.a. Identify and solve linear equations (ACMGM038)

<b>STRAND / DOMAIN</b>	<b>ACMGM.</b>	<b>General Mathematics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACMGM. 2.</b>	<b>Unit 2</b>
<b>INDICATOR</b>	<b>ACMGM. 2.3.</b>	<b>Topic 3: Linear equations and their graphs</b>
<b>INDICATOR</b>	<b>ACMGM. 2.3.2.</b>	<b>Straight-line graphs and their applications:</b>

INDICATOR ACMGM. 2.3.2.a. Construct straight-line graphs both with and without the aid of technology (ACMGM040)

INDICATOR ACMGM. 2.3.2.d. Construct and analyse a straight-line graph to model a given linear relationship; for example, modelling the cost of filling a fuel tank of a car against the number of litres of petrol required. (ACMGM043)

<b>STRAND / DOMAIN</b>	<b>ACMMM.</b>	<b>Mathematical Methods</b>
<b>OUTCOME / INDICATOR</b>	<b>ACMMM. 1.</b>	<b>Unit 1</b>
<b>INDICATOR</b>	<b>ACMMM. 1.1.</b>	<b>Topic 1: Functions and graphs</b>
<b>INDICATOR</b>	<b>ACMMM. 1.1.3.</b>	<b>Lines and linear relationships:</b>

INDICATOR ACMMM. 1.1.1.a. Find the equation of a straight line given sufficient information; parallel and perpendicular lines (ACMMM004) solve linear equations. (ACMMM005)

**Northern Territory Curriculum  
Science  
Grade 11 - Adopted: 2016**

<b>STRAND / DOMAIN</b>	<b>ACSBL.</b>	<b>Biology</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSBL.1 .</b>	<b>Unit 1: Biodiversity and the interconnectedness of life</b>
<b>INDICATOR</b>	<b>ACSBL. 1.2.</b>	<b>Science as a Human Endeavour (Units 1 and 2)</b>

INDICATOR ACSBL.1. 2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSBL014)

<b>STRAND / DOMAIN</b>	<b>ACSBL.</b>	<b>Biology</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSBL.1 .</b>	<b>Unit 1: Biodiversity and the interconnectedness of life</b>

INDICATOR	ACSBL.1.3.	Science Understanding
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INDICATOR	ACSBL.1.3.2.	Ecosystem dynamics
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INDICATOR ACSBL.1.3.2.d. Ecosystems have carrying capacities that limit the number of organisms (within populations) they support, and can be impacted by changes to abiotic and biotic factors, including climatic events (ACSBL025)

STRAND / DOMAIN	ACSCH.	Chemistry
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OUTCOME / INDICATOR	ACSCH.1.	Unit 1: Chemical fundamentals: structure, properties and reactions
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INDICATOR	ACSCH.1.2.	Science as a Human Endeavour (Units 1 and 2)
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INDICATOR ACSCH.1.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSCH015)

STRAND / DOMAIN	ACSCH.	Chemistry
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OUTCOME / INDICATOR	ACSCH.1.	Unit 1: Chemical fundamentals: structure, properties and reactions
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INDICATOR	ACSCH.1.3.	Science Understanding
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INDICATOR	ACSCH.1.3.3.	Chemical reactions: reactants, products and energy change
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INDICATOR ACSCH.1.3.3.b. Endothermic and exothermic reactions can be explained in terms of the Law of Conservation of Energy and the breaking and reforming of bonds; heat energy released or absorbed can be represented in thermochemical equations (ACSCH037)

STRAND / DOMAIN	ACSCH.	Chemistry
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OUTCOME / INDICATOR	ACSCH.2.	Unit 2: Molecular interactions and reactions
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INDICATOR	ACSCH.2.2.	Science as a Human Endeavour (Units 1 and 2)
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INDICATOR ACSCH.2.2.6. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSCH054)

STRAND / DOMAIN	ACSCH.	Chemistry
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OUTCOME / INDICATOR	ACSCH.3.	Unit 3: Equilibrium, acids and redox reactions
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INDICATOR	ACSCH.3.2.	Science as a Human Endeavour (Units 3 & 4)
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INDICATOR ACSCH.3.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSCH088)

STRAND / DOMAIN	ACSCH.	Chemistry
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OUTCOME / INDICATOR	ACSCH.4.	Unit 4: Structure, synthesis and design
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<b>INDICATOR</b>	<b>ACSCH. 4.2.</b>	<b>Science as a Human Endeavour (Units 3 &amp; 4)</b>
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INDICATOR ACSCH.4.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSCH126)

<b>STRAND / DOMAIN</b>	<b>ACSCH.</b>	<b>Chemistry</b>
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<b>OUTCOME / INDICATOR</b>	<b>ACSCH. 4.</b>	<b>Unit 4: Structure, synthesis and design</b>
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<b>INDICATOR</b>	<b>ACSCH. 4.3.</b>	<b>Science Understanding</b>
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<b>INDICATOR</b>	<b>ACSCH. 4.3.2.</b>	<b>Chemical synthesis and design</b>
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INDICATOR ACSCH.4.3.2.a. Chemical synthesis involves the selection of particular reagents to form a product with specific properties (for example, pharmaceuticals, fuels, cosmetics, cleaning products) (ACSCH131)

INDICATOR ACSCH.4.3.2.b. Designing chemical synthesis processes involves constructing reaction pathways that may include more than one chemical reaction (ACSCH132)

INDICATOR ACSCH.4.3.2.c. Designing chemical synthesis processes includes identifying reagents and reaction conditions in order to maximise yield and purity of product (ACSCH133)

INDICATOR ACSCH.4.3.2.e. Green chemistry principles include the design of chemical synthesis processes that use renewable raw materials, limit the use of potentially harmful solvents and minimise the amount of unwanted products (ACSCH135)

<b>STRAND / DOMAIN</b>	<b>ACSES.</b>	<b>Earth and Environmental Science</b>
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<b>OUTCOME / INDICATOR</b>	<b>ACSES.1 .</b>	<b>Unit 1: Introduction to Earth systems</b>
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<b>INDICATOR</b>	<b>ACSES. 1.2.</b>	<b>Science as a Human Endeavour (Units 1 &amp; 2)</b>
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INDICATOR ACSES.1.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSES014)

<b>STRAND / DOMAIN</b>	<b>ACSES.</b>	<b>Earth and Environmental Science</b>
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<b>OUTCOME / INDICATOR</b>	<b>ACSES.2 .</b>	<b>Unit 2: Earth processes – energy transfers and transformations</b>
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<b>INDICATOR</b>	<b>ACSES. 2.2.</b>	<b>Science as a Human Endeavour (Units 1 &amp; 2)</b>
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INDICATOR ACSES.2.2.5. The use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences (ACSES041)

INDICATOR ACSES.2.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSES043)

<b>STRAND / DOMAIN</b>	<b>ACSES.</b>	<b>Earth and Environmental Science</b>
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<b>OUTCOME / INDICATOR</b>	<b>ACSES.2 .</b>	<b>Unit 2: Earth processes – energy transfers and transformations</b>
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INDICATOR	ACSES.2.3.	Science Understanding
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INDICATOR	ACSES.2.3.2.	Energy for atmospheric and hydrologic processes
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INDICATOR	ACSES.2.3.2.a.	The net transfer of solar energy to Earth's surface is influenced by its passage through the atmosphere, including impeded transfer of ultraviolet radiation to Earth's surface due to its interaction with atmospheric ozone, and by the physical characteristics of Earth's surface, including albedo (ACSES048)
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INDICATOR	ACSES.2.3.2.b.	Most of the thermal radiation emitted from Earth's surface passes back out into space but some is reflected or scattered by greenhouse gases back toward Earth; this additional surface warming produces a phenomenon known as the greenhouse effect (ACSES049)
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STRAND / DOMAIN	ACSES.	Earth and Environmental Science
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OUTCOME / INDICATOR	ACSES.3.	Unit 3: Living on Earth - extracting, using and managing Earth resources
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INDICATOR	ACSES.3.2.	Science as a Human Endeavour (Units 3 & 4)
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INDICATOR	ACSES.3.2.2.	Models and theories are contested and refined or replaced when new evidence challenges them, or when a new model or theory has greater explanatory power (ACSES065)
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STRAND / DOMAIN	ACSES.	Earth and Environmental Science
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OUTCOME / INDICATOR	ACSES.3.	Unit 3: Living on Earth - extracting, using and managing Earth resources
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INDICATOR	ACSES.3.3.	Science Understanding
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INDICATOR	ACSES.3.3.2.	Use of renewable Earth resources
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INDICATOR	ACSES.3.3.2.d.	The cost-effective use of renewable energy resources is constrained by the efficiency of available technologies to collect, store and transfer the energy (ACSES079)
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STRAND / DOMAIN	ACSES.	Earth and Environmental Science
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OUTCOME / INDICATOR	ACSES.4.	Unit 4: The changing Earth - the cause and impact of Earth hazards
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INDICATOR	ACSES.4.3.	Science Understanding
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INDICATOR	ACSES.4.3.2.	The cause and impact of global climate change
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INDICATOR	ACSES.4.3.2.a.	Natural processes (for example, oceanic circulation, orbitally-induced solar radiation fluctuations, the plate tectonic supercycle) and human activities contribute to global climate changes that are evident at a variety of time scales (ACSES104)
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INDICATOR	ACSES.4.3.2.b.	Human activities, particularly land-clearing and fossil fuel consumption, produce gases (including carbon dioxide, methane, nitrous oxide and hydrofluorocarbons) and particulate materials that change the composition of the atmosphere and climatic conditions (for example, the enhanced greenhouse effect) (ACSES105)
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INDICATOR	ACSES.4.3.2.c.	Climate change affects the biosphere, atmosphere, geosphere and hydrosphere; climate change has been linked to changes in species distribution, crop productivity, sea level, rainfall patterns, surface temperature and extent of ice sheets (ACSES106)
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<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 1.</b>	<b>Unit 1: Thermal, nuclear and electrical physics</b>
<b>INDICATOR</b>	<b>ACSPH. 1.1.</b>	<b>Science Inquiry Skills</b>

INDICATOR ACSPH.1.1.8. Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports (ACSPH008)

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 1.</b>	<b>Unit 1: Thermal, nuclear and electrical physics</b>
<b>INDICATOR</b>	<b>ACSPH. 1.2.</b>	<b>Science as a Human Endeavour (Units 1 &amp; 2)</b>

INDICATOR ACSPH.1.2.5. The use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences (ACSPH013)

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 2.</b>	<b>Unit 2: Linear Motion and Waves</b>
<b>INDICATOR</b>	<b>ACSPH. 2.1.</b>	<b>Science Inquiry Skills</b>

INDICATOR ACSPH.2.1.8. Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports (ACSPH052)

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 2.</b>	<b>Unit 2: Linear Motion and Waves</b>
<b>INDICATOR</b>	<b>ACSPH. 2.2.</b>	<b>Science as a Human Endeavour (Units 1 &amp; 2)</b>

INDICATOR ACSPH.2.2.4. The use of scientific knowledge is influenced by social, economic, cultural and ethical considerations (ACSPH056)

INDICATOR ACSPH.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSPH059)

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 3.</b>	<b>Unit 3: Gravity and electromagnetism</b>
<b>INDICATOR</b>	<b>ACSPH. 3.1.</b>	<b>Science Inquiry Skills</b>

INDICATOR ACSPH.3.1.8. Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports (ACSPH085)

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 3.</b>	<b>Unit 3: Gravity and electromagnetism</b>
<b>INDICATOR</b>	<b>ACSPH. 3.3.</b>	<b>Science Understanding</b>
<b>INDICATOR</b>	<b>ACSPH. 3.3.2.</b>	<b>Electromagnetism</b>

INDICATOR ACSPH.3 .3.2.g. Magnets, magnetic materials, moving charges and current-carrying wires experience a force in a magnetic field; this force is utilised in DC electric motors (ACSPH108)

INDICATOR ACSPH.3 .3.2.i. A changing magnetic flux induces a potential difference; this process of electromagnetic induction is used in step-up and stepdown transformers, DC and AC generators, and AC induction motors (ACSPH110)

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 4.</b>	<b>Unit 4: Revolutions in modern physics</b>
<b>INDICATOR</b>	<b>ACSPH. 4.1.</b>	<b>Science Inquiry Skills</b>

INDICATOR ACSPH.4 .1.8. Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports (ACSPH121)

Grade 11 - Adopted: 2017

<b>STRAND / DOMAIN</b>	<b>NTCET.B 1.</b>	<b>Biology – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>BI.T.4.</b>	<b>Topic 4: Biodiversity and Ecosystem Dynamics</b>

INDICATOR BI.T4.12. Humans can interfere with natural cycles.

<b>STRAND / DOMAIN</b>	<b>NTCET.C 1.</b>	<b>Chemistry – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>C1.T3.</b>	<b>Topic 3: Molecules</b>
<b>INDICATOR</b>	<b>C1.T3.3.</b>	<b>Hydrocarbons</b>

INDICATOR C1.T3.3. 2. Hydrocarbons are used as fuels and as feedstock for the chemical industry.

INDICATOR C1.T3.3.2. a. Write equations for the complete combustion of hydrocarbons.

<b>STRAND / DOMAIN</b>	<b>NTCET.C 1.</b>	<b>Chemistry – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>C1.T6.</b>	<b>Topic 6: Redox Reactions</b>
<b>INDICATOR</b>	<b>C1.T6.1.</b>	<b>Concepts of Oxidation and Reduction</b>

INDICATOR C1.T6.1.1. A range of reactions, including reactions of metals, combustion, and electrochemical processes, can be considered as redox reactions.

<b>STRAND / DOMAIN</b>	<b>NT CET .E ES1.</b>	<b>Earth and Environmental Science – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>EES1.T4</b>	<b>Topic 4: The Earth's Atmosphere</b>
<b>INDICATOR</b>	<b>EES1.T4.5.</b>	<b>Certain gases in the Earth's atmosphere (known as 'greenhouse gases') produce a phenomenon known as the 'greenhouse effect'.</b>

INDICATOR EES1.T4.5.1. Explain how greenhouse gases absorb and reradiate some of the thermal radiation emitted from Earth's surface to warm the atmosphere.

<b>STRAND / DOMAIN</b>	<b>NT CET .P 1.</b>	<b>Physics – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>P1.SI.</b>	<b>Science Inquiry Skills</b>
<b>INDICATOR</b>	<b>P1.SI.7.</b>	<b>Effective scientific communication is clear and concise.</b>
<b>INDICATOR</b>	<b>P1.SI.7.1</b>	<b>Communicate to specific audiences and for specific purposes using:</b>

INDICATOR P1.SI.7.1.a. Appropriate language

INDICATOR P1.SI.7.1.b. Terminology

<b>STRAND / DOMAIN</b>	<b>NT CET .P 1.</b>	<b>Physics – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>P1.T4.</b>	<b>Topic 4: Energy and Momentum</b>
<b>INDICATOR</b>	<b>P1.T4.1.</b>	<b>Energy</b>
<b>INDICATOR</b>	<b>P1.T4.1.3.</b>	<b>Energy can be transferred from one object to another or transformed into different forms of energy.</b>

INDICATOR P1.T4.1.3.b. Describe examples of energy being transformed.

<b>STRAND / DOMAIN</b>	<b>NT CET .S S1.</b>	<b>Scientific Studies – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>SS1.3.</b>	<b>Designing Investigations and Experiments: Design</b>
<b>INDICATOR</b>	<b>SS1.3.2.</b>	<b>Every step in an investigation serves a purpose.</b>

INDICATOR SS1.3.2.1. Describe the steps of an investigation.

<b>STRAND / DOMAIN</b>	<b>NT CET .S S1.</b>	<b>Scientific Studies – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>SS1.8.</b>	<b>Conducting Investigations: Precision, Reliability, and Accuracy</b>
<b>INDICATOR</b>	<b>SS1.8.5.</b>	<b>The resolution of a measuring instrument is the smallest increment measurable by the measuring instrument.</b>

INDICATOR SS1.8.5.1. Select an instrument of appropriate resolution for a measurement.



<b>STRAND / DOMAIN</b>	<b>NT CET .S S1.</b>	<b>Scientific Studies – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>SS1.12.</b>	<b>Communication</b>
<b>INDICATOR</b>	<b>SS1.12.1.</b>	<b>Scientific communication uses specific terminology, conventions, and symbols.</b>

INDICATOR SS1.12.1. Use scientific terminology, conventions, and symbols that are appropriate for the purpose of the communication.  
1.

<b>STRAND / DOMAIN</b>	<b>NT CET .S S1.</b>	<b>Scientific Studies – Stage 1 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>SS1.12.</b>	<b>Communication</b>
<b>INDICATOR</b>	<b>SS1.12.5.</b>	<b>Multimedia presentations use minimal language and a variety of graphics to present information.</b>

INDICATOR SS1.12.5. Use concise language and graphics to present information.  
1.

**Northern Territory Curriculum  
Science  
Grade 12 - Adopted: 2016**

<b>STRAND / DOMAIN</b>	<b>ACSBL.</b>	<b>Biology</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSBL.1 .</b>	<b>Unit 1: Biodiversity and the interconnectedness of life</b>
<b>INDICATOR</b>	<b>ACSBL.1.2.</b>	<b>Science as a Human Endeavour (Units 1 and 2)</b>

INDICATOR ACSBL.1.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSBL014)

<b>STRAND / DOMAIN</b>	<b>ACSBL.</b>	<b>Biology</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSBL.1 .</b>	<b>Unit 1: Biodiversity and the interconnectedness of life</b>
<b>INDICATOR</b>	<b>ACSBL.1.3.</b>	<b>Science Understanding</b>
<b>INDICATOR</b>	<b>ACSBL.1.3.2.</b>	<b>Ecosystem dynamics</b>

INDICATOR ACSBL.1.3.2.d. Ecosystems have carrying capacities that limit the number of organisms (within populations) they support, and can be impacted by changes to abiotic and biotic factors, including climatic events (ACSBL025)

<b>STRAND / DOMAIN</b>	<b>ACSCH.</b>	<b>Chemistry</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSCH.1.</b>	<b>Unit 1: Chemical fundamentals: structure, properties and reactions</b>
<b>INDICATOR</b>	<b>ACSCH.1.2.</b>	<b>Science as a Human Endeavour (Units 1 and 2)</b>

INDICATOR ACSCH.1.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSCH015)

<b>STRAND / DOMAIN</b>	<b>ACSCH.</b>	<b>Chemistry</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSCH. 1.</b>	<b>Unit 1: Chemical fundamentals: structure, properties and reactions</b>
<b>INDICATOR</b>	<b>ACSCH. 1.3.</b>	<b>Science Understanding</b>
<b>INDICATOR</b>	<b>ACSCH. 1.3.3.</b>	<b>Chemical reactions: reactants, products and energy change</b>

INDICATOR ACSCH.1.3.3.b. Endothermic and exothermic reactions can be explained in terms of the Law of Conservation of Energy and the breaking and reforming of bonds; heat energy released or absorbed can be represented in thermochemical equations (ACSCH037)

<b>STRAND / DOMAIN</b>	<b>ACSCH.</b>	<b>Chemistry</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSCH. 2.</b>	<b>Unit 2: Molecular interactions and reactions</b>
<b>INDICATOR</b>	<b>ACSCH. 2.2.</b>	<b>Science as a Human Endeavour (Units 1 and 2)</b>

INDICATOR ACSCH.2.2.6. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSCH054)

<b>STRAND / DOMAIN</b>	<b>ACSCH.</b>	<b>Chemistry</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSCH. 3.</b>	<b>Unit 3: Equilibrium, acids and redox reactions</b>
<b>INDICATOR</b>	<b>ACSCH. 3.2.</b>	<b>Science as a Human Endeavour (Units 3 &amp; 4)</b>

INDICATOR ACSCH.3.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSCH088)

<b>STRAND / DOMAIN</b>	<b>ACSCH.</b>	<b>Chemistry</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSCH. 4.</b>	<b>Unit 4: Structure, synthesis and design</b>
<b>INDICATOR</b>	<b>ACSCH. 4.2.</b>	<b>Science as a Human Endeavour (Units 3 &amp; 4)</b>

INDICATOR ACSCH.4.2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSCH126)

<b>STRAND / DOMAIN</b>	<b>ACSCH.</b>	<b>Chemistry</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSCH. 4.</b>	<b>Unit 4: Structure, synthesis and design</b>
<b>INDICATOR</b>	<b>ACSCH. 4.3.</b>	<b>Science Understanding</b>

<b>INDICATOR</b>	<b>ACSCH. 4.3.2.</b>	<b>Chemical synthesis and design</b>
INDICATOR	ACSCH.4 .3.2.a.	Chemical synthesis involves the selection of particular reagents to form a product with specific properties (for example, pharmaceuticals, fuels, cosmetics, cleaning products) (ACSCH131)
INDICATOR	ACSCH.4 .3.2.b.	Designing chemical synthesis processes involves constructing reaction pathways that may include more than one chemical reaction (ACSCH132)
INDICATOR	ACSCH.4 .3.2.c.	Designing chemical synthesis processes includes identifying reagents and reaction conditions in order to maximise yield and purity of product (ACSCH133)
INDICATOR	ACSCH.4 .3.2.e.	Green chemistry principles include the design of chemical synthesis processes that use renewable raw materials, limit the use of potentially harmful solvents and minimise the amount of unwanted products (ACSCH135)

<b>STRAND / DOMAIN</b>	<b>ACSES.</b>	<b>Earth and Environmental Science</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSES.1</b>	<b>Unit 1: Introduction to Earth systems</b>
<b>INDICATOR</b>	<b>ACSES. 1.2.</b>	<b>Science as a Human Endeavour (Units 1 &amp; 2)</b>

INDICATOR ACSES.1. 2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSES014)

<b>STRAND / DOMAIN</b>	<b>ACSES.</b>	<b>Earth and Environmental Science</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSES.2</b>	<b>Unit 2: Earth processes – energy transfers and transformations</b>
<b>INDICATOR</b>	<b>ACSES. 2.2.</b>	<b>Science as a Human Endeavour (Units 1 &amp; 2)</b>

INDICATOR ACSES.2. 2.5. The use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences (ACSES041)

INDICATOR ACSES.2. 2.7. Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSES043)

<b>STRAND / DOMAIN</b>	<b>ACSES.</b>	<b>Earth and Environmental Science</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSES.2</b>	<b>Unit 2: Earth processes – energy transfers and transformations</b>
<b>INDICATOR</b>	<b>ACSES. 2.3.</b>	<b>Science Understanding</b>
<b>INDICATOR</b>	<b>ACSES.2 .3.2.</b>	<b>Energy for atmospheric and hydrologic processes</b>

INDICATOR ACSES.2. 3.2.a. The net transfer of solar energy to Earth's surface is influenced by its passage through the atmosphere, including impeded transfer of ultraviolet radiation to Earth's surface due to its interaction with atmospheric ozone, and by the physical characteristics of Earth's surface, including albedo (ACSES048)

INDICATOR ACSES.2. 3.2.b. Most of the thermal radiation emitted from Earth's surface passes back out into space but some is reflected or scattered by greenhouse gases back toward Earth; this additional surface warming produces a phenomenon known as the greenhouse effect (ACSES049)

<b>STRAND / DOMAIN</b>	<b>ACSES.</b>	<b>Earth and Environmental Science</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSES.3</b>	<b>Unit 3: Living on Earth - extracting, using and managing Earth resources</b>
<b>INDICATOR</b>	<b>ACSES.3.2.</b>	<b>Science as a Human Endeavour (Units 3 &amp; 4)</b>

INDICATOR ACSES.3.2. Models and theories are contested and refined or replaced when new evidence challenges them, or when a new model or theory has greater explanatory power (ACSES065)

<b>STRAND / DOMAIN</b>	<b>ACSES.</b>	<b>Earth and Environmental Science</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSES.3</b>	<b>Unit 3: Living on Earth - extracting, using and managing Earth resources</b>
<b>INDICATOR</b>	<b>ACSES.3.3.</b>	<b>Science Understanding</b>
<b>INDICATOR</b>	<b>ACSES.3.3.2.</b>	<b>Use of renewable Earth resources</b>

INDICATOR ACSES.3.3.2. The cost-effective use of renewable energy resources is constrained by the efficiency of available technologies to collect, store and transfer the energy (ACSES079)

<b>STRAND / DOMAIN</b>	<b>ACSES.</b>	<b>Earth and Environmental Science</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSES.4.</b>	<b>Unit 4: The changing Earth - the cause and impact of Earth hazards</b>
<b>INDICATOR</b>	<b>ACSES.4.3.</b>	<b>Science Understanding</b>
<b>INDICATOR</b>	<b>ACSES.4.3.2.</b>	<b>The cause and impact of global climate change</b>

INDICATOR ACSES.4.3.2.a. Natural processes (for example, oceanic circulation, orbitally-induced solar radiation fluctuations, the plate tectonic supercycle) and human activities contribute to global climate changes that are evident at a variety of time scales (ACSES104)

INDICATOR ACSES.4.3.2.b. Human activities, particularly land-clearing and fossil fuel consumption, produce gases (including carbon dioxide, methane, nitrous oxide and hydrofluorocarbons) and particulate materials that change the composition of the atmosphere and climatic conditions (for example, the enhanced greenhouse effect) (ACSES105)

INDICATOR ACSES.4.3.2.c. Climate change affects the biosphere, atmosphere, geosphere and hydrosphere; climate change has been linked to changes in species distribution, crop productivity, sea level, rainfall patterns, surface temperature and extent of ice sheets (ACSES106)

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH.1.</b>	<b>Unit 1: Thermal, nuclear and electrical physics</b>
<b>INDICATOR</b>	<b>ACSPH.1.1.</b>	<b>Science Inquiry Skills</b>

INDICATOR ACSPH.1.1.8. Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports (ACSPH008)

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 1.</b>	<b>Unit 1: Thermal, nuclear and electrical physics</b>
<b>INDICATOR</b>	<b>ACSPH. 1.2.</b>	<b>Science as a Human Endeavour (Units 1 &amp; 2)</b>

INDICATOR ACSPH.1 The use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences (ACSPH013).2.5.

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 2.</b>	<b>Unit 2: Linear Motion and Waves</b>
<b>INDICATOR</b>	<b>ACSPH. 2.1.</b>	<b>Science Inquiry Skills</b>

INDICATOR ACSPH.2 Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports (ACSPH052).1.8.

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 2.</b>	<b>Unit 2: Linear Motion and Waves</b>
<b>INDICATOR</b>	<b>ACSPH. 2.2.</b>	<b>Science as a Human Endeavour (Units 1 &amp; 2)</b>

INDICATOR ACSPH.2 The use of scientific knowledge is influenced by social, economic, cultural and ethical considerations (ACSPH056).2.4.

INDICATOR ACSPH.2 Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts and to design action for sustainability (ACSPH059).2.7.

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 3.</b>	<b>Unit 3: Gravity and electromagnetism</b>
<b>INDICATOR</b>	<b>ACSPH. 3.1.</b>	<b>Science Inquiry Skills</b>

INDICATOR ACSPH.3 Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports (ACSPH085).1.8.

<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 3.</b>	<b>Unit 3: Gravity and electromagnetism</b>
<b>INDICATOR</b>	<b>ACSPH. 3.3.</b>	<b>Science Understanding</b>

INDICATOR ACSPH.3.3.2. Electromagnetism

INDICATOR	ACSPH.3 .3.2.g.	Magnets, magnetic materials, moving charges and current-carrying wires experience a force in a magnetic field; this force is utilised in DC electric motors (ACSPH108)
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INDICATOR	ACSPH.3 .3.2.i.	A changing magnetic flux induces a potential difference; this process of electromagnetic induction is used in step-up and stepdown transformers, DC and AC generators, and AC induction motors (ACSPH110)
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<b>STRAND / DOMAIN</b>	<b>ACSPH.</b>	<b>Physics</b>
<b>OUTCOME / INDICATOR</b>	<b>ACSPH. 4.</b>	<b>Unit 4: Revolutions in modern physics</b>
<b>INDICATOR</b>	<b>ACSPH. 4.1.</b>	<b>Science Inquiry Skills</b>

INDICATOR	ACSPH.4 .1.8.	Communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports (ACSPH121)
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Grade 12 - Adopted: 2017

<b>STRAND / DOMAIN</b>	<b>NTCET.C 2.</b>	<b>Chemistry – Stage 2 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>C2.1.</b>	<b>Topic 1: Elemental and Environmental Chemistry</b>
<b>INDICATOR</b>	<b>C2.1.3.</b>	<b>The Greenhouse Effect</b>
<b>INDICATOR</b>	<b>C2.1.3.1.</b>	<b>Some gases in the atmosphere, called ‘greenhouse gases’, serve as insulation to maintain the temperature of the Earth’s atmosphere. This is known as the ‘natural greenhouse effect’.</b>

INDICATOR	C2.1.3.1.a	Describe the action of the common greenhouse gases, carbon dioxide and methane, that serve to maintain a steady temperature in the Earth’s atmosphere.
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<b>STRAND / DOMAIN</b>	<b>NTCET.C 2.</b>	<b>Chemistry – Stage 2 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>C2.1.</b>	<b>Topic 1: Elemental and Environmental Chemistry</b>
<b>INDICATOR</b>	<b>C2.1.3.</b>	<b>The Greenhouse Effect</b>
<b>INDICATOR</b>	<b>C2.1.3.2.</b>	<b>Human activity that affects the concentration of greenhouse gases has the potential to disrupt the thermal balance of the atmosphere. This is known as the ‘enhanced greenhouse effect’.</b>

INDICATOR	C2.1.3.2.a	Explain the enhanced greenhouse effect and its potential consequences for the environment.
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<b>STRAND / DOMAIN</b>	<b>NTCET.C 2.</b>	<b>Chemistry – Stage 2 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>C2.3.</b>	<b>Topic 3: Using and Controlling Reactions</b>
<b>INDICATOR</b>	<b>C2.3.1.</b>	<b>Measuring Energy Changes</b>
<b>INDICATOR</b>	<b>C2.3.1.1.</b>	<b>Almost all chemical reactions occur with either an absorption or a release of heat or light energy. Other forms of energy, such as electrical energy, can also be released.</b>

INDICATOR	C2.3.1.1.a	Identify combustion and respiration as reactions that release energy and photosynthesis as a reaction that absorbs energy.
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<b>STRAND / DOMAIN</b>	<b>NTCET.C 2.</b>	<b>Chemistry – Stage 2 (2017)</b>
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OUTCOME / INDICATOR	C2.3.	Topic 3: Using and Controlling Reactions
INDICATOR	C2.3.1.	Measuring Energy Changes
INDICATOR	C2.3.1.2.	Exothermic reactions release energy to the surroundings, whereas endothermic reactions absorb energy from the surroundings.

INDICATOR C2.3.1.2.a Deduce whether a reaction is exothermic or endothermic from information provided.

STRAND / DOMAIN	NTCET.C2.	Chemistry – Stage 2 (2017)
OUTCOME / INDICATOR	C2.3.	Topic 3: Using and Controlling Reactions
INDICATOR	C2.3.2.	Fuels
INDICATOR	C2.3.2.1.	Carbon-based fuels provide energy and are feedstock for the chemical industry.

INDICATOR C2.3.2.1.a Describe the advantages and disadvantages of the use of carbon-based fuels as sources of heat energy, compared with their use as feedstock.

STRAND / DOMAIN	NTCET.C2.	Chemistry – Stage 2 (2017)
OUTCOME / INDICATOR	C2.3.	Topic 3: Using and Controlling Reactions
INDICATOR	C2.3.2.	Fuels
INDICATOR	C2.3.2.2.	Carbon dioxide and water are produced by the complete combustion of compounds containing carbon and hydrogen.

INDICATOR C2.3.2.2.a Write balanced equations for the complete combustion of fuels in which the only products are carbon dioxide and water.

STRAND / DOMAIN	NTCET.C2.	Chemistry – Stage 2 (2017)
OUTCOME / INDICATOR	C2.3.	Topic 3: Using and Controlling Reactions
INDICATOR	C2.3.2.	Fuels
INDICATOR	C2.3.2.3.	The products of the incomplete combustion of carbon-based fuels include carbon (soot) and carbon monoxide. Soot and carbon monoxide are harmful to the environment.

INDICATOR C2.3.2.3.a Describe the undesirable consequences of incomplete combustion.

STRAND / DOMAIN	NTCET.EES2.	Earth and Environmental Science – Stage 2 (2018)
OUTCOME / INDICATOR	EES2.T3	Topic 3: Earth's Sustainable Future
INDICATOR	EES2.T3.1.	Renewable resources include some that are available regularly and others that are replenished at time scales from years to millennia.

INDICATOR EES2.T3.1.1. Discuss the need for, and limitations of, renewable sources of energy, including biofuels, solar, wind, and geothermal energy.

<b>STRAND / DOMAIN</b>	<b>NTCET.E ES2.</b>	<b>Earth and Environmental Science – Stage 2 (2018)</b>
<b>OUTCOME / INDICATOR</b>	<b>EES2.T3</b>	<b>Topic 3: Earth's Sustainable Future</b>
<b>INDICATOR</b>	<b>EES2.T 3.3.</b>	<b>The effective use of energy resources is constrained by factors including waste disposal, and the efficiency of available technologies to collect, store, and transfer the energy.</b>

INDICATOR EES2.T3. Compare the advantages and disadvantages of using renewable and non-renewable energy resources.  
3.1.

<b>STRAND / DOMAIN</b>	<b>NTCET.E ES2.</b>	<b>Earth and Environmental Science – Stage 2 (2018)</b>
<b>OUTCOME / INDICATOR</b>	<b>EES2.T4</b>	<b>Topic 4: Climate Change</b>
<b>INDICATOR</b>	<b>EES2.T 4.1.</b>	<b>Natural processes in the Earth's atmosphere affect climate change over geological time.</b>

INDICATOR EES2.T4. Discuss the greenhouse effect.  
1.3.

INDICATOR EES2.T4. Explain how the lifespans of greenhouse gases and their ability to absorb infrared radiation contribute to their warming potentials.  
1.4.

<b>STRAND / DOMAIN</b>	<b>NTCET.E ES2.</b>	<b>Earth and Environmental Science – Stage 2 (2018)</b>
<b>OUTCOME / INDICATOR</b>	<b>EES2.T4</b>	<b>Topic 4: Climate Change</b>
<b>INDICATOR</b>	<b>EES2.T 4.6.</b>	<b>Anthropogenic activities affect climate conditions.</b>

INDICATOR EES2.T4. Explain the enhanced greenhouse effect.  
6.1.

INDICATOR EES2.T4. Describe anthropogenic activities that are changing the levels of greenhouse gases.  
6.2.

INDICATOR EES2.T4. Compare how local, national, and global policies can affect the levels of these gases.  
6.3.

<b>STRAND / DOMAIN</b>	<b>NTCET.E ES2.</b>	<b>Earth and Environmental Science – Stage 2 (2018)</b>
<b>OUTCOME / INDICATOR</b>	<b>EES2.T4</b>	<b>Topic 4: Climate Change</b>
<b>INDICATOR</b>	<b>EES2.T 4.9.</b>	<b>Geological, prehistorical, historical, and contemporary records provide evidence that climate change has affected different regions and species differently over time.</b>

INDICATOR EES2.T4. Investigate how contemporary levels of CO<sub>2</sub> and temperature are monitored, and provide evidence of contemporary climate change.  
9.1.

<b>STRAND / DOMAIN</b>	<b>NTCET.G 2.</b>	<b>Geology – Stage 2 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>G2.6.</b>	<b>The Impact of Human Activities on the Earth</b>



INDICATOR	G2.6.2.	<b>The Importance of Resources</b>
INDICATOR	G2.6.2.1	<b>People use the geological resources of the Earth to help satisfy their needs and wants.</b>

INDICATOR G2.6.2.1. Understand that all lifestyles depend on the use of geological resources.  
a.

STRAND / DOMAIN	NTCET.G2.	<b>Geology – Stage 2 (2017)</b>
OUTCOME / INDICATOR	G2.6.	<b>The Impact of Human Activities on the Earth</b>
INDICATOR	G2.6.2.	<b>The Importance of Resources</b>
INDICATOR	G2.6.2.3	<b>Fossil fuels are commonly used as an energy resource.</b>

INDICATOR G2.6.2.3. Define the term 'fossil fuel'.  
a.

INDICATOR G2.6.2.3.h Explain how fossil fuels are used as an energy resource.  
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STRAND / DOMAIN	NTCET.G2.	<b>Geology – Stage 2 (2017)</b>
OUTCOME / INDICATOR	G2.6.	<b>The Impact of Human Activities on the Earth</b>
INDICATOR	G2.6.2.	<b>The Importance of Resources</b>
INDICATOR	G2.6.2.6	<b>The Earth's atmosphere is dynamic and determines global climate patterns.</b>

INDICATOR G2.6.2.6. Name the principal gases in the Earth's atmosphere and state their approximate proportions.  
a.

STRAND / DOMAIN	NTCET.G2.	<b>Geology – Stage 2 (2017)</b>
OUTCOME / INDICATOR	G2.6.	<b>The Impact of Human Activities on the Earth</b>
INDICATOR	G2.6.3.	<b>Sustainable Future</b>
INDICATOR	G2.6.3.1	<b>The management of geological resources is necessary to ensure that the needs of present and future generations are met.</b>

INDICATOR G2.6.3.1.c Discuss the sustainability of the following resources: metallic resources; non-metallic resources; uranium; soil; fossil fuels; water; atmosphere; oceans.  
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INDICATOR G2.6.3.1. Discuss the relationship between the resources listed above and their classification.  
d.

INDICATOR G2.6.3.1.f Discuss the need for, and limitations of, alternative sources of energy.

INDICATOR G2.6.3.1.i. Explain how seismic surveys are used in petroleum exploration.

STRAND / DOMAIN	NTCET.P2.	<b>Physics – Stage 2 (2017)</b>
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<b>OUTCOME / INDICATOR</b>	<b>P2.S.</b>	<b>Skills</b>
<b>INDICATOR</b>	<b>P2.S.12.</b>	<b>Communication</b>
<b>INDICATOR</b>	<b>P2.S.12.1.</b>	<b>Specific terminology, conventions, and symbols are used for communicating in physics.</b>

INDICATOR P2.S.12.1. Use the terminology, conventions, and symbols of physics that are appropriate to the purpose of the communication.  
a.

<b>STRAND / DOMAIN</b>	<b>NT CET .S S2.</b>	<b>Scientific Studies – Stage 2 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>SS2.3.</b>	<b>Designing Investigations and Experiments: Design</b>
<b>INDICATOR</b>	<b>SS2.3.2.</b>	<b>Every step in an investigation serves a purpose.</b>

INDICATOR SS2.3.2.1. Describe the steps of an investigation.

<b>STRAND / DOMAIN</b>	<b>NT CET .S S2.</b>	<b>Scientific Studies – Stage 2 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>SS2.8.</b>	<b>Conducting Investigations: Precision, Reliability, and Accuracy</b>
<b>INDICATOR</b>	<b>SS2.8.5.</b>	<b>The resolution of a measuring instrument is the smallest increment measurable by the measuring instrument.</b>

INDICATOR SS2.8.5.1 Select an instrument of appropriate resolution for a measurement.

<b>STRAND / DOMAIN</b>	<b>NT CET .S S2.</b>	<b>Scientific Studies – Stage 2 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>SS2.12.</b>	<b>Communication</b>
<b>INDICATOR</b>	<b>SS2.12.1.</b>	<b>Scientific communication uses specific terminology, conventions, and symbols.</b>

INDICATOR SS2.12.1. Use scientific terminology, conventions, and symbols that are appropriate for the purpose of the communication.  
1.

<b>STRAND / DOMAIN</b>	<b>NT CET .S S2.</b>	<b>Scientific Studies – Stage 2 (2017)</b>
<b>OUTCOME / INDICATOR</b>	<b>SS2.12.</b>	<b>Communication</b>
<b>INDICATOR</b>	<b>SS2.12.5.</b>	<b>Multimedia presentations use minimal language and a variety of graphics to present information.</b>

INDICATOR SS2.12.5. Use concise language and graphics to present information.  
1.

Nova Scotia Curriculum  
Mathematics  
Grade 11 - Adopted: 2018

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.EM11.</b>	<b>Extended Mathematics 11</b>
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<b>CURRICULUM OUTCOME</b>	<b>EM11.G CO.</b>	<b>General Curriculum Outcomes</b>
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GRADE LEVEL EXPECTATION EM11.GC O.3. Students will be expected to develop logical reasoning.

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.EM11.</b>	<b>Extended Mathematics 11</b>
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<b>CURRICULUM OUTCOME</b>	<b>EM11.S CO.</b>	<b>Specific Curriculum Outcomes</b>
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<b>GRADE LEVEL EXPECTATION</b>	<b>EM11.S CO.M.</b>	<b>Measurement (M)</b>
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<b>EXPECTATION</b>	<b>EM11.S CO.M01.</b>	<b>Students will be expected to solve problems that involve the application of rates. [CN, PS, R]</b>
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INDICATOR EM11.SC O.M01.06. Draw a graph to represent a rate.

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.EM11.</b>	<b>Extended Mathematics 11</b>
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<b>CURRICULUM OUTCOME</b>	<b>EM11.S CO.</b>	<b>Specific Curriculum Outcomes</b>
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<b>GRADE LEVEL EXPECTATION</b>	<b>EM11.S CO.LR.</b>	<b>Logical Reasoning (LR)</b>
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<b>EXPECTATION</b>	<b>EM11.S CO.LR01</b>	<b>Students will be expected to analyze and prove conjectures, using inductive and deductive reasoning, to solve problems. [C, CN, PS, R]</b>
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INDICATOR EM11.SC O.LR01.03. Compare, using examples, inductive and deductive reasoning.

INDICATOR EM11.SC O.LR01.06. Prove a conjecture, using deductive reasoning (not limited to two column proofs).

INDICATOR EM11.SC O.LR01.09. Solve a contextual problem involving inductive or deductive reasoning.

Grade 11 - Adopted: 2015

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.M11.</b>	<b>Mathematics 11</b>
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<b>CURRICULUM OUTCOME</b>	<b>M11.GC O.</b>	<b>General Curriculum Outcomes</b>
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GRADE LEVEL EXPECTATION M11.GC O.3. Develop logical reasoning

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.M11.</b>	<b>Mathematics 11</b>
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<b>CURRICULUM OUTCOME</b>	<b>M11.SC O.</b>	<b>Specific Curriculum Outcomes</b>
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<b>GRADE LEVEL EXPECTATION</b>	<b>M11.SC O.M.</b>	<b>Measurement (M)</b>
<b>EXPECTATION</b>	<b>M11.SC O.M01.</b>	<b>Students will be expected to solve problems that involve the application of rates.</b>

INDICATOR M11.SCO .M01.06. Draw a graph to represent a rate.

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.M11.</b>	<b>Mathematics 11</b>
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<b>CURRICULUM OUTCOME</b>	<b>M11.SC O.</b>	<b>Specific Curriculum Outcomes</b>
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<b>GRADE LEVEL EXPECTATION</b>	<b>M11.SC O.LR.</b>	<b>Logical Reasoning (LR)</b>
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<b>EXPECTATION</b>	<b>M11.SC O.LR01.</b>	<b>Students will be expected to analyze and prove conjectures, using inductive and deductive reasoning, to solve problems.</b>
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INDICATOR M11.SCO .LR01.03. Compare, using examples, inductive and deductive reasoning.

INDICATOR M11.SCO .LR01.06. Prove a conjecture, using deductive reasoning (not limited to two column proofs).

INDICATOR M11.SCO .LR01.09. Solve a contextual problem involving inductive or deductive reasoning.

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.MW11.</b>	<b>Mathematics at Work 11</b>
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<b>CURRICULUM OUTCOME</b>	<b>MW11.S CO.</b>	<b>Specific Curriculum Outcomes</b>
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<b>GRADE LEVEL EXPECTATION</b>	<b>MW11.S CO.A.</b>	<b>Algebra (A)</b>
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<b>EXPECTATION</b>	<b>MW11.S CO.A01.</b>	<b>Students will be expected to solve problems that require the manipulation and application of formulas related to: volume and capacity, surface area, slope and rate of change, simple interest, finance charges</b>
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INDICATOR MW11.S CO.A01.0 5. Create and solve a contextual problem that involves a formula.

**Nova Scotia Curriculum  
Mathematics  
Grade 12 - Adopted: 2015**

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.M12.</b>	<b>Mathematics 12</b>
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<b>CURRICULUM OUTCOME</b>	<b>M12.GC O.</b>	<b>General Curriculum Outcomes</b>
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GRADE LEVEL EXPECTATION M12.GC O.2. Develop logical reasoning

<b>GENERAL LEARNING OUTCOME</b>	NS.MW12.	<b>Mathematics at Work 12</b>
<b>CURRICULUM OUTCOME</b>	MW12.S CO.	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	MW12.S CO.A.	<b>Algebra (A)</b>
<b>EXPECTATION</b>	MW12.S CO.A01.	<b>Students will be expected to demonstrate an understanding of linear relations by: recognizing patterns and trends, graphing, creating tables of values, writing equations, interpolating and extrapolating, solving problems [CN, PS, R, T, V]</b>

INDICATOR MW12.S CO.A01.0 4. Create a table of values for a given equation of a linear relation.

INDICATOR MW12.S CO.A01.1 2. Match given contexts with their corresponding graphs, and explain the reasoning.

INDICATOR MW12.S CO.A01.1 3. Solve a contextual problem that involves the application of a formula for a linear relation.

**Nova Scotia Curriculum  
Science  
Grade 11 - Adopted: 2015**

<b>GENERAL LEARNING OUTCOME</b>	NS.11.CH EM.	<b>Chemistry 11 / Advanced Chemistry 11</b>
<b>CURRICULUM OUTCOME</b>	11.CHE M.SCO.	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	11.CHE M.SCO.1 .	<b>Stoichiometry (40%) (Advanced, 30%)</b>
<b>EXPECTATION</b>	11.CHE M.SCO.1. 4.	<b>APPLICATIONS OF STOICHIOMETRY</b>

INDICATOR 11.CHEM. SCO.1.4.d . Compare processes used in science with those used in technology (114-7)

INDICATOR 11.CHEM. SCO.1.4.e . Analyze society's influence on science and technology (117-2)

<b>GENERAL LEARNING OUTCOME</b>	NS.11.CH EM.	<b>Chemistry 11 / Advanced Chemistry 11</b>
<b>CURRICULUM OUTCOME</b>	11.CHE M.SCO.	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	11.CHE M.SCO.3 .	<b>Organic Chemistry (30%) (Advanced, 25%)</b>
<b>EXPECTATION</b>	11.CHE M.SCO.3. 2.	<b>INFLUENCES OF ORGANIC COMPOUNDS ON SOCIETY</b>

INDICATOR	11.CHEM. SCO.3.2.e	Analyze natural and technological systems to interpret and explain the influence of organic compounds on society (116-7)
GENERAL LEARNING OUTCOME	NS.11.CHEM.	Chemistry 11 / Advanced Chemistry 11
CURRICULUM OUTCOME	11.CHEM.SCO.	Specific Curriculum Outcomes
GRADE LEVEL EXPECTATION	11.CHEM.SCO.3	Organic Chemistry (30%) (Advanced, 25%)
EXPECTATION	11.CHEM.SCO.3.5.	APPLICATIONS OF ORGANIC CHEMISTRY

INDICATOR	11.CHEM. SCO.3.5.b	Distinguish between scientific questions and technological problems (115-1)
GENERAL LEARNING OUTCOME	NS.11.CHEM.	Chemistry 11 / Advanced Chemistry 11
CURRICULUM OUTCOME	11.CHEM.SCO.	Specific Curriculum Outcomes
GRADE LEVEL EXPECTATION	11.CHEM.SCO.4	Advanced Chemistry 11 Outcomes
EXPECTATION	11.CHEM.SCO.4.1.	IN-DEPTH TREATMENT (COMPLETED WITHIN THE UNITS)

INDICATOR	11.CHEM. SCO.4.1.h	Analyze natural and technological systems to interpret and explain the influence of organic compounds on society (116-7)
GENERAL LEARNING OUTCOME	NS.11.PHYS.	Physics 11 / Advanced Physics 11
CURRICULUM OUTCOME	11.PHYS.SCO.	Specific Curriculum Outcomes
GRADE LEVEL EXPECTATION	11.PHYS.SCO.2.	Dynamics (22%) (Advanced, 18%)
EXPECTATION	11.PHYS.SCO.2.1.	DYNAMICS INTRODUCTION

INDICATOR	11.PHYS. SCO.2.1.a	Analyze the influence of society on scientific and technological endeavours in dynamics (117-2)
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INDICATOR	11.PHYS. SCO.2.1.b	Describe and evaluate the design of technological solutions and the way they function, using scientific principles (116-6)
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GENERAL LEARNING OUTCOME	NS.11.PHYS.	Physics 11 / Advanced Physics 11
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<b>CURRICULUM OUTCOME</b>	<b>11.PHYS.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>11.PHYS.SCO.2.</b>	<b>Dynamics (22%) (Advanced, 18%)</b>
<b>EXPECTATION</b>	<b>11.PHYS.SCO.2.2.</b>	<b>NEWTON'S LAWS</b>

INDICATOR 11.PHYS.SCO.2.2.h Analyze and describe examples where knowledge of the dynamics of bodies was enhanced or revised as a result of the invention of a technology (116-2)

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.11.PHYS.</b>	<b>Physics 11 / Advanced Physics 11</b>
<b>CURRICULUM OUTCOME</b>	<b>11.PHYS.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>11.PHYS.SCO.3.</b>	<b>Momentum and Energy (35%) (Advanced, 30%)</b>
<b>EXPECTATION</b>	<b>11.PHYS.SCO.3.3.</b>	<b>TRANSFORMATION, TOTAL ENERGY, AND CONSERVATION</b>

INDICATOR 11.PHYS.SCO.3.3.f Analyze and describe examples where technological solutions were developed based on scientific understanding (116-4)

INDICATOR 11.PHYS.SCO.3.3.i Distinguish between problems that can be solved by the application of physics-related technologies and those that cannot (118-8)

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.11.PHYS.</b>	<b>Physics 11 / Advanced Physics 11</b>
<b>CURRICULUM OUTCOME</b>	<b>11.PHYS.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>11.PHYS.SCO.3.</b>	<b>Momentum and Energy (35%) (Advanced, 30%)</b>
<b>EXPECTATION</b>	<b>11.PHYS.SCO.3.4</b>	<b>TECHNOLOGICAL IMPLICATIONS</b>

INDICATOR 11.PHYS.SCO.3.4.b Describe and evaluate the design of technological solutions and the way they function using principles of energy and momentum (116-6)

INDICATOR 11.PHYS.SCO.3.4.c Explain the importance of using appropriate language and conventions when describing events related to momentum and energy (114-9)

<b>GENERAL LEARNING OUTCOME</b>	<b>NS.11.PHYS.</b>	<b>Physics 11 / Advanced Physics 11</b>
<b>CURRICULUM OUTCOME</b>	<b>11.PHYS.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>11.PHYS.SCO.4.</b>	<b>Waves (28%) (Advanced, 22%)</b>
<b>EXPECTATION</b>	<b>11.PHYS.SCO.4.1</b>	<b>FUNDAMENTAL PROPERTIES</b>

INDICATOR	11.PHYS. SCO.4.1.g .	Construct and test a prototype of a device and troubleshoot problems as they arise (214-14)
<b>Nova Scotia Curriculum Science Grade 12 - Adopted: 2015</b>		
<b>GENERAL LEARNING OUTCOME</b>	<b>NS.12.CHEM.</b>	<b>Chemistry 12 / Advanced Chemistry 12</b>
<b>CURRICULUM OUTCOME</b>	<b>12.CHEM.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>12.CHEM.SCO.1</b> .	<b>Thermochemistry (20%) (Advanced, 15%)</b>
<b>EXPECTATION</b>	<b>12.CHEM.SCO.1.1.</b>	<b>THERMOCHEMISTRY STSE</b>
INDICATOR	12.CHEM. SCO.1.1.d .	Compare the molar enthalpies of several combustion reactions involving organic compounds (324-7)
INDICATOR	12.CHEM. SCO.1.1.e .	Write and balance chemical equations for combustion reactions of alkanes, including energy amounts (324-1)
<b>GENERAL LEARNING OUTCOME</b>	<b>NS.12.CHEM.</b>	<b>Chemistry 12 / Advanced Chemistry 12</b>
<b>CURRICULUM OUTCOME</b>	<b>12.CHEM.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>12.CHEM.SCO.1</b> .	<b>Thermochemistry (20%) (Advanced, 15%)</b>
<b>EXPECTATION</b>	<b>12.CHEM.SCO.1.2.</b>	<b>EXPERIMENTS WITH ENERGY CHANGES</b>
INDICATOR	12.CHEM. SCO.1.2.c .	Design a thermochemistry experiment identifying and controlling major variables (212-3)
INDICATOR	12.CHEM. SCO.1.2.d .	Work co-operatively with team members to develop and carry out thermochemistry experiments (215-6)
INDICATOR	12.CHEM. SCO.1.2.e .	Evaluate and select appropriate instruments for collecting evidence and appropriate processes for problem solving, inquiring, and decision making (212-8)
INDICATOR	12.CHEM. SCO.1.2.f	Determine experimentally the changes in energy of various chemical reactions (324-6)



INDICATOR	12.CHEM. SCO.1.2.g	Analyze the knowledge and skills acquired in their study of thermochemistry to identify areas of further study related to science and technology (117-9)
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INDICATOR	12.CHEM. SCO.1.2.h	Propose alternative solutions to solving energy problems and identify the potential strengths and weaknesses of each (214-15)
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<b>GENERAL LEARNING OUTCOME</b>	<b>NS.12.CHEM.</b>	<b>Chemistry 12 / Advanced Chemistry 12</b>
<b>CURRICULUM OUTCOME</b>	<b>12.CHEM.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>12.CHEM.SCO.1</b>	<b>Thermochemistry (20%) (Advanced, 15%)</b>
<b>EXPECTATION</b>	<b>12.CHEM.SCO.1.5.</b>	<b>SCIENCE DECISIONS INVOLVING THERMOCHEMISTRY</b>

INDICATOR	12.CHEM. SCO.1.5.b	Use library and electronic research tools to collect information on a given topic (213-6)
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INDICATOR	12.CHEM. SCO.1.5.c	Select and integrate information from various print and electronic sources or from several parts of the same source (213-7)
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INDICATOR	12.CHEM. SCO.1.5.d	Identify multiple perspectives that influence a science-related decision or issue involving their thermochemistry project (215-4)
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<b>GENERAL LEARNING OUTCOME</b>	<b>NS.12.CHEM.</b>	<b>Chemistry 12 / Advanced Chemistry 12</b>
<b>CURRICULUM OUTCOME</b>	<b>12.CHEM.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>12.CHEM.SCO.5</b>	<b>Advanced Chemistry 12 Outcomes</b>
<b>EXPECTATION</b>	<b>12.CHEM.SCO.5.1.</b>	<b>IN-DEPTH TREATMENT (COMPLETED WITHIN THE UNITS)</b>

INDICATOR	12.CHEM. SCO.5.1.b	Analyze the knowledge and skills acquired in their study of thermochemistry to identify areas of further study related to science and technology (117-9)
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<b>GENERAL LEARNING OUTCOME</b>	<b>NS.12.GEO.</b>	<b>Geology 12</b>
<b>CURRICULUM OUTCOME</b>	<b>12.GEO.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>12.GEO.SCO.1.</b>	<b>The Nature of Geology (10%)</b>
<b>EXPECTATION</b>	<b>12.GEO.SCO.1.3.</b>	<b>EARTH SYSTEMS</b>

INDICATOR	12.GEO.S CO.1.3.b.	Explain how a knowledge of geology might influence our decisions about how we use Earth's resources (360-7)
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INDICATOR	12.GEO.S CO.1.3.c.	Identify questions to investigate that arise from practical problems and issues (212-1)
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<b>GENERAL LEARNING OUTCOME</b>	<b>NS.12.GEO.</b>	<b>Geology 12</b>
<b>CURRICULUM OUTCOME</b>	<b>12.GEO.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>12.GEO.SCO.6.</b>	<b>Environmental Geology (15%)</b>

<b>EXPECTATION</b>	<b>12.GEO.SCO.6.2.</b>	<b>RESOURCE ISSUES</b>
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INDICATOR	12.GEO.S CO.6.2.j.	Propose a course of action on social issues related to science and technology, taking into account human and environmental needs (118-9)
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<b>GENERAL LEARNING OUTCOME</b>	<b>NS.12.PHYS.</b>	<b>Physics 12 / Advanced Physics 12</b>
<b>CURRICULUM OUTCOME</b>	<b>12.PHYS.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>12.PHYS.SCO.1.</b>	<b>Force, Motion, Work, and Energy (55%) (Advanced, 45%)</b>

<b>EXPECTATION</b>	<b>12.PHYS.SCO.1.3.</b>	<b>PROJECTILES</b>
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INDICATOR	12.PHYS.SCO.1.3.a.	Construct, test, and evaluate a device or system on the basis of developed criteria (214-14, 214-16)
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<b>GENERAL LEARNING OUTCOME</b>	<b>NS.12.PHYS.</b>	<b>Physics 12 / Advanced Physics 12</b>
<b>CURRICULUM OUTCOME</b>	<b>12.PHYS.SCO.</b>	<b>Specific Curriculum Outcomes</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>12.PHYS.SCO.2.</b>	<b>Fields (21%) (Advanced, 15%)</b>

<b>EXPECTATION</b>	<b>12.PHYS.SCO.2.5.</b>	<b>GENERATORS AND MOTORS</b>
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INDICATOR	12.PHYS.SCO.2.5.a.	Compare and contrast the ways a motor and generator function, using the principles of electromagnetism (328-9)
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Prince Edward Island Curriculum  
Mathematics  
Grade 11 - Adopted: 2012

<b>STRAND / COURSE</b>	<b>PE.MAT521A.</b>	<b>Mathematics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>MAT521A.LR.</b>	<b>Logical Reasoning (LR): Develop logical reasoning.</b>

<b>CURRICULUM OUTCOME</b>	<b>MAT521 A.LR1.</b>	<b>Analyse and prove conjectures, using inductive and deductive reasoning, to solve problems. [C, CN, PS, R]</b>
<b>GRADE LEVEL EXPECTATION</b>		<b>Students who have achieved this outcome should be able to:</b>

EXPECTATION MAT521A.LR1.C. Compare, using examples, inductive and deductive reasoning.

EXPECTATION MAT521A.LR1.I. Solve a contextual problem involving inductive or deductive reasoning.

<b>STRAND / COURSE</b>	<b>PE.MAT5 21A.</b>	<b>Mathematics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>MAT521 A.LR.</b>	<b>Logical Reasoning (LR): Develop logical reasoning.</b>
<b>CURRICULUM OUTCOME</b>	<b>MAT521 A.LR2.</b>	<b>Analyse puzzles and games that involve spatial reasoning, using problem-solving strategies. [CN, PS, R, V]</b>
<b>GRADE LEVEL EXPECTATION</b>		<b>Students who have achieved this outcome should be able to:</b>

EXPECTATION MAT521A.LR2.A. Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g.: guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternate approaches.

EXPECTATION MAT521A.LR2.B. Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.

EXPECTATION MAT521A.LR2.C. Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

<b>STRAND / COURSE</b>	<b>PE.MAT5 21E.</b>	<b>Mathematics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>MAT521 E.LR.</b>	<b>Logical Reasoning (LR): Develop logical reasoning.</b>
<b>CURRICULUM OUTCOME</b>	<b>MAT521 E.LR3.</b>	<b>Analyse and prove conjectures, using deductive reasoning, to solve problems. [C, CN, PS, R]</b>
<b>GRADE LEVEL EXPECTATION</b>		<b>Students who have achieved this outcome should be able to:</b>

EXPECTATION MAT521E.LR3.A. Determine whether a conclusion is based on inductive or deductive reasoning.

<b>STRAND / COURSE</b>	<b>PE.MAT5 31A.</b>	<b>Mathematics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>MAT531 A.N.</b>	<b>Number (N): Develop number sense and critical thinking skills.</b>
<b>CURRICULUM OUTCOME</b>	<b>MAT531 A.N1.</b>	<b>Analyse puzzles and games that involve numerical reasoning, using problem-solving strategies. [C, CN, PS, R]</b>
<b>GRADE LEVEL EXPECTATION</b>		<b>Students who have achieved this outcome should be able to:</b>

EXPECTATION	MAT531A .N1.A.	Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternate approaches.
EXPECTATION	MAT531A .N1.B.	Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.
EXPECTATION	MAT531A .N1.C.	Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

<b>STRAND / COURSE</b>	<b>PE.MAT531A.</b>	<b>Mathematics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>MAT 531 A.A.</b>	<b>Algebra (A): Develop algebraic reasoning.</b>
<b>CURRICULUM OUTCOME</b>	<b>MAT 531 A.A1.</b>	<b>Solve problems that require the manipulation and application of formulas related to: volume and capacity; surface area; slope and rate of change; simple interest; finance charges. [CN, PS, R]</b>
<b>GRADE LEVEL EXPECTATION</b>		<b>Students who have achieved this outcome should be able to:</b>

EXPECTATION	MAT531A .A1.A.	Solve a contextual problem that involves the application of a formula that does not require manipulation.
EXPECTATION	MAT531A .A1.B.	Solve a contextual problem that involves the application of a formula that requires manipulation.
EXPECTATION	MAT531A .A1.F.	Identify and correct errors in a solution to a problem that involves a formula.

<b>STRAND / COURSE</b>	<b>PE.MAT531A.</b>	<b>Mathematics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>MAT 531 A.A.</b>	<b>Algebra (A): Develop algebraic reasoning.</b>
<b>CURRICULUM OUTCOME</b>	<b>MAT 531 A.A2.</b>	<b>Demonstrate an understanding of slope: as rise over run; as a rate of change; by solving problems. [C, CN, PS, V]</b>
<b>GRADE LEVEL EXPECTATION</b>		<b>Students who have achieved this outcome should be able to:</b>

EXPECTATION	MAT531A .A2.I.	Solve a contextual problem that involves slope or rate of change.
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**Prince Edward Island Curriculum**  
**Mathematics**  
 Grade 12 - Adopted: 2013

<b>STRAND / COURSE</b>	<b>PE.MAT621A.</b>	<b>Mathematics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>MAT 621 A.LR.</b>	<b>Logical Reasoning (LR): Develop logical reasoning.</b>
<b>CURRICULUM OUTCOME</b>	<b>MAT 621 A.LR1.</b>	<b>Analyse puzzles and games that involve numerical and logical reasoning, using problem-solving strategies. [CN, ME, PS, R]</b>
<b>GRADE LEVEL EXPECTATION</b>		<b>Students who have achieved this outcome should be able to:</b>

EXPECTATION	MAT621A.LR1.A.	Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g.: guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternate approaches.
EXPECTATION	MAT621A.LR1.B.	Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.
EXPECTATION	MAT621A.LR1.C.	Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

<b>STRAND / COURSE</b>	<b>PE.MAT631A.</b>	<b>Mathematics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>MAT631A.N.</b>	<b>Number (N): Develop number sense and critical thinking skills.</b>
<b>CURRICULUM OUTCOME</b>	<b>MAT631A.N1.</b>	<b>Analyse puzzles and games that involve logical reasoning, using problem-solving techniques. [C, CN, PS, R]</b>
<b>GRADE LEVEL EXPECTATION</b>		<b>Students who have achieved this outcome should be able to:</b>

EXPECTATION MAT631A.N1.A. Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g., guess and check; look for a pattern; make a systematic list; draw or model; eliminate possibilities; simplify the original problem; work backward; develop alternate approaches.

EXPECTATION MAT631A.N1.B. Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.

EXPECTATION MAT631A.N1.C. Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

<b>STRAND / COURSE</b>	<b>PE.MAT631A.</b>	<b>Mathematics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>MAT631A.A.</b>	<b>Algebra (A): Develop algebraic reasoning.</b>
<b>CURRICULUM OUTCOME</b>	<b>MAT631A.A1.</b>	<b>Describe an understanding of linear relations by: recognizing patterns and trends; graphing; creating tables of values; writing equations; interpolating and extrapolating; solving problems. [CN, PS, R, T, V]</b>
<b>GRADE LEVEL EXPECTATION</b>		<b>Students who have achieved this outcome should be able to:</b>

EXPECTATION MAT631A.A1.E. Sketch the graph for a given table of values.

EXPECTATION MAT631A.A1.G. Create, with or without technology, a graph to represent a data set, including scatter plots.

EXPECTATION MAT631A.A1.K. Relate slope and rate of change to linear functions.

EXPECTATION MAT631A.A1.M. Solve a contextual problem that involves the application of a formula for a linear relation.

<b>STRAND / COURSE</b>	<b>PE.431A.</b>	<b>Applied Science 701A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>431A.2.</b>	<b>Energy Sources</b>
<b>CURRICULUM OUTCOME</b>		<b>Students will be expected to</b>

GRADE LEVEL EXPECTATION 431A.2.2. Use library and other research tools to collect information on a selected energy topic (213-6).

GRADE LEVEL EXPECTATION 431A.2.3. Select and integrate information from various print and electronic sources or from several parts of the same source (213-7).

GRADE LEVEL EXPECTATION 431A.2.5. Construct arguments to support a decision or judgment, using examples and evidence and recognizing various perspectives (118-6).

<b>STRAND / COURSE</b>	<b>PE.431A.</b>	<b>Applied Science 701A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>431A.3.</b>	<b>Student Reflection, Skills Logbook, Engineering Notebook</b>
<b>CURRICULUM OUTCOME</b>		<b>Students will be expected to</b>

GRADE LEVEL EXPECTATION 431A.3.1. Evaluate individual and group processes used in planning, problem solving, decision making, and completing a task (215-7).

<b>STRAND / COURSE</b>	<b>PE.431A.</b>	<b>Applied Science 701A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>431A.14</b>	<b>Final Project</b>
<b>CURRICULUM OUTCOME</b>		<b>Students will be expected to</b>

GRADE LEVEL EXPECTATION 431A.14.1. Propose alternative solutions to a given practical problem, identify the potential strengths and weaknesses of each, and select one as the basis for a plan (214-15).

GRADE LEVEL EXPECTATION 431A.14.2. Work co-operatively with team members to construct and test a robot design, using components conducive to completing a predetermined task, and troubleshooting problems as they arise (214-14/215-6h).

GRADE LEVEL EXPECTATION 431A.14.3. Communicate the results of a scientific or technological endeavour, using appropriate language and conventions (114-9).

<b>STRAND / COURSE</b>	<b>PE.C521A</b>	<b>Chemistry 521A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C521A.1</b>	<b>Stoichiometry</b>
<b>CURRICULUM OUTCOME</b>	<b>C521A.1.4.</b>	<b>Applications of Stoichiometry - Students will be expected to</b>

GRADE LEVEL EXPECTATION C521A.1. Analyse society's influence on science and technology (117-2).  
4.4.

<b>STRAND / COURSE</b>	<b>PE.C521A</b>	<b>Chemistry 521A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C521A.2</b>	<b>From Structures to Properties</b>
<b>CURRICULUM OUTCOME</b>	<b>C521A.2 .1.</b>	<b>Chemistry &amp; Consumer Products - Students will be expected to</b>

GRADE LEVEL EXPECTATION C521A.2. Use library and electronic research tools to collect bonding information (213-6).  
1.3.

GRADE LEVEL EXPECTATION C521A.2. Select and integrate information from various print and electronic sources (213-7).  
1.4.

<b>STRAND / COURSE</b>	<b>PE.C521A</b>	<b>Chemistry 521A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C521A.2</b>	<b>From Structures to Properties</b>
<b>CURRICULUM OUTCOME</b>	<b>C521A.2 .3.</b>	<b>Bonding - Students will be expected to</b>

GRADE LEVEL EXPECTATION C521A.2. Explain, in simple terms, the energy changes of bond breaking and bond formation, and relate this to energy changes for exothermic and endothermic reactions (114-2).  
3.3.

<b>STRAND / COURSE</b>	<b>PE.C521A</b>	<b>Chemistry 521A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C521A.3</b>	<b>Organic Chemistry</b>
<b>CURRICULUM OUTCOME</b>	<b>C521A.3 .2.</b>	<b>Influences of Organic Compounds on Society - Students will be expected to</b>

GRADE LEVEL EXPECTATION C521A.3. Analyse natural and technological systems to interpret and explain the influence of organic compounds on society (116-7).  
2.1.

Grade 11 - Adopted: 2009

<b>STRAND / COURSE</b>	<b>PE.P521A</b>	<b>Physics 521A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>P521A.2.</b>	<b>Dynamics</b>
<b>CURRICULUM OUTCOME</b>	<b>P521A.2 .3.</b>	<b>Momentum Introduction - Students will be expected to</b>

GRADE LEVEL EXPECTATION P521A.2. Analyse and describe examples where knowledge of the dynamics of bodies was enhanced or revised as a result of the invention of a technology (116-2).  
3.2.

GRADE LEVEL EXPECTATION P521A.2. Analyse the influence of society on scientific and technological endeavours in dynamics (117-2).  
3.3.

GRADE LEVEL EXPECTATION	P521A.2.3.4.	Describe and evaluate the design of technological solutions and the way they function, using scientific principles (116-6).
GRADE LEVEL EXPECTATION	P521A.2.3.5.	Analyse natural and technological systems to interpret and explain their structure and dynamics (116-7).
GRADE LEVEL EXPECTATION	P521A.2.3.6.	Describe the functioning of technical devices based on the principles of momentum (116-5).
GRADE LEVEL EXPECTATION	P521A.2.3.7.	Construct and test a prototype of a device, and troubleshoot problems as they arise (214-14).

<b>STRAND / COURSE</b>	<b>PE.P521A</b>	<b>Physics 521A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>P521A.3.</b>	<b>Momentum and Energy</b>
<b>CURRICULUM OUTCOME</b>	<b>P521A.3.1.</b>	<b>Technological Implications - Students will be expected to</b>

GRADE LEVEL EXPECTATION	P521A.3.1.2.	Describe and evaluate the design of technological solutions and the way they function using principles of energy and momentum (116-6).
GRADE LEVEL EXPECTATION	P521A.3.1.3.	Analyse and describe examples where technological solutions were developed based on scientific understanding (116-4).
GRADE LEVEL EXPECTATION	P521A.3.1.4.	Explain the importance of using appropriate language and conventions when describing events related to momentum and energy (114-9).

<b>STRAND / COURSE</b>	<b>PE.P521A</b>	<b>Physics 521A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>P521A.3.</b>	<b>Momentum and Energy</b>
<b>CURRICULUM OUTCOME</b>	<b>P521A.3.3.</b>	<b>Transformation, Total Energy, and Conservation - Students will be expected to</b>

GRADE LEVEL EXPECTATION	P521A.3.3.5.	Distinguish between problems that can be solved by the application of physics-related technologies and those that cannot (118-8).
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**Prince Edward Island Curriculum**  
**Science**  
 Grade 12 - Adopted: 2006

<b>STRAND / COURSE</b>	<b>PE.C621A</b>	<b>Chemistry</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C621A.1</b>	<b>Thermochemistry</b>
<b>CURRICULUM OUTCOME</b>	<b>C621A.1.2.</b>	<b>Science Decisions Involving Thermochemistry - Students will be expected to</b>

GRADE LEVEL EXPECTATION	C621A.1.2.2.	Use library and electronic research tools to collect information on a given topic (213-6).
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GRADE LEVEL EXPECTATION	C621A.1.2.3.	Select and integrate information from various print and electronic sources or from several parts of the same source (213-7).
<b>STRAND / COURSE</b>	<b>PE.C621A</b>	<b>Chemistry</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C621A.1</b>	<b>Thermochemistry</b>
<b>CURRICULUM OUTCOME</b>	<b>C621A.1.3.</b>	<b>Enthalpy Changes - Students will be expected to</b>
GRADE LEVEL EXPECTATION	C621A.1.3.2.	Illustrate changes in energy of various chemical reactions, using potential energy diagrams (324-5).

EXPECTATION C621A.1.3.2.a. Identify exothermic and endothermic processes from the sign of  $\Delta H$ , from thermochemical equations, and from labelled enthalpy/potential energy diagrams.

<b>STRAND / COURSE</b>	<b>PE.C621A</b>	<b>Chemistry</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C621A.1</b>	<b>Thermochemistry</b>
<b>CURRICULUM OUTCOME</b>	<b>C621A.1.3.</b>	<b>Enthalpy Changes - Students will be expected to</b>
GRADE LEVEL EXPECTATION	C621A.1.3.3.	Compile and display evidence and information on heats of formation in a variety of formats, including diagrams, flow charts, tables, and graphs (214-3).

EXPECTATION C621A.1.3.3.a. Write thermochemical equations including the quantity of energy exchanged given either the value of  $\Delta H$  or a labelled enthalpy diagram, and vice versa.

<b>STRAND / COURSE</b>	<b>PE.C621A</b>	<b>Chemistry</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C621A.1</b>	<b>Thermochemistry</b>
<b>CURRICULUM OUTCOME</b>	<b>C621A.1.3.</b>	<b>Enthalpy Changes - Students will be expected to</b>

GRADE LEVEL EXPECTATION C621A.1.3.4. Compare the molar enthalpies of several combustion reactions involving organic compounds (324-7).

GRADE LEVEL EXPECTATION C621A.1.3.5. Write and balance chemical equations for combustion reactions of alkanes, including energy amounts (324-1).

<b>STRAND / COURSE</b>	<b>PE.C621A</b>	<b>Chemistry</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C621A.1</b>	<b>Thermochemistry</b>
<b>CURRICULUM OUTCOME</b>	<b>C621A.1.4.</b>	<b>Thermochemistry Experimentation - Students will be expected to</b>

GRADE LEVEL EXPECTATION C621A.1.4.1. Work cooperatively with team members to develop and carry out thermochemistry experiments (215-6).

GRADE LEVEL EXPECTATION C621A.1. Determine experimentally the changes in energy of various chemical reactions (324-6).  
4.4.

<b>STRAND / COURSE</b>	<b>PE.C621A</b>	<b>Chemistry</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>C621A.1</b>	<b>Thermochemistry</b>
<b>CURRICULUM OUTCOME</b>	<b>C621A.1 .4.</b>	<b>Thermochemistry Experimentation - Students will be expected to</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>C621A.1 .4.6.</b>	<b>Propose alternative solutions to solving energy problems and identify the potential strengths and weaknesses of each (214-15).</b>

EXPECTATION C621A.1. Explain, in simple terms, the energy changes of bond breaking and bond formation.  
4.6.a.

Grade 12 - Adopted: 2010

<b>STRAND / COURSE</b>	<b>PE.P621A</b>	<b>Physics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>P621A.1.</b>	<b>Application of Vectors</b>
<b>CURRICULUM OUTCOME</b>	<b>P621A.1 .3.</b>	<b>Projectiles - Students will be expected to</b>

GRADE LEVEL EXPECTATION P621A.1. Construct, test, and evaluate a device or system on the basis of developed criteria (214-14, 214-16).  
3.2.

<b>STRAND / COURSE</b>	<b>PE.P621A</b>	<b>Physics</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>P621A.3.</b>	<b>Electricity and Magnetism</b>
<b>CURRICULUM OUTCOME</b>	<b>P621A.3 .5.</b>	<b>Generators and Motors - Students will be expected to</b>

GRADE LEVEL EXPECTATION P621A.3. Compare and contrast the ways a motor and generator function, using the principles of electromagnetism (328-9).  
5.2.

Grade 12 - Adopted: 2011

<b>STRAND / COURSE</b>	<b>PE.ES621A.</b>	<b>Environmental Science 621A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>ES621A.2.</b>	<b>Introduction to Environmental Science</b>
<b>CURRICULUM OUTCOME</b>		<b>Sustainable Development - Students will be expected to</b>

GRADE LEVEL EXPECTATION ES621A.2 Explain the environmental, social, and economic factors of sustainable development.  
.2.

GRADE LEVEL EXPECTATION ES621A.2 Define stewardship in relation to sustainability.  
.3.

<b>STRAND / COURSE</b>	<b>PE.ES621A.</b>	<b>Environmental Science 621A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>ES621A.2.</b>	<b>Introduction to Environmental Science</b>
<b>CURRICULUM OUTCOME</b>		<b>Worldviews - Students will be expected to</b>

GRADE LEVEL EXPECTATION ES621A.2.5. Define the precautionary principle.

<b>STRAND / COURSE</b>	<b>PE.ES621A.</b>	<b>Environmental Science 621A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>ES621A.5.</b>	<b>Natural Resources</b>
<b>CURRICULUM OUTCOME</b>		<b>Energy Resources - Students will be expected to</b>

GRADE LEVEL EXPECTATION ES621A.5.17. Evaluate the advantages and disadvantages of renewable and nonrenewable energy sources from a variety of perspectives.

GRADE LEVEL EXPECTATION ES621A.5.18. Describe factors that might affect future energy use on Prince Edward Island.

<b>STRAND / COURSE</b>	<b>PE.ES621A.</b>	<b>Environmental Science 621A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>ES621A.6.</b>	<b>Environmental Challenges and Successes</b>
<b>CURRICULUM OUTCOME</b>		<b>Climate Change - Students will be expected to</b>

GRADE LEVEL EXPECTATION ES621A.6.3. Demonstrate an understanding of the greenhouse gases found in the troposphere and stratosphere.

EXPECTATION ES621A.6.3.a. Natural sources of greenhouse gases.

EXPECTATION ES621A.6.3.b. Anthropogenic sources of greenhouse gases.

<b>STRAND / COURSE</b>	<b>PE.ES621A.</b>	<b>Environmental Science 621A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>ES621A.6.</b>	<b>Environmental Challenges and Successes</b>
<b>CURRICULUM OUTCOME</b>		<b>Climate Change - Students will be expected to</b>

GRADE LEVEL EXPECTATION ES621A.6.4. Distinguish between the greenhouse effect and global warming.

GRADE LEVEL EXPECTATION ES621A.6.5. Identify that climate change can have a catastrophic effect on Earth.

<b>STRAND / COURSE</b>	<b>PE.ES621A.</b>	<b>Environmental Science 621A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>ES621A.6.</b>	<b>Environmental Challenges and Successes</b>
<b>CURRICULUM OUTCOME</b>		<b>Climate Change - Students will be expected to</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>ES621A.6.6.</b>	<b>Identify the effects that climate change can have on Prince Edward Island.</b>

EXPECTATION ES621A.6.6.a. Sea level rise

EXPECTATION ES621A.6.6.b. Increased erosion

EXPECTATION ES621A.6.6.c. Economic effects

EXPECTATION ES621A.6.6.d. Social effects

EXPECTATION ES621A.6.6.e. Species movement/loss

<b>STRAND / COURSE</b>	<b>PE.ES621A.</b>	<b>Environmental Science 621A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>ES621A.6.</b>	<b>Environmental Challenges and Successes</b>
<b>CURRICULUM OUTCOME</b>		<b>Climate Change - Students will be expected to</b>

GRADE LEVEL EXPECTATION ES621A.6.7. Compare different schools of thought about global warming and its future projections.

<b>STRAND / COURSE</b>	<b>PE.ES621A.</b>	<b>Environmental Science 621A</b>
<b>GENERAL LEARNING OUTCOME</b>	<b>ES621A.6.</b>	<b>Environmental Challenges and Successes</b>
<b>CURRICULUM OUTCOME</b>		<b>Climate Change - Students will be expected to</b>
<b>GRADE LEVEL EXPECTATION</b>	<b>ES621A.6.8.</b>	<b>Demonstrate an understanding of challenges and successes made to address climate change.</b>

EXPECTATION ES621A.6.8.b. Industries

**Programme de formation de l'école québécoise - Progression des apprentissages  
Mathematics**

Grade 11 - Adopted: 2009

<b>STRAND</b>	<b>QC.6.</b>	<b>Algèbre: Comprendre les relations de dépendance</b>
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<b>STANDARD</b>	<b>6.B.</b>	<b>Analyse des situations en utilisant des fonctions réelles</b>
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SUBSTRAND 6.B.6. Détermine les valeurs ou les données par la résolution d'équations et les inégalités

<b>STRAND</b>	<b>QC.6.</b>	<b>Algèbre: Comprendre les relations de dépendance</b>
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<b>STANDARD</b>	<b>6.B.</b>	<b>Analyse des situations en utilisant des fonctions réelles</b>
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<b>SUBSTRAND</b>		<b>Note: Les déclarations 1 à 9 s'appliquent aux fonctions énumérées ci-dessous.</b>
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COMPETENCY 6.B.1-9.a. Les fonctions polynomiales de degré 0 ou 1

<b>STRAND</b>	<b>QC.11.</b>	<b>Géométrie analytique: l'analyse des situations en utilisant la géométrie analytique</b>
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<b>STANDARD</b>	<b>11.B.</b>	<b>Les lignes droites et demi-plans</b>
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<b>SUBSTRAND</b>	<b>11.B.3.</b>	<b>Modèles avec ou sans outils technologiques, une situation impliquant</b>
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COMPETENCY 11.B.3.a. Les lignes droites: graphiquement et algébriquement

<b>STRAND</b>	<b>QC.11.</b>	<b>Géométrie analytique: l'analyse des situations en utilisant la géométrie analytique</b>
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<b>STANDARD</b>	<b>11.B.</b>	<b>Les lignes droites et demi-plans</b>
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SUBSTRAND 11.B.4. Détermine l'équation d'une droite en utilisant la pente et un point ou à l'aide de deux points

SUBSTRAND 11.B.5. Détermine l'équation d'une ligne parallèle ou perpendiculaire à l'autre

**Programme de formation de l'école québécoise - Progression des apprentissages**  
**Mathematics**  
 Grade 12 - Adopted: 2009

<b>STRAND</b>	<b>QC.6.</b>	<b>Algèbre: Comprendre les relations de dépendance</b>
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<b>STANDARD</b>	<b>6.B.</b>	<b>Analyse des situations en utilisant des fonctions réelles</b>
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SUBSTRAND 6.B.6. Détermine les valeurs ou les données par la résolution d'équations et les inégalités

<b>STRAND</b>	<b>QC.6.</b>	<b>Algèbre: Comprendre les relations de dépendance</b>
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<b>STANDARD</b>	<b>6.B.</b>	<b>Analyse des situations en utilisant des fonctions réelles</b>
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<b>SUBSTRAND</b>		<b>Note: Les déclarations 1 à 9 s'appliquent aux fonctions énumérées ci-dessous.</b>
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COMPETENCY 6.B.1-9.a. Les fonctions polynomiales de degré 0 ou 1

<b>STRAND</b>	<b>QC.11.</b>	<b>Géométrie analytique: l'analyse des situations en utilisant la géométrie analytique</b>
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<b>STANDARD</b>	<b>11.B.</b>	<b>Les lignes droites et demi-plans</b>
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<b>SUBSTRAND</b>	<b>11.B.3.</b>	<b>Modèles avec ou sans outils technologiques, une situation impliquant</b>
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COMPETENCY 11.B.3.a. Les lignes droites: graphiquement et algébriquement

<b>STRAND</b>	<b>QC.11.</b>	<b>Géométrie analytique: l'analyse des situations en utilisant la géométrie analytique</b>
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<b>STANDARD</b>	<b>11.B.</b>	<b>Les lignes droites et demi-plans</b>
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SUBSTRAND	11.B.4.	Détermine l'équation d'une droite en utilisant la pente et un point ou à l'aide de deux points
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SUBSTRAND	11.B.5.	Détermine l'équation d'une ligne parallèle ou perpendiculaire à l'autre
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**Programme de formation de l'école québécoise - Progression des apprentissages  
Science**

Grade 11 - Adopted: 2009

<b>STRAND</b>	<b>QC.1.</b>	<b>Parcours de formation générale: Le Monde Matériel</b>
<b>STANDARD</b>	<b>1.B.</b>	<b>Changements</b>
<b>SUBSTRAND</b>	<b>1.B.3.</b>	<b>Les changements chimiques</b>
<b>COMPETENCY</b>	<b>1.B.3.c.</b>	<b>Oxydation</b>

OBJECTIVE 1.B.3.c.ii. Réactions chimiques connues associés avec des réactions d'oxydation (par exemple la combustion, corrosion)

<b>STRAND</b>	<b>QC.3.</b>	<b>Parcours de formation générale: La Terre et l'espace</b>
<b>STANDARD</b>	<b>3.A.</b>	<b>Caractéristiques de la Terre</b>
<b>SUBSTRAND</b>	<b>3.A.2.</b>	<b>Lithosphère</b>
<b>COMPETENCY</b>	<b>3.A.2.I.</b>	<b>Le pergélisol</b>

OBJECTIVE 3.A.2.I.ii. Explique en partie les conséquences d'une élévation de la température dans le pergélisol (glissements de terrain, par exemple, les émissions de méthane)

<b>STRAND</b>	<b>QC.3.</b>	<b>Parcours de formation générale: La Terre et l'espace</b>
<b>STANDARD</b>	<b>3.A.</b>	<b>Caractéristiques de la Terre</b>
<b>SUBSTRAND</b>	<b>3.A.4.</b>	<b>Atmosphère</b>
<b>COMPETENCY</b>	<b>3.A.4.a.</b>	<b>Caractéristiques générales de l'atmosphère</b>

OBJECTIVE 3.A.4.a.iii. Décrit les relations entre l'atmosphère et certaines activités humaines (par exemple les loisirs, la consommation d'énergie de transport,)

<b>STRAND</b>	<b>QC.3.</b>	<b>Parcours de formation générale: La Terre et l'espace</b>
<b>STANDARD</b>	<b>3.A.</b>	<b>Caractéristiques de la Terre</b>
<b>SUBSTRAND</b>	<b>3.A.4.</b>	<b>Atmosphère</b>
<b>COMPETENCY</b>	<b>3.A.4.b.</b>	<b>Effet de serre</b>

OBJECTIVE 3.A.4.b.i. Décrit l'effet de serre

OBJECTIVE 3.A.4.b.ii. Explique en partie les conséquences d'une concentration plus élevée de gaz à effet de serre (par exemple le réchauffement climatique qui pourrait entraîner des niveaux marins plus élevés, des perturbations dans les écosystèmes ou la fonte des glaciers)

<b>STRAND</b>	<b>QC.3.</b>	<b>Parcours de formation générale: La Terre et l'espace</b>
<b>STANDARD</b>	<b>3.B.</b>	<b>Phénomènes géologiques et géophysiques</b>
<b>SUBSTRAND</b>	<b>3.B.i.</b>	<b>Les ressources énergétiques renouvelables et non renouvelables</b>

COMPETENCY	3.B.i.ii.	Décrit les technologies utilisées pour produire de l'électricité en utilisant les ressources énergétiques de la lithosphère, l'hydrosphère et l'atmosphère
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COMPETENCY	3.B.i.iii.	Décrit le principal impact de l'utilisation des ressources énergétiques dans la lithosphère, l'hydrosphère et l'atmosphère
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<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.1.</b>	<b>Forces et mouvements</b>
<b>COMPETENCY</b>	<b>4.B.1.a.</b>	<b>Types de mouvement</b>

OBJECTIVE	4.B.1.a.i.	Identifie les parties qui se déplacent d'une manière spécifique dans un objet technique (rectiligne translation, rotation, hélicoïdal)
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<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.2.</b>	<b>Les systèmes technologiques</b>
<b>COMPETENCY</b>	<b>4.B.2.a.</b>	<b>Système</b>

OBJECTIVE	4.B.2.a.i.	Identifie un système (ensemble d'éléments connectés qui interagissent les uns avec les autres) dans un objet technique ou à l'application technologique
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OBJECTIVE	4.B.2.a.ii.	Décrit la fonction globale d'un système technologique
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OBJECTIVE	4.B.2.a.iii.	Noms des entrées et sorties d'un système technologique
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OBJECTIVE	4.B.2.a.iv.	Noms des processus et des éléments de commande d'un système technologique
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<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.2.</b>	<b>Les systèmes technologiques</b>
<b>COMPETENCY</b>	<b>4.B.2.b.</b>	<b>Composantes d'un système</b>

OBJECTIVE	4.B.2.b.i.	Décrit le rôle des composants d'un système technologique (par exemple, explique le rôle des parties d'un système d'éclairage)
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<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.2.</b>	<b>Les systèmes technologiques</b>
<b>COMPETENCY</b>	<b>4.B.2.c.</b>	<b>Transformations de l'énergie</b>

OBJECTIVE	4.B.2.c.ii.	Définit les transformations d'énergie
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OBJECTIVE	4.B.2.c.iii.	Identifie les transformations d'énergie dans un objet technique ou du système technologique
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<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.a.</b>	<b>De base des fonctions mécaniques (liaisons, de contrôle de guidage)</b>

OBJECTIVE 4.B.3.a.i. Décrit le rôle des liens et des contrôles directeurs dans un objet technique

OBJECTIVE 4.B.3.a.ii. Identifie un contrôle de guidage dans un objet technique, ainsi que les liens connexes (par exemple, une roulette à pizza est guidé par un pivot, qui le lie à la poignée)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
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<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
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<b>COMPETENCY</b>	<b>4.B.3.b.</b>	<b>Typiques des liaisons mécaniques</b>
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OBJECTIVE 4.B.3.b.i. Décrit les avantages et les inconvénients de différents types de liens

OBJECTIVE 4.B.3.b.ii. Noms des types de liens utilisés dans un objet technique (par exemple, le lien en spirale entre un pot et son couvercle)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
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<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
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<b>COMPETENCY</b>	<b>4.B.3.c.</b>	<b>Lier des pièces mécaniques</b>
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OBJECTIVE 4.B.3.c.i. Décrit les caractéristiques des liens dans un objet technique (directe ou indirecte, rigide ou souple, amovible ou permanente, partielle ou complète)

OBJECTIVE 4.B.3.c.ii. Détermine les caractéristiques souhaitables de liens dans la conception d'un objet technique

OBJECTIVE 4.B.3.c.iii. Les juge le choix des solutions d'assemblage dans un objet technique

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
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<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
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<b>COMPETENCY</b>	<b>4.B.3.d.</b>	<b>Degré de liberté d'une partie</b>
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OBJECTIVE 4.B.3.d.i. Explique le but de limitation de mouvement (degré de liberté) dans un objet technique (par exemple, certains charnières de limiter dans quelle mesure une porte de placard pouvez ouvrir, l'empêchant de frapper le mur)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
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<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
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<b>COMPETENCY</b>	<b>4.B.3.e.</b>	<b>Les fonctions typiques</b>
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OBJECTIVE 4.B.3.e.iii. Explique le choix d'un type de lien dans un objet technique (par exemple en utilisant une vis permet de fixer et à retirer un boîtier de batterie)



<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.f.</b>	<b>Contrôles directeurs</b>

OBJECTIVE 4.B.3.f.i. Où le choix d'un type de commande de guidage dans un objet technique (par exemple des guides coulissants un tiroir et réduit la friction)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.g.</b>	<b>L'adhésion et de frottement des pièces</b>

OBJECTIVE 4.B.3.g.i. Décrit les avantages et les inconvénients de l'adhésion et de frottement des pièces dans un objet technique

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.h.</b>	<b>Des systèmes de transmission de mouvement</b>

OBJECTIVE 4.B.3.h.i. Identifie les systèmes de transmission de mouvement dans des objets techniques

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.i.</b>	<b>Fonction, composantes et utilisation des systèmes de transmission de mouvement</b>

OBJECTIVE 4.B.3.i.i. Systèmes de transmission de mouvement dans Noms d'objets techniques (roues de friction, poulies et courroies, engrenage des roues dentées et engrenages à chaîne, roue et vis sans fin)

OBJECTIVE 4.B.3.i.ii. Décrit les fonctions des composants d'un système de transmission de mouvement (par exemple dans une bicyclette, l'ensemble d'engrenages sur le pédalier est l'unité d'entraînement, la roue dentée sur la roue arrière est l'unité de réception, et la chaîne est le bloc intermédiaire)

OBJECTIVE 4.B.3.i.iii. Décrit les variations de vitesse ou de réversibilité un système de transmission de mouvement (par exemple une roue dentée qui est remplacé par une plus petite roue ou une roue à moins de dents augmente la vitesse de rotation)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.j.</b>	<b>Construction et caractéristiques des systèmes de transmission de mouvement</b>

OBJECTIVE 4.B.3.j.i. Explique le choix d'un système de transmission de mouvement dans un objet technique (par exemple en utilisant un ensemble d'engrenages plutôt que roues de friction pour obtenir du couple moteur et éviter de glisser)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.k.</b>	<b>Systèmes de transformation de mouvement</b>

OBJECTIVE 4.B.3.k.i. Identifie les systèmes de transformation de mouvement dans des objets techniques

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.l.</b>	<b>Fonction, composantes et utilisation des systèmes de transformation de mouvement</b>

OBJECTIVE 4.B.3.l.i. Noms de transformation des systèmes de mouvement dans les objets techniques (par exemple système de roue à denture hélicoïdale, cames et rouleaux, bielle et manivelle, pignon et crémaillère)

OBJECTIVE 4.B.3.l.ii. Décrit les fonctions des composants d'un système de transformation de mouvement (par exemple dans un tire-bouchon à double levier, le pignon est l'unité d'entraînement et la crémaillère est l'unité de réception)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.m.</b>	<b>Construction et caractéristiques des systèmes de transformation de mouvement</b>

OBJECTIVE 4.B.3.m.i. Explique le choix d'un système de transformation de mouvement (système d'engrenage à vis, cames, bielles, manivelles, des diapositives, rotation des mécanismes bielle-manivelle, crémaillère et pignon d'entraînement) dans un objet technique (par exemple prises la plupart des voitures utilisent un système d'engrenage à vis plutôt que un système à crémaillère et pignon, parce que la force du bras sur la petite manivelle fournit plus de poussée et parce que, étant donné qu'il est non réversible, le système est plus sûr)

OBJECTIVE 4.B.3.m.ii. Explique le choix d'un système de transformation de mouvement (engrenage à vis, cames, bielles, manivelles, curseur-manivelle mécanisme, crémaillère et pignon d'entraînement, excentrique) dans un objet technique

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.n.</b>	<b>Les changements de vitesse</b>

OBJECTIVE 4.B.3.n.i. Utilise des systèmes qui permettent des changements de vitesse dans la conception des objets techniques

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.D.</b>	<b>Matériels</b>
<b>SUBSTRAND</b>	<b>4.D.1.</b>	<b>Les ressources matérielles</b>
<b>COMPETENCY</b>	<b>4.D.1.c.</b>	<b>Équipement</b>

OBJECTIVE	4.D.1.c.i.	Définit les outils et les équipements que les éléments nécessaires à la fabrication d'un objet (usinage, contrôle, assemblage)
<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Fabrication</b>
<b>SUBSTRAND</b>	<b>4.E.a.</b>	<b>Caractéristiques</b>
COMPETENCY	4.E.a.ii.	Évalue un objet prototype ou technique, basée sur les environnements décrits dans le cahier des charges (humaine, technique, industriel, économique, physique, de l'environnement)
<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Fabrication</b>
<b>SUBSTRAND</b>	<b>4.E.b.</b>	<b>Feuille de processus de fabrication</b>
COMPETENCY	4.E.b.i.	Définit une feuille processus de fabrication comme un ensemble d'étapes à suivre pour usiner les pièces qui composent un objet technique
COMPETENCY	4.E.b.ii.	Suit un processus et une feuille de montage pour construire un objet constitué de composants rares ou pour construire une partie de cet objet
<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Fabrication</b>
<b>SUBSTRAND</b>	<b>4.E.c.</b>	<b>Façonner</b>
<b>COMPETENCY</b>	<b>4.E.c.i.</b>	<b>Machines et outils</b>
OBJECTIVE	4.E.c.i.1.	Associés qui façonnent les processus avec les types de matériaux utilisés (par exemple injection-soufflage est utilisé pour façonner des matières plastiques)
OBJECTIVE	4.E.c.i.2.	Détermine les techniques appropriées de mise en forme basée sur l'observation directe des objets techniques (par exemple, certains pieds de table sont tournés sur un tour)
<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Fabrication</b>
<b>SUBSTRAND</b>	<b>4.E.d.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>4.E.d.i.</b>	<b>Caractéristiques de mise en forme, perçage, taraudage et le filetage</b>
OBJECTIVE	4.E.d.i.1.	Associés, portant sur (marquage) avec des matériaux d'économie, techniques de façonnage et les types de matériaux à mettre en forme
OBJECTIVE	4.E.d.i.2.	Décrit les caractéristiques des outils nécessaires pour façonner un matériau à usiner (par exemple la pointe d'un foret à métaux est conique, tandis que celle d'un foret à bois est le double cannelure)
<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.a.</b>	<b>En toute sécurité en utilisant des machines et tools4</b>

OBJECTIVE	5.A.2.a.i.	Utiliser les outils en toute sécurité (par exemple couteau rétractable, marteau, tournevis, pinces)
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OBJECTIVE	5.A.2.a.ii.	Utilise des machines-outils en toute sécurité (scie à ruban, perceuse, ponceuse)
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.b.</b>	<b>Mesure et portant sur</b>

OBJECTIVE	5.A.2.b.iii.	Adopte la position appropriée pour la lecture d'un instrument
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OBJECTIVE	5.A.2.b.iv.	Marque les matériaux à être façonné à l'aide d'un crayon ou d'un poinçon
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.c.</b>	<b>Usinage et formant</b>

OBJECTIVE	5.A.2.c.i.	Choisit les matériaux appropriés, des outils, des techniques et des processus
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OBJECTIVE	5.A.2.c.iii.	Immobilise la partie à former
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OBJECTIVE	5.A.2.c.iv.	Formulaires de la partie en conformité avec les étapes dans les processus d'usinage suivantes: le sciage, le forage, ponçage, le dépôt
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OBJECTIVE	5.A.2.c.v.	Forme la partie en conformité avec les étapes dans les procédés d'usinage suivantes: extraction, épissage, brasage
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.d.</b>	<b>Finition</b>

OBJECTIVE	5.A.2.d.i.	Sables les côtés ou ébavurer les bords de chaque pièce après formage
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OBJECTIVE	5.A.2.d.ii.	Utilise la finition appropriée (teinture, peinture)
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OBJECTIVE	5.A.2.d.iii.	Rectifier, les encaustiques, des marteaux ou des pièces métalliques ciseaux
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.e.</b>	<b>Assemblage</b>

OBJECTIVE	5.A.2.e.ii.	Immobilise pièces lors du collage
OBJECTIVE	5.A.2.e.iii.	Perceuses à le diamètre des vis, des clous ou des rivets utilisés
OBJECTIVE	5.A.2.e.iv.	Fraises des ouvertures pour vis à tête fraisée

<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.f.</b>	<b>Montage et démontage</b>

OBJECTIVE	5.A.2.f.i.	Identifie et réunit les pièces et la quincaillerie
OBJECTIVE	5.A.2.f.ii.	Choisit les outils appropriés
OBJECTIVE	5.A.2.f.iii.	Pour le démontage, les chiffres et d'enregistrer l'emplacement des pièces
OBJECTIVE	5.A.2.f.iv.	Dans le cas des circuits électriques, identifie et rassemble les composants électriques
OBJECTIVE	5.A.2.f.v.	Dans le cas de circuits électroniques, identifie et rassemble les composants électroniques
OBJECTIVE	5.A.2.f.viii.	Connecte les composants en utilisant les fils, connecteurs ou les soudures

<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.g.</b>	<b>Effectuer des tâches de vérification et de contrôle</b>

OBJECTIVE	5.A.2.g.i.	Évalue les dimensions d'une pièce pendant et après la construction à l'aide d'une règle
OBJECTIVE	5.A.2.g.iii.	Utilise un modèle afin de vérifier la conformité d'une partie
OBJECTIVE	5.A.2.g.iv.	Évalue les dimensions d'une pièce pendant et après la construction en utilisant pieds à coulisse

<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.h.</b>	<b>Faire une partie</b>

OBJECTIVE	5.A.2.h.i.	Donne une pièce en utilisant les techniques appropriées
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.B.</b>	<b>Science</b>
<b>SUBSTRAND</b>	<b>5.B.d.</b>	<b>Utilisation d'instruments de mesure</b>

COMPETENCY	5.B.d.i.	Adopte la position appropriée pour la lecture d'un instrument
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COMPETENCY	5.B.d.vi.	Utilise les instruments de mesure appropriée (par exemple un ampèremètre, fiole jaugée)
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.B.</b>	<b>Science</b>
<b>SUBSTRAND</b>	<b>5.B.e.</b>	<b>Utilisation d'instruments d'observation</b>

COMPETENCY	5.B.e.i.	Utilise des instruments d'observation appropriée (loupe, loupe binoculaire, jumelles, microscope)
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<b>STRAND</b>	<b>QC.6.</b>	<b>Parcours de formation générale: Stratégies</b>
<b>STANDARD</b>	<b>6.A.</b>	<b>Stratégies d'exploration</b>

SUBSTRAND	6.A.2.	La distinction entre les différents types d'informations utiles pour résoudre le problème
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SUBSTRAND	6.A.8.	Explorer différentes manières de résoudre le problème
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SUBSTRAND	6.A.11.	Tenant compte des contraintes liées à la résolution d'un problème ou faire un objet (par exemple: spécifications, les ressources disponibles, le temps alloué)
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SUBSTRAND	6.A.13.	Utilisation de différents types de raisonnement (par exemple, induction, déduction, l'inférence, la comparaison, la classification)
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SUBSTRAND	6.A.14.	En utilisant des approches empiriques (par exemple du procès et l'erreur, l'analyse, l'exploration en utilisant ses sens)
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<b>STRAND</b>	<b>QC.6.</b>	<b>Parcours de formation générale: Stratégies</b>
<b>STANDARD</b>	<b>6.B.</b>	<b>Stratégies d'instrumentation</b>

SUBSTRAND	6.B.3.	Recourir au design technique pour illustrer une solution (par exemple des diagrammes, des croquis, des dessins techniques)
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SUBSTRAND	6.B.4.	En utilisant des outils différents pour l'enregistrement des informations (par exemple des diagrammes, des notes, des graphiques, des procédures, le journal de bord)
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SUBSTRAND	6.B.5.	En utilisant une variété de techniques d'observation et d'outils
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SUBSTRAND	6.B.6.	Sélection des techniques appropriées ou des outils pour l'observation
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<b>STRAND</b>	<b>QC.6.</b>	<b>Parcours de formation générale: Stratégies</b>
<b>STANDARD</b>	<b>6.C.</b>	<b>Des stratégies analytiques</b>

SUBSTRAND	6.C.1.	Identifier les contraintes et les éléments importants liés à la situation de résolution de problèmes
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SUBSTRAND	6.C.2.	Diviser un problème complexe en sous-problèmes plus simples
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SUBSTRAND	6.C.3.	Utilisation de différents types de raisonnement (par exemple le raisonnement inductif et déductif, la comparaison, la classification, priorisation) afin de traiter l'information
SUBSTRAND	6.C.4.	En raisonnant par analogie, afin de traiter l'information et adapter les connaissances scientifiques et technologiques
<b>STRAND</b>	<b>QC.6.</b>	<b>Parcours de formation générale: Stratégies</b>
<b>STANDARD</b>	<b>6.D.</b>	<b>Les stratégies de communication</b>
SUBSTRAND	6.D.1.	En utilisant différents moyens de communication pour proposer des explications ou des solutions (par exemple une présentation orale, présentation écrite, la procédure)
SUBSTRAND	6.D.3.	L'échange d'informations
SUBSTRAND	6.D.5.	L'utilisation d'outils pour afficher des informations dans différents formats (par exemple des tableaux de données, graphiques, diagrammes)
<b>STRAND</b>	<b>QC.12.</b>	<b>Chimie - secondaire V Programme facultatif: Stratégies</b>
<b>STANDARD</b>	<b>12.B.</b>	<b>Stratégies d'instrumentation</b>
SUBSTRAND	12.B.3.	Recourir au design technique pour illustrer une solution (par exemple des diagrammes, des croquis, des dessins techniques)
<b>STRAND</b>	<b>QC.12.</b>	<b>Chimie - secondaire V Programme facultatif: Stratégies</b>
<b>STANDARD</b>	<b>12.D.</b>	<b>Les stratégies de communication</b>
SUBSTRAND	12.D.1.	En utilisant différents moyens de communication pour proposer des explications ou des solutions (par exemple une présentation orale, présentation écrite, la procédure)
SUBSTRAND	12.D.3.	L'échange d'informations
<b>STRAND</b>	<b>QC.18.</b>	<b>Physique - Secondaire V Programme facultatif: Stratégies</b>
<b>STANDARD</b>	<b>18.B.</b>	<b>Stratégies d'instrumentation</b>
SUBSTRAND	18.B.3.	Recourir au design technique pour illustrer une solution (par exemple des diagrammes, des croquis, des dessins techniques)
<b>STRAND</b>	<b>QC.18.</b>	<b>Physique - Secondaire V Programme facultatif: Stratégies</b>
<b>STANDARD</b>	<b>18.D.</b>	<b>Les stratégies de communication</b>
SUBSTRAND	18.D.1.	En utilisant différents moyens de communication pour proposer des explications ou des solutions (par exemple une présentation orale, présentation écrite, la procédure).
SUBSTRAND	18.D.3.	L'échange d'informations

**Programme de formation de l'école québécoise - Progression des apprentissages**

**Science**

Grade 12 - Adopted: 2009

<b>STRAND</b>	<b>QC.1.</b>	<b>Parcours de formation générale: Le Monde Matériel</b>
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<b>STANDARD</b>	<b>1.B.</b>	<b>Changements</b>
<b>SUBSTRAND</b>	<b>1.B.3.</b>	<b>Les changements chimiques</b>
<b>COMPETENCY</b>	<b>1.B.3.c.</b>	<b>Oxydation</b>

OBJECTIVE 1.B.3.c.ii. Réactions chimiques connues associés avec des réactions d'oxydation (par exemple la combustion, corrosion)

<b>STRAND</b>	<b>QC.3.</b>	<b>Parcours de formation générale: La Terre et l'espace</b>
<b>STANDARD</b>	<b>3.A.</b>	<b>Caractéristiques de la Terre</b>
<b>SUBSTRAND</b>	<b>3.A.2.</b>	<b>Lithosphère</b>
<b>COMPETENCY</b>	<b>3.A.2.1.</b>	<b>Le pergélisol</b>

OBJECTIVE 3.A.2.1.ii. Explique en partie les conséquences d'une élévation de la température dans le pergélisol (glissements de terrain, par exemple, les émissions de méthane)

<b>STRAND</b>	<b>QC.3.</b>	<b>Parcours de formation générale: La Terre et l'espace</b>
<b>STANDARD</b>	<b>3.A.</b>	<b>Caractéristiques de la Terre</b>
<b>SUBSTRAND</b>	<b>3.A.4.</b>	<b>Atmosphère</b>
<b>COMPETENCY</b>	<b>3.A.4.a.</b>	<b>Caractéristiques générales de l'atmosphère</b>

OBJECTIVE 3.A.4.a.iii. Décrit les relations entre l'atmosphère et certaines activités humaines (par exemple les loisirs, la consommation d'énergie de transport)

<b>STRAND</b>	<b>QC.3.</b>	<b>Parcours de formation générale: La Terre et l'espace</b>
<b>STANDARD</b>	<b>3.A.</b>	<b>Caractéristiques de la Terre</b>
<b>SUBSTRAND</b>	<b>3.A.4.</b>	<b>Atmosphère</b>
<b>COMPETENCY</b>	<b>3.A.4.b.</b>	<b>Effet de serre</b>

OBJECTIVE 3.A.4.b.i. Décrit l'effet de serre

OBJECTIVE 3.A.4.b.ii. Explique en partie les conséquences d'une concentration plus élevée de gaz à effet de serre (par exemple le réchauffement climatique qui pourrait entraîner des niveaux marins plus élevés, des perturbations dans les écosystèmes ou la fonte des glaciers)

<b>STRAND</b>	<b>QC.3.</b>	<b>Parcours de formation générale: La Terre et l'espace</b>
<b>STANDARD</b>	<b>3.B.</b>	<b>Phénomènes géologiques et géophysiques</b>
<b>SUBSTRAND</b>	<b>3.B.i.</b>	<b>Les ressources énergétiques renouvelables et non renouvelables</b>

COMPETENCY 3.B.i.ii. Décrit les technologies utilisées pour produire de l'électricité en utilisant les ressources énergétiques de la lithosphère, l'hydrosphère et l'atmosphère

COMPETENCY 3.B.i.iii. Décrit le principal impact de l'utilisation des ressources énergétiques dans la lithosphère, l'hydrosphère et l'atmosphère

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.1.</b>	<b>Forces et mouvements</b>



<b>COMPETENCY</b>	<b>4.B.1.a.</b>	<b>Types de mouvement</b>
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OBJECTIVE 4.B.1.a.i. Identifie les parties qui se déplacent d'une manière spécifique dans un objet technique (rectiligne translation, rotation, hélicoïdal)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
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<b>SUBSTRAND</b>	<b>4.B.2.</b>	<b>Les systèmes technologiques</b>
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<b>COMPETENCY</b>	<b>4.B.2.a.</b>	<b>Système</b>
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OBJECTIVE 4.B.2.a.i. Identifie un système (ensemble d'éléments connectés qui interagissent les uns avec les autres) dans un objet technique ou à l'application technologique

OBJECTIVE 4.B.2.a.ii. Décrit la fonction globale d'un système technologique

OBJECTIVE 4.B.2.a.iii. Noms des entrées et sorties d'un système technologique

OBJECTIVE 4.B.2.a.iv. Noms des processus et des éléments de commande d'un système technologique

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
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<b>SUBSTRAND</b>	<b>4.B.2.</b>	<b>Les systèmes technologiques</b>
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<b>COMPETENCY</b>	<b>4.B.2.b.</b>	<b>Composantes d'un système</b>
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OBJECTIVE 4.B.2.b.i. Décrit le rôle des composants d'un système technologique (par exemple, explique le rôle des parties d'un système d'éclairage)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
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<b>SUBSTRAND</b>	<b>4.B.2.</b>	<b>Les systèmes technologiques</b>
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<b>COMPETENCY</b>	<b>4.B.2.c.</b>	<b>Transformations de l'énergie</b>
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OBJECTIVE 4.B.2.c.ii. Définit les transformations d'énergie

OBJECTIVE 4.B.2.c.iii. Identifie les transformations d'énergie dans un objet technique ou du système technologique

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
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<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
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<b>COMPETENCY</b>	<b>4.B.3.a.</b>	<b>De base des fonctions mécaniques (liaisons, de contrôle de guidage)</b>
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OBJECTIVE 4.B.3.a.i. Décrit le rôle des liens et des contrôles directeurs dans un objet technique

OBJECTIVE 4.B.3.a.ii. Identifie un contrôle de guidage dans un objet technique, ainsi que les liens connexes (par exemple, une roulette à pizza est guidé par un pivot, qui le lie à la poignée)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.b.</b>	<b>Typiques des liaisons mécaniques</b>

OBJECTIVE 4.B.3.b.i. Décrit les avantages et les inconvénients de différents types de liens

OBJECTIVE 4.B.3.b.ii. Noms des types de liens utilisés dans un objet technique (par exemple, le lien en spirale entre un pot et son couvercle)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.c.</b>	<b>Lier des pièces mécaniques</b>

OBJECTIVE 4.B.3.c.i. Décrit les caractéristiques des liens dans un objet technique (directe ou indirecte, rigide ou souple, amovible ou permanente, partielle ou complète)

OBJECTIVE 4.B.3.c.ii. Détermine les caractéristiques souhaitables de liens dans la conception d'un objet technique

OBJECTIVE 4.B.3.c.iii. Les juge le choix des solutions d'assemblage dans un objet technique

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.d.</b>	<b>Degré de liberté d'une partie</b>

OBJECTIVE 4.B.3.d.i. Explique le but de limitation de mouvement (degré de liberté) dans un objet technique (par exemple, certains charnières de limiter dans quelle mesure une porte de placard pouvez ouvrir, l'empêchant de frapper le mur)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.e.</b>	<b>Les fonctions typiques</b>

OBJECTIVE 4.B.3.e.iii. Explique le choix d'un type de lien dans un objet technique (par exemple en utilisant une vis permet de fixer et à retirer un boîtier de batterie)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.f.</b>	<b>Contrôles directeurs</b>

OBJECTIVE 4.B.3.f.i. Où le choix d'un type de commande de guidage dans un objet technique (par exemple des guides coulissants un tiroir et réduit la friction)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.g.</b>	<b>L'adhésion et de frottement des pièces</b>

OBJECTIVE 4.B.3.g.i. Décrit les avantages et les inconvénients de l'adhésion et de frottement des pièces dans un objet technique

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.h.</b>	<b>Des systèmes de transmission de mouvement</b>

OBJECTIVE 4.B.3.h.i. Identifie les systèmes de transmission de mouvement dans des objets techniques

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.i.</b>	<b>Fonction, composantes et utilisation des systèmes de transmission de mouvement</b>

OBJECTIVE 4.B.3.i.i. Systèmes de transmission de mouvement dans Noms d'objets techniques (roues de friction, poulies et courroies, engrenage des roues dentées et engrenages à chaîne, roue et vis sans fin)

OBJECTIVE 4.B.3.i.ii. Décrit les fonctions des composants d'un système de transmission de mouvement (par exemple dans une bicyclette, l'ensemble d'engrenages sur le pédalier est l'unité d'entraînement, la roue dentée sur la roue arrière est l'unité de réception, et la chaîne est le bloc intermédiaire)

OBJECTIVE 4.B.3.i.iii. Décrit les variations de vitesse ou de réversibilité un système de transmission de mouvement (par exemple une roue dentée qui est remplacé par une plus petite roue ou une roue à moins de dents augmente la vitesse de rotation)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.j.</b>	<b>Construction et caractéristiques des systèmes de transmission de mouvement</b>

OBJECTIVE 4.B.3.j.i. Explique le choix d'un système de transmission de mouvement dans un objet technique (par exemple en utilisant un ensemble d'engrenages plutôt que roues de friction pour obtenir du couple moteur et éviter de glisser)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.k.</b>	<b>Systèmes de transformation de mouvement</b>

OBJECTIVE 4.B.3.k.i. Identifie les systèmes de transformation de mouvement dans des objets techniques

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.I.</b>	<b>Fonction, composantes et utilisation des systèmes de transformation de mouvement</b>

OBJECTIVE 4.B.3.I.i. Noms de transformation des systèmes de mouvement dans les objets techniques (par exemple système de roue à denture hélicoïdale, cames et rouleaux, bielle et manivelle, pignon et crémaillère)

OBJECTIVE 4.B.3.I.ii. Décrit les fonctions des composants d'un système de transformation de mouvement (par exemple dans un tire-bouchon à double levier, le pignon est l'unité d'entraînement et la crémaillère est l'unité de réception)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.m.</b>	<b>Construction et caractéristiques des systèmes de transformation de mouvement</b>

OBJECTIVE 4.B.3.m.i. Explique le choix d'un système de transformation de mouvement (système d'engrenage à vis, cames, bielles, manivelles, des diapositives, rotation des mécanismes bielle-manivelle, crémaillère et pignon d'entraînement) dans un objet technique (par exemple prises la plupart des voitures utilisent un système d'engrenage à vis plutôt que un système à crémaillère et pignon, parce que la force du bras sur la petite manivelle fournit plus de poussée et parce que, étant donné qu'il est non réversible, le système est plus sûr)

OBJECTIVE 4.B.3.m.ii. Explique le choix d'un système de transformation de mouvement (engrenage à vis, cames, bielles, manivelles, curseur-manivelle mécanisme, crémaillère et pignon d'entraînement, excentrique) dans un objet technique

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Génie mécanique</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Ingénierie</b>
<b>COMPETENCY</b>	<b>4.B.3.n.</b>	<b>Les changements de vitesse</b>

OBJECTIVE 4.B.3.n.i. Utilise des systèmes qui permettent des changements de vitesse dans la conception des objets techniques

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.D.</b>	<b>Matériels</b>
<b>SUBSTRAND</b>	<b>4.D.1.</b>	<b>Les ressources matérielles</b>
<b>COMPETENCY</b>	<b>4.D.1.c.</b>	<b>Équipement</b>

OBJECTIVE 4.D.1.c.i. Définit les outils et les équipements que les éléments nécessaires à la fabrication d'un objet (usinage, contrôle, assemblage)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Fabrication</b>
<b>SUBSTRAND</b>	<b>4.E.a.</b>	<b>Caractéristiques</b>

COMPETENCY 4.E.a.ii. Évalue un objet prototype ou technique, basée sur les environnements décrits dans le cahier des charges (humaine, technique, industriel, économique, physique, de l'environnement)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Fabrication</b>
<b>SUBSTRAND</b>	<b>4.E.b.</b>	<b>Feuille de processus de fabrication</b>

COMPETENCY 4.E.b.i. Définit une feuille processus de fabrication comme un ensemble d'étapes à suivre pour usiner les pièces qui composent un objet technique

COMPETENCY 4.E.b.ii. Suit un processus et une feuille de montage pour construire un objet constitué de composants rares ou pour construire une partie de cet objet

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Fabrication</b>
<b>SUBSTRAND</b>	<b>4.E.c.</b>	<b>Façonner</b>
<b>COMPETENCY</b>	<b>4.E.c.i.</b>	<b>Machines et outils</b>

OBJECTIVE 4.E.c.i.1. Associés qui façonnent les processus avec les types de matériaux utilisés (par exemple injection-soufflage est utilisé pour façonner des matières plastiques)

OBJECTIVE 4.E.c.i.2. Détermine les techniques appropriées de mise en forme basée sur l'observation directe des objets techniques (par exemple, certains pieds de table sont tournés sur un tour)

<b>STRAND</b>	<b>QC.4.</b>	<b>Parcours de formation générale: Le monde technologique</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Fabrication</b>
<b>SUBSTRAND</b>	<b>4.E.d.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>4.E.d.i.</b>	<b>Caractéristiques de mise en forme, perçage, taraudage et le filetage</b>

OBJECTIVE 4.E.d.i.1. Associés, portant sur (marquage) avec des matériaux d'économie, techniques de façonnage et les types de matériaux à mettre en forme

OBJECTIVE 4.E.d.i.2. Décrit les caractéristiques des outils nécessaires pour façonner un matériau à usiner (par exemple la pointe d'un foret à métaux est conique, tandis que celle d'un foret à bois est le double cannelure)

<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.a.</b>	<b>En toute sécurité en utilisant des machines et tools4</b>

OBJECTIVE 5.A.2.a.i. Utiliser les outils en toute sécurité (par exemple couteau rétractable, marteau, tournevis, pinces)

OBJECTIVE 5.A.2.a.ii. Utilise des machines-outils en toute sécurité (scie à ruban, perceuse, ponceuse)

<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.b.</b>	<b>Mesure et portant sur</b>

OBJECTIVE	5.A.2.b.iii.	Adopte la position appropriée pour la lecture d'un instrument
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OBJECTIVE	5.A.2.b.iv.	Marque les matériaux à être façonné à l'aide d'un crayon ou d'un poinçon
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.c.</b>	<b>Usinage et formant</b>

OBJECTIVE	5.A.2.c.i.	Choisit les matériaux appropriés, des outils, des techniques et des processus
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OBJECTIVE	5.A.2.c.iii.	Immobilise la partie à former
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OBJECTIVE	5.A.2.c.iv.	Formulaires de la partie en conformité avec les étapes dans les processus d'usinage suivantes: le sciage, le forage, ponçage, le dépôt
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OBJECTIVE	5.A.2.c.v.	Forme la partie en conformité avec les étapes dans les procédés d'usinage suivantes: extraction, épissage, brasage
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.d.</b>	<b>Finition</b>

OBJECTIVE	5.A.2.d.i.	Sables les côtés ou ébavurer les bords de chaque pièce après formage
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OBJECTIVE	5.A.2.d.ii.	Utilise la finition appropriée (teinture, peinture)
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OBJECTIVE	5.A.2.d.iii.	Rectifier, les encaustiques, des marteaux ou des pièces métalliques ciseaux
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.e.</b>	<b>Assemblage</b>

OBJECTIVE	5.A.2.e.ii.	Immobilise pièces lors du collage
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OBJECTIVE	5.A.2.e.iii.	Perceuses à le diamètre des vis, des clous ou des rivets utilisés
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OBJECTIVE	5.A.2.e.iv.	Fraises des ouvertures pour vis à tête fraisée
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.f.</b>	<b>Montage et démontage</b>

OBJECTIVE	5.A.2.f.i.	Identifie et réunit les pièces et la quincaillerie
OBJECTIVE	5.A.2.f.ii.	Choisit les outils appropriés
OBJECTIVE	5.A.2.f.iii.	Pour le démontage, les chiffres et d'enregistrer l'emplacement des pièces
OBJECTIVE	5.A.2.f.iv.	Dans le cas des circuits électriques, identifie et rassemble les composants électriques
OBJECTIVE	5.A.2.f.v.	Dans le cas de circuits électroniques, identifie et rassemble les composants électroniques
OBJECTIVE	5.A.2.f.viii.	Connecte les composants en utilisant les fils, connecteurs ou les soudures

<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.g.</b>	<b>Effectuer des tâches de vérification et de contrôle</b>

OBJECTIVE	5.A.2.g.i.	Évalue les dimensions d'une pièce pendant et après la construction à l'aide d'une règle
OBJECTIVE	5.A.2.g.iii.	Utilise un modèle afin de vérifier la conformité d'une partie
OBJECTIVE	5.A.2.g.iv.	Évalue les dimensions d'une pièce pendant et après la construction en utilisant pieds à coulisse

<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technologie</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Fabrication</b>
<b>COMPETENCY</b>	<b>5.A.2.h.</b>	<b>Faire une partie</b>

OBJECTIVE	5.A.2.h.i.	Donne une pièce en utilisant les techniques appropriées
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.B.</b>	<b>Science</b>
<b>SUBSTRAND</b>	<b>5.B.d.</b>	<b>Utilisation d'instruments de mesure</b>

COMPETENCY	5.B.d.i.	Adopte la position appropriée pour la lecture d'un instrument
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COMPETENCY	5.B.d.vi.	Utilise les instruments de mesure appropriée (par exemple un ampèremètre, fiole jaugée)
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<b>STRAND</b>	<b>QC.5.</b>	<b>Parcours de formation générale: Techniques</b>
<b>STANDARD</b>	<b>5.B.</b>	<b>Science</b>
<b>SUBSTRAND</b>	<b>5.B.e.</b>	<b>Utilisation d'instruments d'observation</b>

COMPETENCY	5.B.e.i.	Utilise des instruments d'observation appropriée (loupe, loupe binoculaire, jumelles, microscope)
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<b>STRAND</b>	<b>QC.6.</b>	<b>Parcours de formation générale: Stratégies</b>
<b>STANDARD</b>	<b>6.A.</b>	<b>Stratégies d'exploration</b>
SUBSTRAND	6.A.2.	La distinction entre les différents types d'informations utiles pour résoudre le problème
SUBSTRAND	6.A.8.	Explorer différentes manières de résoudre le problème
SUBSTRAND	6.A.11.	Tenant compte des contraintes liées à la résolution d'un problème ou faire un objet (par exemple: spécifications, les ressources disponibles, le temps alloué)
SUBSTRAND	6.A.13.	Utilisation de différents types de raisonnement (par exemple, induction, déduction, l'inférence, la comparaison, la classification)
SUBSTRAND	6.A.14.	En utilisant des approches empiriques (par exemple du procès et l'erreur, l'analyse, l'exploration en utilisant ses sens)

<b>STRAND</b>	<b>QC.6.</b>	<b>Parcours de formation générale: Stratégies</b>
<b>STANDARD</b>	<b>6.B.</b>	<b>Stratégies d'instrumentation</b>
SUBSTRAND	6.B.3.	Recourir au design technique pour illustrer une solution (par exemple des diagrammes, des croquis, des dessins techniques)
SUBSTRAND	6.B.4.	En utilisant des outils différents pour l'enregistrement des informations (par exemple des diagrammes, des notes, des graphiques, des procédures, le journal de bord)
SUBSTRAND	6.B.5.	En utilisant une variété de techniques d'observation et d'outils
SUBSTRAND	6.B.6.	Sélection des techniques appropriées ou des outils pour l'observation

<b>STRAND</b>	<b>QC.6.</b>	<b>Parcours de formation générale: Stratégies</b>
<b>STANDARD</b>	<b>6.C.</b>	<b>Des stratégies analytiques</b>
SUBSTRAND	6.C.1.	Identifier les contraintes et les éléments importants liés à la situation de résolution de problèmes
SUBSTRAND	6.C.2.	Diviser un problème complexe en sous-problèmes plus simples
SUBSTRAND	6.C.3.	Utilisation de différents types de raisonnement (par exemple le raisonnement inductif et déductif, la comparaison, la classification, priorisation) afin de traiter l'information
SUBSTRAND	6.C.4.	En raisonnant par analogie, afin de traiter l'information et adapter les connaissances scientifiques et technologiques

<b>STRAND</b>	<b>QC.6.</b>	<b>Parcours de formation générale: Stratégies</b>
<b>STANDARD</b>	<b>6.D.</b>	<b>Les stratégies de communication</b>
SUBSTRAND	6.D.1.	En utilisant différents moyens de communication pour proposer des explications ou des solutions (par exemple une présentation orale, présentation écrite, la procédure)
SUBSTRAND	6.D.3.	L'échange d'informations



SUBSTRAND	6.D.5.	L'utilisation d'outils pour afficher des informations dans différents formats (par exemple des tableaux de données, graphiques, diagrammes)
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<b>STRAND</b>	<b>QC.12.</b>	<b>Chimie - secondaire V Programme facultatif: Stratégies</b>
<b>STANDARD</b>	<b>12.B.</b>	<b>Stratégies d'instrumentation</b>

SUBSTRAND	12.B.3.	Recourir au design technique pour illustrer une solution (par exemple des diagrammes, des croquis, des dessins techniques)
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<b>STRAND</b>	<b>QC.12.</b>	<b>Chimie - secondaire V Programme facultatif: Stratégies</b>
<b>STANDARD</b>	<b>12.D.</b>	<b>Les stratégies de communication</b>

SUBSTRAND	12.D.1.	En utilisant différents moyens de communication pour proposer des explications ou des solutions (par exemple une présentation orale, présentation écrite, la procédure)
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SUBSTRAND	12.D.3.	L'échange d'informations
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<b>STRAND</b>	<b>QC.18.</b>	<b>Physique - Secondaire V Programme facultatif: Stratégies</b>
<b>STANDARD</b>	<b>18.B.</b>	<b>Stratégies d'instrumentation</b>

SUBSTRAND	18.B.3.	Recourir au design technique pour illustrer une solution (par exemple des diagrammes, des croquis, des dessins techniques)
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<b>STRAND</b>	<b>QC.18.</b>	<b>Physique - Secondaire V Programme facultatif: Stratégies</b>
<b>STANDARD</b>	<b>18.D.</b>	<b>Les stratégies de communication</b>

SUBSTRAND	18.D.1.	En utilisant différents moyens de communication pour proposer des explications ou des solutions (par exemple une présentation orale, présentation écrite, la procédure).
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SUBSTRAND	18.D.3.	L'échange d'informations
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**Québec Education Program Progression of Learning**

**Mathematics**

Grade 11 - Adopted: 2009/Updated 2016

<b>STRAND</b>	<b>QC.6.</b>	<b>Algebra: Understanding dependency relationships</b>
<b>STANDARD</b>	<b>6.B.</b>	<b>Analyzing situations using real functions</b>

SUBSTRAND	6.B.6.	Determines values or data by solving equations and inequalities
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<b>STRAND</b>	<b>QC.6.</b>	<b>Algebra: Understanding dependency relationships</b>
<b>STANDARD</b>	<b>6.B.</b>	<b>Analyzing situations using real functions</b>

<b>SUBSTRAND</b>		<b>Note: Statements 1 to 9 apply to the functions listed below.</b>
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COMPETENCY	6.B.1-9.a.	Polynomial functions of degree 0 or 1
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<b>STRAND</b>	<b>QC.11.</b>	<b>Analytic Geometry: Analyzing situations using analytic geometry</b>
<b>STANDARD</b>	<b>11.B.</b>	<b>Straight lines and half-planes</b>

<b>SUBSTRAND</b>	<b>11.B.3.</b>	<b>Models, with or without technological tools, a situation involving</b>
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COMPETENCY 11.B.3.a. Straight lines: graphically and algebraically

<b>STRAND</b>	<b>QC.11.</b>	<b>Analytic Geometry: Analyzing situations using analytic geometry</b>
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<b>STANDARD</b>	<b>11.B.</b>	<b>Straight lines and half-planes</b>
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SUBSTRAND 11.B.4. Determines the equation of a line using the slope and a point or using two points

SUBSTRAND 11.B.5. Determines the equation of a line parallel or perpendicular to another

**Québec Education Program Progression of Learning  
Science**

Grade 11 - Adopted: 2009

<b>STRAND</b>	<b>QC.1.</b>	<b>General Education Path: The Material World</b>
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<b>STANDARD</b>	<b>1.B.</b>	<b>Changes</b>
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<b>SUBSTRAND</b>	<b>1.B.3.</b>	<b>Chemical changes</b>
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<b>COMPETENCY</b>	<b>1.B.3.a.</b>	<b>Chemical changes</b>
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OBJECTIVE 1.B.3.a.iii. Names different types of chemical changes (e.g. decomposition, oxidation)

<b>STRAND</b>	<b>QC.1.</b>	<b>General Education Path: The Material World</b>
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<b>STANDARD</b>	<b>1.B.</b>	<b>Changes</b>
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<b>SUBSTRAND</b>	<b>1.B.3.</b>	<b>Chemical changes</b>
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<b>COMPETENCY</b>	<b>1.B.3.c.</b>	<b>Oxidation</b>
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OBJECTIVE 1.B.3.c.ii. Associates known chemical reactions with oxidation reactions (e.g. combustion, corrosion)

<b>STRAND</b>	<b>QC.1.</b>	<b>General Education Path: The Material World</b>
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<b>STANDARD</b>	<b>1.B.</b>	<b>Changes</b>
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<b>SUBSTRAND</b>	<b>1.B.3.</b>	<b>Chemical changes</b>
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<b>COMPETENCY</b>	<b>1.B.3.m.</b>	<b>Endothermic and exothermic reactions</b>
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OBJECTIVE 1.B.3.m.i. Distinguishes an endothermic reaction from an exothermic reaction according to perceptible signs (e.g. temperature variations, emission of light)

<b>STRAND</b>	<b>QC.3.</b>	<b>General Education Path: The Earth and Space</b>
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<b>STANDARD</b>	<b>3.A.</b>	<b>Characteristics of the Earth</b>
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<b>SUBSTRAND</b>	<b>3.A.2.</b>	<b>Lithosphere</b>
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<b>COMPETENCY</b>	<b>3.A.2.1.</b>	<b>Permafrost</b>
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OBJECTIVE 3.A.2.1.ii. Explains some of the consequences of a rise in temperature in the permafrost (e.g. landslides, methane emissions)

<b>STRAND</b>	<b>QC.3.</b>	<b>General Education Path: The Earth and Space</b>
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<b>STANDARD</b>	<b>3.A.</b>	<b>Characteristics of the Earth</b>
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<b>SUBSTRAND</b>	<b>3.A.4.</b>	<b>Atmosphere</b>
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<b>COMPETENCY</b>	<b>3.A.4.a.</b>	<b>General characteristics of the atmosphere</b>
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OBJECTIVE 3.A.4.a.iii. Describes the relationships between the atmosphere and certain human activities (e.g. recreation, transportation, energy consumption)

<b>STRAND</b>	<b>QC.3.</b>	<b>General Education Path: The Earth and Space</b>
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<b>STANDARD</b>	<b>3.A.</b>	<b>Characteristics of the Earth</b>
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<b>SUBSTRAND</b>	<b>3.A.4.</b>	<b>Atmosphere</b>
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<b>COMPETENCY</b>	<b>3.A.4.b.</b>	<b>Greenhouse effect</b>
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OBJECTIVE 3.A.4.b.i. Describes the greenhouse effect

OBJECTIVE 3.A.4.b.ii. Explains some of the consequences of a higher concentration of greenhouse gases (e.g. global warming that could result in higher sea levels, disturbances in ecosystems or the melting of glaciers)

<b>STRAND</b>	<b>QC.3.</b>	<b>General Education Path: The Earth and Space</b>
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<b>STANDARD</b>	<b>3.B.</b>	<b>Geological and geophysical phenomena</b>
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<b>SUBSTRAND</b>	<b>3.B.i.</b>	<b>Renewable and nonrenewable energy resources</b>
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COMPETENCY 3.B.i.ii. Describes technologies used to produce electricity using the energy resources in the lithosphere, hydrosphere and atmosphere

COMPETENCY 3.B.i.iii. Describes the main impact of the use of energy resources in the lithosphere, hydrosphere and atmosphere

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
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<b>SUBSTRAND</b>	<b>4.B.1.</b>	<b>Forces and motion</b>
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<b>COMPETENCY</b>	<b>4.B.1.a.</b>	<b>Types of motion</b>
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OBJECTIVE 4.B.1.a.i. Identifies parts that move in a specific way in a technical object (rectilinear translation, rotation, helical)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
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<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
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<b>SUBSTRAND</b>	<b>4.B.2.</b>	<b>Technological systems</b>
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<b>COMPETENCY</b>	<b>4.B.2.a.</b>	<b>System</b>
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OBJECTIVE 4.B.2.a.i. Identifies a system (set of connected elements that interact with each other) in a technical object or technological application

OBJECTIVE 4.B.2.a.ii. Describes the overall function of a technological system

OBJECTIVE 4.B.2.a.iii. Names the inputs and outputs of a technological system

OBJECTIVE 4.B.2.a.iv. Names the processes and control elements of a technological system

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.2.</b>	<b>Technological systems</b>
<b>COMPETENCY</b>	<b>4.B.2.b.</b>	<b>Components of a system</b>

OBJECTIVE 4.B.2.b.i. Describes the role of the components of a technological system (e.g. explains the role of the parts of a lighting system)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.2.</b>	<b>Technological systems</b>
<b>COMPETENCY</b>	<b>4.B.2.c.</b>	<b>Energy transformations</b>

OBJECTIVE 4.B.2.c.ii. Defines energy transformations

OBJECTIVE 4.B.2.c.iii. Identifies energy transformations in a technical object or technological system

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.a.</b>	<b>Basic mechanical functions (links, guiding control)</b>

OBJECTIVE 4.B.3.a.i. Describes the role of links and guiding controls in a technical object

OBJECTIVE 4.B.3.a.ii. Identifies a guiding control in a technical object, as well as the related links (e.g. a pizza wheel is guided by a pivot, which links it to the handle)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.b.</b>	<b>Typical mechanical links</b>

OBJECTIVE 4.B.3.b.i. Describes the advantages and disadvantages of different types of links

OBJECTIVE 4.B.3.b.ii. Names the types of links used in a technical object (e.g. the spiral link between a jar and its lid)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.c.</b>	<b>Linking of mechanical parts</b>

OBJECTIVE 4.B.3.c.i. Describes the characteristics of the links in a technical object (direct or indirect, rigid or flexible, removable or permanent, partial or complete)

OBJECTIVE	4.B.3.c.ii.	Determines the desirable characteristics of links in the design of a technical object
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OBJECTIVE	4.B.3.c.iii.	Judges the choice of assembly solutions in a technical object
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<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.d.</b>	<b>Degree of freedom of a part</b>

OBJECTIVE	4.B.3.d.i.	Explains the purpose of limiting motion (degree of freedom) in a technical object (e.g. some hinges limit how far a cupboard door can open, preventing it from hitting the wall)
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<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.e.</b>	<b>Typical functions</b>

OBJECTIVE	4.B.3.e.iii.	Explains the choice of a type of link in a technical object (e.g. using a screw makes it possible to attach and remove a battery case)
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<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.f.</b>	<b>Guiding controls</b>

OBJECTIVE	4.B.3.f.i.	Explains the choice of a type of guiding control in a technical object (e.g. the slide guides a drawer and reduces friction)
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<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.g.</b>	<b>Adhesion and friction of parts</b>

OBJECTIVE	4.B.3.g.i.	Describes the advantages and disadvantages of the adhesion and friction of parts in a technical object
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<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.h.</b>	<b>Motion transmission systems</b>

OBJECTIVE	4.B.3.h.i.	Identifies motion transmission systems in technical objects
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<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>

<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.i.</b>	<b>Function, components and use of motion transmission systems</b>
OBJECTIVE	4.B.3.i.i.	Names motion transmission systems in technical objects (friction gears, pulleys and belt, gear assembly, sprocket wheels and chain, wheel and worm gear)
OBJECTIVE	4.B.3.i.ii.	Describes the functions of the components of a motion transmission system (e.g. in a bicycle, the gear assembly on the crankset is the driving unit, the sprocket wheel on the rear wheel is the receiving unit, and the chain is the intermediate unit)
OBJECTIVE	4.B.3.i.iii.	Describes the speed changes or reversibility of a motion transmission system (e.g. a sprocket wheel that is replaced by a smaller wheel or a wheel with fewer teeth increases rotation speed)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.j.</b>	<b>Construction and characteristics of motion transmission systems</b>
OBJECTIVE	4.B.3.j.i.	Explains the choice of a motion transmission system in a technical object (e.g. using a gear assembly rather than friction gears to get better engine torque and avoid slipping)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.k.</b>	<b>Motion transformation systems</b>
OBJECTIVE	4.B.3.k.i.	Identifies motion transformation systems in technical objects

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.l.</b>	<b>Function, components and use of motion transformation systems</b>
OBJECTIVE	4.B.3.l.i.	Names motion transformation systems in technical objects (e.g. screw gear system, cam and roller, connecting rod and crank, rack and pinion)
OBJECTIVE	4.B.3.l.ii.	Describes the functions of the components of a motion transformation system (e.g. in a double-lever corkscrew, the pinion is the driving unit and the rack is the receiving unit)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.m.</b>	<b>Construction and characteristics of motion transformation systems</b>
OBJECTIVE	4.B.3.m.i.	Explains the choice of a motion transformation system (screw gear system, cams, connecting rods, cranks, slides, rotating slider crank mechanisms, rack-and-pinion drive) in a technical object (e.g. most car jacks use a screw gear system rather than a rack-and-pinion system, because the force of the arm on the small crank provides more thrust and because, given that it is nonreversible, the system is safer)

OBJECTIVE	4.B.3.m.ii.	Explains the choice of a motion transformation system (screw gear, cams, connecting rods, cranks, slider-crank mechanism, rack-and-pinion drive, eccentric) in a technical object
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<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.B.</b>	<b>Mechanical engineering</b>
<b>SUBSTRAND</b>	<b>4.B.3.</b>	<b>Engineering</b>
<b>COMPETENCY</b>	<b>4.B.3.n.</b>	<b>Speed changes</b>

OBJECTIVE 4.B.3.n.i. Uses systems that allow for speed changes in the design of technical objects

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.D.</b>	<b>Materials</b>
<b>SUBSTRAND</b>	<b>4.D.1.</b>	<b>Material resources</b>
<b>COMPETENCY</b>	<b>4.D.1.c.</b>	<b>Equipment</b>

OBJECTIVE 4.D.1.c.i. Defines tools and equipment as the elements needed to manufacture an object (machining, control, assembly)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Manufacturing</b>
<b>SUBSTRAND</b>	<b>4.E.a.</b>	<b>Specifications</b>

COMPETENCY 4.E.a.ii. Evaluates a prototype or technical object based on the environments described in the specifications (human, technical, industrial, economic, physical, environmental)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Manufacturing</b>
<b>SUBSTRAND</b>	<b>4.E.b.</b>	<b>Manufacturing process sheet</b>

COMPETENCY 4.E.b.i. Defines a manufacturing process sheet as a set of steps to follow to machine the parts that make up a technical object

COMPETENCY 4.E.b.ii. Follows a process and assembly sheet to construct an object consisting of few components or to construct part of that object

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
<b>STANDARD</b>	<b>4.E.</b>	<b>Manufacturing</b>
<b>SUBSTRAND</b>	<b>4.E.c.</b>	<b>Shaping</b>
<b>COMPETENCY</b>	<b>4.E.c.i.</b>	<b>Machines and tools</b>

OBJECTIVE 4.E.c.i.1. Associates shaping processes with the types of materials used (e.g. injection blow moulding is used to shape plastics)

OBJECTIVE 4.E.c.i.2. Determines the appropriate shaping techniques based on direct observation of technical objects (e.g. some table legs are turned on a lathe)

<b>STRAND</b>	<b>QC.4.</b>	<b>General Education Path: The Technological World</b>
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<b>STANDARD</b>	<b>4.E.</b>	<b>Manufacturing</b>
<b>SUBSTRAND</b>	<b>4.E.d.</b>	<b>Manufacturing</b>
<b>COMPETENCY</b>	<b>4.E.d.i.</b>	<b>Characteristics of laying out, drilling, tapping and threading</b>

OBJECTIVE 4.E.d.i.1. Associates laying out (marking) with saving materials, shaping techniques and the types of materials to be shaped

OBJECTIVE 4.E.d.i.2. Describes the characteristics of the tools needed to shape a material to be machined (e.g. the tip of a metal drill is conical, while that of a wood drill is double fluted)

<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
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<b>STANDARD</b>	<b>5.A.</b>	<b>Technology</b>
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<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Manufacturing</b>
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<b>COMPETENCY</b>	<b>5.A.2.a.</b>	<b>Safely using machines and tools</b>
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OBJECTIVE 5.A.2.a.i. Uses tools safely (e.g. retractable utility knife, hammer, screwdriver, pliers)

OBJECTIVE 5.A.2.a.ii. Uses machine tools safely (band saw, drill, sander)

<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
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<b>STANDARD</b>	<b>5.A.</b>	<b>Technology</b>
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<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Manufacturing</b>
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<b>COMPETENCY</b>	<b>5.A.2.b.</b>	<b>Measuring and laying out</b>
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OBJECTIVE 5.A.2.b.iii. Adopts the appropriate position for reading an instrument

OBJECTIVE 5.A.2.b.iv. Marks the materials to be shaped using a pencil or punch

<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
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<b>STANDARD</b>	<b>5.A.</b>	<b>Technology</b>
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<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Manufacturing</b>
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<b>COMPETENCY</b>	<b>5.A.2.c.</b>	<b>Machining and forming</b>
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OBJECTIVE 5.A.2.c.i. Chooses the appropriate materials, tools, techniques and processes

OBJECTIVE 5.A.2.c.iii. Immobilizes the part to be formed

OBJECTIVE 5.A.2.c.iv. Forms the part in accordance with the steps in the following machining processes: sawing, drilling, sanding, filing

OBJECTIVE 5.A.2.c.v. Forms the part in accordance with the steps in the following machining processes: stripping, splicing, soldering

<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
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<b>STANDARD</b>	<b>5.A.</b>	<b>Technology</b>
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<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Manufacturing</b>
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<b>COMPETENCY</b>	<b>5.A.2.d.</b>	<b>Finishing</b>
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OBJECTIVE	5.A.2.d.i.	Sands the sides or deburrs the edges of each part after forming
OBJECTIVE	5.A.2.d.ii.	Uses the appropriate finish (stain, paint)

OBJECTIVE	5.A.2.d.iii.	Grinds, polishes, hammers or chisels metal parts
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<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technology</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Manufacturing</b>
<b>COMPETENCY</b>	<b>5.A.2.e.</b>	<b>Assembling</b>

OBJECTIVE	5.A.2.e.ii.	Immobilizes parts during gluing
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OBJECTIVE	5.A.2.e.iii.	Drills to the diameter of the screws, nails or rivets used
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OBJECTIVE	5.A.2.e.iv.	Countersinks the openings for countersunk screws
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<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technology</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Manufacturing</b>
<b>COMPETENCY</b>	<b>5.A.2.f.</b>	<b>Assembling and disassembling</b>

OBJECTIVE	5.A.2.f.i.	Identifies and gathers the parts and hardware
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OBJECTIVE	5.A.2.f.ii.	Chooses the appropriate tools
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OBJECTIVE	5.A.2.f.iii.	For disassembly, numbers and records the location of the parts
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OBJECTIVE	5.A.2.f.iv.	In the case of electrical circuits, identifies and gathers the electrical components
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OBJECTIVE	5.A.2.f.v.	In the case of electronic circuits, identifies and gathers the electronic components
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OBJECTIVE	5.A.2.f.viii.	Connects the components using wire, connectors or solders
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<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technology</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Manufacturing</b>
<b>COMPETENCY</b>	<b>5.A.2.g.</b>	<b>Performing verification and control tasks</b>

OBJECTIVE	5.A.2.g.i.	Evaluates the dimensions of a part during and after construction using a ruler
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OBJECTIVE	5.A.2.g.iii.	Uses a template to verify the conformity of a part
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OBJECTIVE	5.A.2.g.iv.	Evaluates the dimensions of a part during and after construction using vernier calipers
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<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
<b>STANDARD</b>	<b>5.A.</b>	<b>Technology</b>
<b>SUBSTRAND</b>	<b>5.A.2.</b>	<b>Manufacturing</b>
<b>COMPETENCY</b>	<b>5.A.2.h.</b>	<b>Making a part</b>

OBJECTIVE 5.A.2.h.i. Makes a part using the appropriate techniques

<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
<b>STANDARD</b>	<b>5.B.</b>	<b>Science</b>
<b>SUBSTRAND</b>	<b>5.B.d.</b>	<b>Using measuring instruments</b>

COMPETENCY 5.B.d.i. Adopts the appropriate position for reading an instrument

COMPETENCY 5.B.d.vi. Uses measuring instruments appropriately (e.g. ammeter, volumetric flask)

<b>STRAND</b>	<b>QC.5.</b>	<b>General Education Path: Techniques</b>
<b>STANDARD</b>	<b>5.B.</b>	<b>Science</b>
<b>SUBSTRAND</b>	<b>5.B.e.</b>	<b>Using observational instruments</b>

COMPETENCY 5.B.e.i. Uses observational instruments appropriately (e.g. magnifying glass, stereomicroscope, binoculars, microscope)

<b>STRAND</b>	<b>QC.6.</b>	<b>General Education Path: Strategies</b>
<b>STANDARD</b>	<b>6.A.</b>	<b>Exploration strategies</b>

SUBSTRAND 6.A.2. Distinguishing between the different types of information useful for solving the problem

SUBSTRAND 6.A.8. Exploring various ways of solving the problem

SUBSTRAND 6.A.11. Taking into account the constraints involved in solving a problem or making an object (e.g. specifications, available resources, time allotted)

SUBSTRAND 6.A.13. Using different types of reasoning (e.g. induction, deduction, inference, comparison, classification)

SUBSTRAND 6.A.14. Using empirical approaches (e.g. trial and error, analysis, exploration using one's senses)

<b>STRAND</b>	<b>QC.6.</b>	<b>General Education Path: Strategies</b>
<b>STANDARD</b>	<b>6.B.</b>	<b>Instrumentation strategies</b>

SUBSTRAND 6.B.3. Using technical design to illustrate a solution (e.g. diagrams, sketches, technical drawings)

SUBSTRAND 6.B.4. Using different tools for recording information (e.g. diagrams, notes, graphs, procedures, logbook)

SUBSTRAND 6.B.5. Using a variety of observational techniques and tools

SUBSTRAND 6.B.6. Selecting suitable techniques or tools for observation

<b>STRAND</b>	<b>QC.6.</b>	<b>General Education Path: Strategies</b>
<b>STANDARD</b>	<b>6.C.</b>	<b>Analytical strategies</b>
SUBSTRAND	6.C.1.	Identifying the constraints and important elements related to the problem-solving situation
SUBSTRAND	6.C.2.	Dividing a complex problem into simpler subproblems
SUBSTRAND	6.C.3.	Using different types of reasoning (e.g. inductive and deductive reasoning, comparison, classification, prioritization) in order to process information
SUBSTRAND	6.C.4.	Reasoning by analogy in order to process information and adapt scientific and technological knowledge
<b>STRAND</b>	<b>QC.6.</b>	<b>General Education Path: Strategies</b>
<b>STANDARD</b>	<b>6.D.</b>	<b>Communication strategies</b>
SUBSTRAND	6.D.1.	Using different means of communication to propose explanations or solutions (e.g. oral presentation, written presentation, procedure)
SUBSTRAND	6.D.3.	Exchanging information
SUBSTRAND	6.D.5.	Using tools to display information in various formats (e.g. data tables, graphs, diagrams)
<b>STRAND</b>	<b>QC.12.</b>	<b>Chemistry - Secondary V Optional Program: Strategies</b>
<b>STANDARD</b>	<b>12.B.</b>	<b>Instrumentation strategies</b>
SUBSTRAND	12.B.3.	Using technical design to illustrate a solution (e.g. diagrams, sketches, technical drawings)
<b>STRAND</b>	<b>QC.12.</b>	<b>Chemistry - Secondary V Optional Program: Strategies</b>
<b>STANDARD</b>	<b>12.D.</b>	<b>Communication strategies</b>
SUBSTRAND	12.D.1.	Using different means of communication to propose explanations or solutions (e.g. oral presentation, written presentation, procedure)
SUBSTRAND	12.D.3.	Exchanging information
<b>STRAND</b>	<b>QC.18.</b>	<b>Physics - Secondary V Optional Program: Strategies</b>
<b>STANDARD</b>	<b>18.B.</b>	<b>Instrumentation strategies</b>
SUBSTRAND	18.B.3.	Using technical design to illustrate a solution (e.g. diagrams, sketches, technical drawings)
<b>STRAND</b>	<b>QC.18.</b>	<b>Physics - Secondary V Optional Program: Strategies</b>
<b>STANDARD</b>	<b>18.D.</b>	<b>Communication strategies</b>
SUBSTRAND	18.D.1.	Using different means of communication to propose explanations or solutions (e.g. oral presentation, written presentation, procedure).
SUBSTRAND	18.D.3.	Exchanging information

Saskatchewan Curriculum  
Mathematics  
Grade 11 - Adopted: 2010 / 2005

<b>OUTCOME / COURSE</b>	<b>SK.FP10.</b>	<b>Foundations of Mathematics and Pre-calculus 10</b>
<b>FOCUS</b>	<b>FP10.7.</b>	<b>Demonstrate, with and without the use of technology, understanding of slope (concretely, pictorially, and symbolically) with respect to: line segments and lines, rate of change, ratio of rise to run, parallel lines, perpendicular lines. [PS, R, V].</b>

OUTCOME FP10.7.g. Draw a line given its slope and a point on the line.

<b>OUTCOME / COURSE</b>	<b>SK.FP10.</b>	<b>Foundations of Mathematics and Pre-calculus 10</b>
<b>FOCUS</b>	<b>FP10.8.</b>	<b>Demonstrate understanding of linear relations including: representing in words, ordered pairs, tables of values, graphs, function notation, and equations; determining characteristics including intercepts, slope, domain, and range; relating different equation forms to each other and to graphs. [C, CN, PS, R, T, V]</b>

OUTCOME FP10.8.a Critique the statement "any straight line is the graph of a linear function".

OUTCOME FP10.8.h. Sketch examples of linear relations to demonstrate the number of x or y intercepts possible for any line.

OUTCOME FP10.8.j. Solve a situational question that involves the intercepts, slope, domain, or range of a linear relation.

OUTCOME FP10.8.l. Generalize, explain, and apply strategies for drawing or sketching the graph of a linear relation in slope-intercept, general, or slope-point form, or function notation.

OUTCOME FP10.8.m. Graph, with and without technology, a linear relation given in slope-intercept, general, or slope-point form, and explain the strategy used to create the graph.

OUTCOME FP10.8.s. Explain why a linear function would never have a term of  $x^2$  when in simplified form.

<b>OUTCOME / COURSE</b>	<b>SK.FP10.</b>	<b>Foundations of Mathematics and Pre-calculus 10</b>
<b>FOCUS</b>	<b>FP10.9.</b>	<b>Demonstrate understanding of the writing and application of equations of linear relations, given: a graph of a relation, a point that satisfies a relation and the slope of the relation, two distinct points that satisfy a relation, a point that satisfies the relation and the equation of a line parallel or perpendicular to the relation. [CN, PS, R, V].</b>
<b>OUTCOME</b>	<b>FP10.9.b.</b>	<b>Develop, generalize, explain, and apply strategies for writing an equation for a linear relation when given:</b>

INDICATOR FP10.9.b.1. A point that satisfies the relation and the slope of the relation.

INDICATOR FP10.9.b.3. The coordinates of a point that satisfy the relation and the equation of a line parallel or perpendicular to the line.

<b>OUTCOME / COURSE</b>	<b>SK.FP10.</b>	<b>Foundations of Mathematics and Pre-calculus 10</b>
<b>FOCUS</b>	<b>FP10.9.</b>	<b>Demonstrate understanding of the writing and application of equations of linear relations, given: a graph of a relation, a point that satisfies a relation and the slope of the relation, two distinct points that satisfy a relation, a point that satisfies the relation and the equation of a line parallel or perpendicular to the relation. [CN, PS, R, V].</b>

OUTCOME FP10.9.e Apply knowledge and skills of linear relations and their equations to solve situational questions.

<b>OUTCOME / COURSE</b>	<b>SK.WA10.</b>	<b>Workplace and Apprenticeship Mathematics 10</b>
<b>FOCUS</b>	<b>WA10.2.</b>	<b>Analyze puzzles and games that involve spatial reasoning using problem solving strategies. [C, CN, PS, R]</b>

OUTCOME WA10.2.a. Determine, explain, and verify strategies to solve a puzzle or to win a game.

OUTCOME WA10.2.b. Observe and analyze errors in a solution to a puzzle or in a strategy for winning a game and explain the reasoning.

OUTCOME WA10.2.c Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

Grade 11 - Adopted: 2010

<b>OUTCOME / COURSE</b>	<b>SK.FM20.</b>	<b>Foundations of Mathematics 20</b>
<b>FOCUS</b>	<b>FM20.2.</b>	<b>Demonstrate understanding of inductive and deductive reasoning including: analyzing conjectures; analyzing spatial puzzles and games; providing conjectures; solving problems. [C, CN, PS, R, V]</b>

OUTCOME FM20.2.d Identify situations relevant to self, family, or community involving inductive and/or deductive reasoning.

OUTCOME FM20.2.i. Solve situational questions that involve inductive or deductive reasoning.

<b>OUTCOME / COURSE</b>	<b>SK.FM20.</b>	<b>Foundations of Mathematics 20</b>
<b>FOCUS</b>	<b>FM20.2.</b>	<b>Demonstrate understanding of inductive and deductive reasoning including: analyzing conjectures; analyzing spatial puzzles and games; providing conjectures; solving problems. [C, CN, PS, R, V]</b>
<b>OUTCOME</b>	<b>FM20.2.j</b>	<b>Determine, explain, and verify strategies for solving puzzles or winning games, such as:</b>

INDICATOR FM20.2.j.3. Make a systematic list.

INDICATOR FM20.2.j.4. Create a drawing or model.

INDICATOR FM20.2.j.5. Eliminate possibilities.

INDICATOR FM20.2.j.6. Solve simpler problems.

INDICATOR FM20.2.j.7. Work backward.

<b>OUTCOME / COURSE</b>	<b>SK.WA20.</b>	<b>Workplace and Apprenticeship Mathematics 20</b>
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<b>FOCUS</b>	<b>WA20.2.</b>	<b>Demonstrate the ability to analyze puzzles and games that involve numerical reasoning and problem solving strategies. [C, CN, PS, R]</b>
<b>OUTCOME</b>	<b>WA20.2.a.</b>	<b>Determine, explain, and verify strategies to solve a puzzle or to win a game such as:</b>

INDICATOR WA20.2.a Make a systematic list.  
.3.

INDICATOR WA20.2.a Draw or model.  
.4.

INDICATOR WA20.2.a Eliminate possibilities.  
.5.

INDICATOR WA20.2.a Formulate and simplify a problem that is similar to the original problem.  
.6.

INDICATOR WA20.2.a Work backwards.  
.7.

INDICATOR WA20.2.a Develop alternative approaches.  
.8.

<b>OUTCOME / COURSE</b>	<b>SK.WA20.</b>	<b>Workplace and Apprenticeship Mathematics 20</b>
<b>FOCUS</b>	<b>WA20.9.</b>	<b>Demonstrate concretely, pictorially, and symbolically (with and without the use of technology) an understanding of slope with respect to: rise over run, rate of change, solving problems. [C, CN, PS, V]</b>

OUTCOME WA20.9. Solve situational questions that involve slope or rate of change, verify and explain why solutions are reasonable or not.  
h.

Grade 11 - Adopted: 2012

<b>OUTCOME / COURSE</b>	<b>SK.FM30.</b>	<b>Foundations of Mathematics 30</b>
<b>FOCUS</b>	<b>FM30.2.</b>	<b>Demonstrate understanding of inductive and deductive reasoning including: analysis of conditional statements; analysis of puzzles and games involving numerical and logical reasoning; making and justifying decisions; solving problems. [C, CN, ME, PS, R]</b>
<b>OUTCOME</b>	<b>FM30.2.a.</b>	<b>Develop, generalize, verify, explain, and apply strategies to solve a puzzle or win a game such as:</b>

INDICATOR FM30.2.a. Make a systematic list.  
3.

INDICATOR FM30.2.a. Draw or model.  
4.

INDICATOR FM30.2.a. Eliminate possibilities.  
5.

INDICATOR FM30.2.a. Simplify the original problem.  
6.

INDICATOR FM30.2.a. Work backwards to develop alternative approaches.  
7.

<b>OUTCOME / COURSE</b>	<b>SK.FM30.</b>	<b>Foundations of Mathematics 30</b>
<b>FOCUS</b>	<b>FM30.2.</b>	<b>Demonstrate understanding of inductive and deductive reasoning including: analysis of conditional statements; analysis of puzzles and games involving numerical and logical reasoning; making and justifying decisions; solving problems. [C, CN, ME, PS, R]</b>

OUTCOME FM30.2.b Identify and correct errors in a solution to a puzzle or in a strategy to win a game.

OUTCOME FM30.2.c Create a variation on a puzzle or game and describe a strategy for solving the puzzle or winning the game.

<b>OUTCOME / COURSE</b>	<b>SK.WA30.</b>	<b>Workplace and Apprenticeship Mathematics 30</b>
<b>FOCUS</b>	<b>WA30.1.</b>	<b>Analyze puzzles and games that involve logical reasoning using problem-solving strategies. [C, CN, PS, R]</b>
<b>OUTCOME</b>	<b>WA30.1.a.</b>	<b>Determine, explain, and verify strategies to solve a puzzle or to win a game such as:</b>

INDICATOR WA30.1.a Make a systematic list.  
.3.

INDICATOR WA30.1.a Draw or model.  
.4.

INDICATOR WA30.1.a Eliminate possibilities.  
.5.

INDICATOR WA30.1.a Formulate and simplify a problem that is similar to the original problem.  
.6.

INDICATOR WA30.1.a Work backwards.  
.7.

INDICATOR WA30.1.a Develop alternative approaches.  
.8.

<b>OUTCOME / COURSE</b>	<b>SK.WA30.</b>	<b>Workplace and Apprenticeship Mathematics 30</b>
<b>FOCUS</b>	<b>WA30.1.</b>	<b>Analyze puzzles and games that involve logical reasoning using problem-solving strategies. [C, CN, PS, R]</b>

OUTCOME WA30.1.b Observe and analyze errors in solutions to puzzles or in strategies for winning games, and explain the reasoning.

OUTCOME WA30.1.c Create a variation on a puzzle or a game, and describe a strategy for solving the altered puzzle or winning the game.

<b>OUTCOME / COURSE</b>	<b>SK.WA30.</b>	<b>Workplace and Apprenticeship Mathematics 30</b>
<b>FOCUS</b>	<b>WA30.8.</b>	<b>Extend and apply understanding of linear relations including: patterns and trends, graphs, tables of values, equations, interpolation and extrapolation, problem solving. [CN, PS, R, T, V]</b>

OUTCOME	WA30.8.	Analyze graphs, tables of values, number patterns, and/or equations to generalize characteristics of linear relations. a.
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OUTCOME	WA30.8.I.	Create and solve situational problems that involve the application of a formula for a linear relation.
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**Saskatchewan Curriculum  
Mathematics  
Grade 12 - Adopted: 2010 / 2005**

<b>OUTCOME / COURSE</b>	<b>SK.FP10.</b>	<b>Foundations of Mathematics and Pre-calculus 10</b>
<b>FOCUS</b>	<b>FP10.7.</b>	<b>Demonstrate, with and without the use of technology, understanding of slope (concretely, pictorially, and symbolically) with respect to: line segments and lines, rate of change, ratio of rise to run, parallel lines, perpendicular lines. [PS, R, V].</b>

OUTCOME	FP10.7.g.	Draw a line given its slope and a point on the line.
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<b>OUTCOME / COURSE</b>	<b>SK.FP10.</b>	<b>Foundations of Mathematics and Pre-calculus 10</b>
<b>FOCUS</b>	<b>FP10.8.</b>	<b>Demonstrate understanding of linear relations including: representing in words, ordered pairs, tables of values, graphs, function notation, and equations; determining characteristics including intercepts, slope, domain, and range; relating different equation forms to each other and to graphs. [C, CN, PS, R, T, V]</b>

OUTCOME	FP10.8.a	Critique the statement "any straight line is the graph of a linear function".
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OUTCOME	FP10.8.h.	Sketch examples of linear relations to demonstrate the number of x or y intercepts possible for any line.
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OUTCOME	FP10.8.j.	Solve a situational question that involves the intercepts, slope, domain, or range of a linear relation.
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OUTCOME	FP10.8.I.	Generalize, explain, and apply strategies for drawing or sketching the graph of a linear relation in slope-intercept, general, or slope-point form, or function notation.
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OUTCOME	FP10.8.m.	Graph, with and without technology, a linear relation given in slope-intercept, general, or slope-point form, and explain the strategy used to create the graph.
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OUTCOME	FP10.8.s.	Explain why a linear function would never have a term of $x^2$ when in simplified form.
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<b>OUTCOME / COURSE</b>	<b>SK.FP10.</b>	<b>Foundations of Mathematics and Pre-calculus 10</b>
<b>FOCUS</b>	<b>FP10.9.</b>	<b>Demonstrate understanding of the writing and application of equations of linear relations, given: a graph of a relation, a point that satisfies a relation and the slope of the relation, two distinct points that satisfy a relation, a point that satisfies the relation and the equation of a line parallel or perpendicular to the relation. [CN, PS, R, V].</b>
<b>OUTCOME</b>	<b>FP10.9.b.</b>	<b>Develop, generalize, explain, and apply strategies for writing an equation for a linear relation when given:</b>

INDICATOR	FP10.9.b.1.	A point that satisfies the relation and the slope of the relation.
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INDICATOR	FP10.9.b.3.	The coordinates of a point that satisfy the relation and the equation of a line parallel or perpendicular to the line.
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<b>OUTCOME / COURSE</b>	<b>SK.FP10.</b>	<b>Foundations of Mathematics and Pre-calculus 10</b>
<b>FOCUS</b>	<b>FP10.9.</b>	<b>Demonstrate understanding of the writing and application of equations of linear relations, given: a graph of a relation, a point that satisfies a relation and the slope of the relation, two distinct points that satisfy a relation, a point that satisfies the relation and the equation of a line parallel or perpendicular to the relation. [CN, PS, R, V].</b>

OUTCOME FP10.9.e Apply knowledge and skills of linear relations and their equations to solve situational questions.

<b>OUTCOME / COURSE</b>	<b>SK.WA10.</b>	<b>Workplace and Apprenticeship Mathematics 10</b>
<b>FOCUS</b>	<b>WA10.2.</b>	<b>Analyze puzzles and games that involve spatial reasoning using problem solving strategies. [C, CN, PS, R]</b>

OUTCOME WA10.2. a. Determine, explain, and verify strategies to solve a puzzle or to win a game.

OUTCOME WA10.2. b. Observe and analyze errors in a solution to a puzzle or in a strategy for winning a game and explain the reasoning.

OUTCOME WA10.2.c Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

Grade 12 - Adopted: 2010

<b>OUTCOME / COURSE</b>	<b>SK.FM20.</b>	<b>Foundations of Mathematics 20</b>
<b>FOCUS</b>	<b>FM20.2.</b>	<b>Demonstrate understanding of inductive and deductive reasoning including: analyzing conjectures; analyzing spatial puzzles and games; providing conjectures; solving problems. [C, CN, PS, R, V]</b>

OUTCOME FM20.2.d Identify situations relevant to self, family, or community involving inductive and/or deductive reasoning.

OUTCOME FM20.2.i. Solve situational questions that involve inductive or deductive reasoning.

<b>OUTCOME / COURSE</b>	<b>SK.FM20.</b>	<b>Foundations of Mathematics 20</b>
<b>FOCUS</b>	<b>FM20.2.</b>	<b>Demonstrate understanding of inductive and deductive reasoning including: analyzing conjectures; analyzing spatial puzzles and games; providing conjectures; solving problems. [C, CN, PS, R, V]</b>
<b>OUTCOME</b>	<b>FM20.2.j</b>	<b>Determine, explain, and verify strategies for solving puzzles or winning games, such as:</b>

INDICATOR FM20.2.j. 3. Make a systematic list.

INDICATOR FM20.2.j. 4. Create a drawing or model.

INDICATOR FM20.2.j. 5. Eliminate possibilities.

INDICATOR FM20.2.j. 6. Solve simpler problems.

INDICATOR FM20.2.j. Work backward.  
7.

<b>OUTCOME / COURSE</b>	<b>SK.WA20.</b>	<b>Workplace and Apprenticeship Mathematics 20</b>
<b>FOCUS</b>	<b>WA20.2.</b>	<b>Demonstrate the ability to analyze puzzles and games that involve numerical reasoning and problem solving strategies. [C, CN, PS, R]</b>
<b>OUTCOME</b>	<b>WA20.2.a.</b>	<b>Determine, explain, and verify strategies to solve a puzzle or to win a game such as:</b>

INDICATOR WA20.2.a Make a systematic list.  
.3.

INDICATOR WA20.2.a Draw or model.  
.4.

INDICATOR WA20.2.a Eliminate possibilities.  
.5.

INDICATOR WA20.2.a Formulate and simplify a problem that is similar to the original problem.  
.6.

INDICATOR WA20.2.a Work backwards.  
.7.

INDICATOR WA20.2.a Develop alternative approaches.  
.8.

<b>OUTCOME / COURSE</b>	<b>SK.WA20.</b>	<b>Workplace and Apprenticeship Mathematics 20</b>
<b>FOCUS</b>	<b>WA20.9.</b>	<b>Demonstrate concretely, pictorially, and symbolically (with and without the use of technology) an understanding of slope with respect to: rise over run, rate of change, solving problems. [C, CN, PS, V]</b>

OUTCOME WA20.9.h. Solve situational questions that involve slope or rate of change, verify and explain why solutions are reasonable or not.

Grade 12 - Adopted: 2012

<b>OUTCOME / COURSE</b>	<b>SK.FM30.</b>	<b>Foundations of Mathematics 30</b>
<b>FOCUS</b>	<b>FM30.2.</b>	<b>Demonstrate understanding of inductive and deductive reasoning including: analysis of conditional statements; analysis of puzzles and games involving numerical and logical reasoning; making and justifying decisions; solving problems. [C, CN, ME, PS, R]</b>
<b>OUTCOME</b>	<b>FM30.2.a.</b>	<b>Develop, generalize, verify, explain, and apply strategies to solve a puzzle or win a game such as:</b>

INDICATOR FM30.2.a. Make a systematic list.  
3.

INDICATOR FM30.2.a. Draw or model.  
4.

INDICATOR FM30.2.a. Eliminate possibilities.  
5.

INDICATOR	FM30.2.a.	Simplify the original problem. 6.
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INDICATOR	FM30.2.a.	Work backwards to develop alternative approaches. 7.
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<b>OUTCOME / COURSE</b>	<b>SK.FM30.</b>	<b>Foundations of Mathematics 30</b>
<b>FOCUS</b>	<b>FM30.2.</b>	<b>Demonstrate understanding of inductive and deductive reasoning including: analysis of conditional statements; analysis of puzzles and games involving numerical and logical reasoning; making and justifying decisions; solving problems. [C, CN, ME, PS, R]</b>

OUTCOME	FM30.2.b	Identify and correct errors in a solution to a puzzle or in a strategy to win a game. .
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OUTCOME	FM30.2.c	Create a variation on a puzzle or game and describe a strategy for solving the puzzle or winning the game. .
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<b>OUTCOME / COURSE</b>	<b>SK.WA30.</b>	<b>Workplace and Apprenticeship Mathematics 30</b>
<b>FOCUS</b>	<b>WA30.1.</b>	<b>Analyze puzzles and games that involve logical reasoning using problem-solving strategies. [C, CN, PS, R]</b>
<b>OUTCOME</b>	<b>WA30.1.a.</b>	<b>Determine, explain, and verify strategies to solve a puzzle or to win a game such as:</b>

INDICATOR	WA30.1.a	Make a systematic list. .3.
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INDICATOR	WA30.1.a	Draw or model. .4.
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INDICATOR	WA30.1.a	Eliminate possibilities. .5.
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INDICATOR	WA30.1.a	Formulate and simplify a problem that is similar to the original problem. .6.
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INDICATOR	WA30.1.a	Work backwards. .7.
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INDICATOR	WA30.1.a	Develop alternative approaches. .8.
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<b>OUTCOME / COURSE</b>	<b>SK.WA30.</b>	<b>Workplace and Apprenticeship Mathematics 30</b>
<b>FOCUS</b>	<b>WA30.1.</b>	<b>Analyze puzzles and games that involve logical reasoning using problem-solving strategies. [C, CN, PS, R]</b>

OUTCOME	WA30.1.b.	Observe and analyze errors in solutions to puzzles or in strategies for winning games, and explain the reasoning. b.
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OUTCOME	WA30.1.c	Create a variation on a puzzle or a game, and describe a strategy for solving the altered puzzle or winning the game. .
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<b>OUTCOME / COURSE</b>	<b>SK.WA30.</b>	<b>Workplace and Apprenticeship Mathematics 30</b>
<b>FOCUS</b>	<b>WA30.8.</b>	<b>Extend and apply understanding of linear relations including: patterns and trends, graphs, tables of values, equations, interpolation and extrapolation, problem solving. [CN, PS, R, T, V]</b>

OUTCOME WA30.8. Analyze graphs, tables of values, number patterns, and/or equations to generalize characteristics of linear relations.  
a.

OUTCOME WA30.8.I. Create and solve situational problems that involve the application of a formula for a linear relation.

**Saskatchewan Curriculum  
Science  
Grade 11 - Adopted: 2016**

<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
<b>FOCUS</b>	<b>SCI10-CD.</b>	<b>Climate and Ecosystem Dynamics</b>
<b>OUTCOME</b>	<b>SCI10-CD1.</b>	<b>Assess the implications of human actions on the local and global climate and the sustainability of ecosystems. [CP, DM]</b>

INDICATOR SCI10-CD1.a. Pose questions or problems relating to the effects of human actions on global climate change and the sustainability of ecosystems that arise from personal research. (A, S, STSE)

INDICATOR SCI10-CD1.h. Provide examples of human actions that have contributed to the anthropogenic greenhouse effect. (K, STSE)

INDICATOR SCI10-CD1.i. Research how scientists examine changes to the key indicators of climate change (e.g., CO<sub>2</sub> concentration, global surface temperature, Arctic sea ice area, land ice mass and sea level) to support the scientific understanding of climate change. (K, STSE, A)

INDICATOR SCI10-CD1.j. Reflect upon individual and societal behavioural and lifestyle choices that can help to minimize anthropogenic sources of global climate change. (K, STSE)

<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
<b>FOCUS</b>	<b>SCI10-CD.</b>	<b>Climate and Ecosystem Dynamics</b>
<b>OUTCOME</b>	<b>SCI10-CD2.</b>	<b>Investigate factors that influence Earth's climate system, including the role of the natural greenhouse effect. [DM, SI]</b>

INDICATOR SCI10-CD2.e. Explain how greenhouse gases (e.g., water vapour, carbon dioxide, methane, nitrous oxide, sulphur dioxide and ozone), particles, clouds and surface albedo affect the amount of solar energy absorbed and re-radiated at various locations on Earth. (K)

INDICATOR SCI10-CD2.f. Explain the role of natural sources (e.g., volcanoes, fire, evaporation and living organisms) of the primary greenhouse gases in Earth's atmosphere and how they contribute to the natural greenhouse effect. (K, A)

INDICATOR SCI10-CD2.g. Design, construct and evaluate the effectiveness of a model used to illustrate the natural greenhouse effect, the reflectivity of Earth's surface or the relationship between Earth's axial tilt and the seasons. (S, STSE, A)

<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
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<b>FOCUS</b>	<b>SCI10-CD.</b>	<b>Climate and Ecosystem Dynamics</b>
<b>OUTCOME</b>	<b>SCI10-CD3.</b>	<b>Examine biodiversity through the analysis of interactions among populations within communities. [DM, SI]</b>

INDICATOR SCI10-CD3.k. Examine how factors such as invasive species, habitat loss and climate change affect biodiversity within an ecosystem, and can result in species becoming at-risk (i.e., vulnerable, threatened and extirpated). (K, STSE)

<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
<b>FOCUS</b>	<b>SCI10-CR.</b>	<b>Chemical Reactions</b>
<b>OUTCOME</b>	<b>SCI10-CR1.</b>	<b>Explore the properties of chemical reactions, including the role of energy changes, and applications of acids and bases. [CP, SI]</b>

INDICATOR SCI10-CR1.a. Create a representation about the prevalence of chemistry in our lives. (A, S)

INDICATOR SCI10-CR1.b. Research the ways in which people, including First Nations and Métis, from various times and cultures have applied their understanding of the transformation of materials to produce new substances. (STSE)

INDICATOR SCI10-CR1.c. Observe and describe a variety of chemical reactions, including synthesis, decomposition, combustion, single replacement and double replacement. (S, K)

INDICATOR SCI10-CR1.g. Investigate the properties of endothermic and exothermic chemical reactions, including identifying where or how energy is absorbed or released in the reaction and identifying potential benefits and consequences of the reaction. (K, S)

<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
<b>FOCUS</b>	<b>SCI10-CR.</b>	<b>Chemical Reactions</b>
<b>OUTCOME</b>	<b>SCI10-CR3.</b>	<b>Represent chemical reactions and conservation of mass symbolically using models, word and skeleton equations and balanced chemical equations. [SI, DM]</b>

INDICATOR SCI10-CR3.g. Categorize chemical reactions as synthesis, decomposition, combustion, single replacement and double replacement, including acid base neutralization. (S, K, A)

<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
<b>FOCUS</b>	<b>SCI10-FM.</b>	<b>Force and Motion in Our World</b>
<b>OUTCOME</b>	<b>SCI10-FM1.</b>	<b>Explore the development of motion-related technologies and their impacts on self and society. [DM, TPS]</b>

INDICATOR SCI10-FM1.a. Create a representation of different types of motion and motion-related technologies from various cultures, including First Nations and Métis. (S, STSE)

INDICATOR SCI10-FM1.d. Design, construct and evaluate a prototype of an object that meets a student-identified need related to motion. (STSE, S, A)

INDICATOR SCI10-FM1.e. Evaluate the design and function of a motion-related technology using student-identified criteria such as safety, cost, availability and impact on everyday life and the environment. (STSE)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
<b>FOCUS</b>	<b>ES20-SDS.</b>	<b>Student-Directed Study</b>
<b>OUTCOME</b>	<b>ES20-SDS1.</b>	<b>Create and carry out a plan to explore one or more topics of personal interest relevant to Environmental Science 20 in depth. [CP, DM, SI, TPS]</b>

INDICATOR ES20-SDS1.g. Develop an action plan, including a desired future state, goals, targets, strategies and performance measures, to address a specific environmental issue. (S, STSE)

INDICATOR ES20-SDS1.h. Assess the extent to which a global issue (e.g., climate change, water shortages, habitat destruction, invasive species and air pollution) is evident within a local context. (A, STSE)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
<b>FOCUS</b>	<b>ES20-ES.</b>	<b>The Nature of Environmental Science</b>
<b>OUTCOME</b>	<b>ES20-ES1.</b>	<b>Examine the methods, mindsets and purposes of environmental science. [CP, DM]</b>

INDICATOR ES20-ES1.h. Examine how principles of sustainability (i.e., environmental, economic and social justice) are integral to environmental science. (STSE)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
<b>FOCUS</b>	<b>ES20-AH.</b>	<b>Atmosphere and Human Health</b>
<b>OUTCOME</b>	<b>ES20-AH1.</b>	<b>Assess the impact of human activities on indoor and outdoor air quality and the need for regulations and mitigating technologies to minimize risks to human health. [SI, DM]</b>

INDICATOR ES20-AH1.g. Explain the scientific principles underlying technologies and processes such as air scrubbers, baghouse filters, electrostatic precipitators and catalytic converters that were developed to reduce contaminants in motor vehicle and industrial emissions or to improve indoor air quality. (K, STSE, S)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
<b>FOCUS</b>	<b>ES20-AH.</b>	<b>Atmosphere and Human Health</b>
<b>OUTCOME</b>	<b>ES20-AH2.</b>	<b>Analyze the production, reliability and uses of geoscience data to investigate the effects of a changing climate on society and the environment. [CP, DM, SI]</b>

INDICATOR ES20-AH2.d. Examine how and why organizations such as the Intergovernmental Panel on Climate Change (IPCC), Canadian Centre for Climate Modeling and Analysis and Prairie Adaptation Research Collaborative (PARC) work to provide scientific research related to climate change and its potential environmental and societal implications. (STSE)

INDICATOR ES20-AH2.f. Examine the degree to which the scientific community has achieved consensus regarding the reality of anthropogenic climate change. (STSE)

INDICATOR ES20-AH2.g. Investigate potential environmental, economic and societal impacts of climate change in Saskatchewan on human health, population distribution and access to water and other resources. (STSE)

INDICATOR ES20-AH2.i. Hypothesize how life on earth might respond to a changing global climate given different scenarios change such as sea level rise, extreme weather events, water shortages, increased spread of disease, flooding and acidification of the oceans. (K, STSE, S, A)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
<b>FOCUS</b>	<b>ES20-HP.</b>	<b>Human Population and Pollution</b>
<b>OUTCOME</b>	<b>ES20-HP1.</b>	<b>Investigate technologies and processes used for mitigating and managing resource use, waste generation and pollution associated with a growing human population. [CP, DM, SI]</b>

INDICATOR ES20-HP1.d. Discuss the strengths and limitations of models (e.g., I=PAT) that scientists use to quantify the impact of population, consumption, technology and stewardship on the environment. (STSE, A)

INDICATOR ES20-HP1.g. Describe technologies and processes that have been developed to minimize the impacts of mining, forestry and/or agricultural operations on air, water and soil quality and quantity. (STSE, K)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
<b>FOCUS</b>	<b>ES20-TE.</b>	<b>Terrestrial Ecosystems</b>
<b>OUTCOME</b>	<b>ES20-TE3.</b>	<b>Recognize the need for intact habitat to support animal populations and biodiversity. [SI, CP, DM]</b>

INDICATOR ES20-TE3.g. Discuss the implications of the competitive exclusion principle with respect to animals and plants in an ecosystem, including the introduction of invasive species and the potential for shifting ecozones due to climate change. (K)

<b>OUTCOME / COURSE</b>	<b>SK.PS20.</b>	<b>Physical Science 20</b>
<b>FOCUS</b>	<b>PS20-SDS.</b>	<b>Student-Directed Study</b>
<b>OUTCOME</b>	<b>PS20-SDS1.</b>	<b>Create and carry out a plan to explore one or more topics of personal interest relevant to Physical Science 20 in depth. [DM, SI, TPS]</b>

INDICATOR PS20-SDS1.d. Design, construct and evaluate the effectiveness of a device, model or technique that demonstrates the scientific principles underlying a concept related to Physical Science 20. (STSE, S)

INDICATOR PS20-SDS1.g. Construct a tool (e.g., rubric, checklist, self-evaluation form or peer-evaluation form) to assess the process and products involved in a student-directed study. (S, A)

<b>OUTCOME / COURSE</b>	<b>SK.PS20.</b>	<b>Physical Science 20</b>
<b>FOCUS</b>	<b>PS20-HT.</b>	<b>Heat</b>
<b>OUTCOME</b>	<b>PS20-HT2.</b>	<b>Determine the quantities of heat involved in chemical reactions through experimentation and calculation. [SI, TPS]</b>

INDICATOR PS20-HT2.a. Distinguish between endothermic and exothermic chemical reactions, including those that occur in solutions. (K)

INDICATOR PS20-HT2.c. Measure, using a thermometer or temperature probe, and record the temperature change in an exothermic and/or endothermic chemical reaction. (S, K)

<b>OUTCOME / COURSE</b>	<b>SK.PS20.</b>	<b>Physical Science 20</b>
<b>FOCUS</b>	<b>PS20-FC.</b>	<b>Foundations of Chemistry</b>

<b>OUTCOME</b>	<b>PS20-FC1.</b>	<b>Predict products of the five basic types of chemical reactions and evaluate the impact of these reactions on society and the environment. [DM, SI]</b>
INDICATOR	PS20-FC1.a.	Observe and analyze synthesis, decomposition, combustion, single-replacement and double-replacement (including acid base neutralization) reactions. (S, K)
INDICATOR	PS20-FC1.b.	Represent synthesis, decomposition, combustion, single-replacement and double-replacement (including acid base neutralization) reactions using atomic models, other manipulatives, skeleton equations, balanced chemical equations and International Union of Pure and Applied Chemistry (IUPAC) nomenclature. (S)
INDICATOR	PS20-FC1.g.	Distinguish between the products of complete and incomplete combustion reactions and potential consequences of the latter for living things and the environment. (STSE, K)
INDICATOR	PS20-FC1.h.	Design, and carry out if practical, an investigation to demonstrate the difference between a complete and incomplete combustion reaction. (S)
INDICATOR	PS20-FC1.j.	Analyze and compare the fuel consumed and carbon output of various combustion reactions (e.g., methane, propane, octane and ethanol). (STSE, S)

<b>OUTCOME / COURSE</b>	<b>SK.CH30.</b>	<b>Chemistry 30</b>
<b>FOCUS</b>	<b>CH30-MS.</b>	<b>Chemical Bonding and Materials Science</b>
<b>OUTCOME</b>	<b>CH30-MS4.</b>	<b>Determine the suitability of materials for use in specific applications. [DM, TPS]</b>

INDICATOR	CH30-MS4.d.	Explore how First Nations and Métis people used their understanding of material properties to determine their use (e.g., different species of wood used for burning, smoking and creating structures for housing and transportation). (STSE, K)
INDICATOR	CH30-MS4.e.	Research First Nations and Métis beliefs regarding the ethical treatment of Mother Earth with respect to the gathering, creating, using and disposing of materials. (STSE, K)
INDICATOR	CH30-MS4.f.	Identify criteria (e.g., cost, availability, ethics, transportation cost and source of material) used to guide the choice of materials for a specific application. (STSE, A)

<b>OUTCOME / COURSE</b>	<b>SK.PH30.</b>	<b>Physics 30</b>
<b>FOCUS</b>	<b>PH30-SDS.</b>	<b>Student-Directed Study</b>
<b>OUTCOME</b>	<b>PH30-SDS1.</b>	<b>Create and carry out a plan to explore one or more topics of personal interest relevant to Physics 30 in depth. [DM, SI, TPS]</b>

INDICATOR	PH30-SDS1.d.	Design, construct and evaluate the effectiveness of a device, model or technique that demonstrates the scientific principles underlying concept related to a Physics 30 topic. (STSE, S)
INDICATOR	PH30-SDS1.g.	Construct a tool (e.g., rubric, checklist, self-evaluation form or peer-evaluation form) to assess the process and products involved in a student-directed study. (S, A)

<b>OUTCOME / COURSE</b>	<b>SK.PH30.</b>	<b>Physics 30</b>
<b>FOCUS</b>	<b>PH30-FI.</b>	<b>Fields</b>



<b>OUTCOME</b>	<b>PH30-FI2.</b>	<b>Investigate electric and magnetic fields and their interactions with matter. [SI, TPS]</b>
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INDICATOR	PH30-FI2.k.	Design, construct and evaluate a prototype of a technology (e.g., electric motor, generator or electromagnet) to demonstrate principles of electromagnetism. (K, S)
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<b>OUTCOME / COURSE</b>	<b>SK.ES30.</b>	<b>Earth Science 30</b>
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<b>FOCUS</b>	<b>ES30-LS.</b>	<b>Lithosphere</b>
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<b>OUTCOME</b>	<b>ES30-LS3.</b>	<b>Investigate the processes and technologies used to locate and extract mineral resources and fossil fuels locally, provincially and globally. [DM, SI, TPS]</b>
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INDICATOR	ES30-LS3.b.	Identify the location, method of extraction, uses and economic impact of major fossil fuel and mineral (e.g., gold, diamond, rare earth elements, copper, zinc, kaolin, coal, potash, uranium, salt, and sodium sulphate) resources. (STSE)
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INDICATOR	ES30-LS3.c.	Investigate how the location of major mineral and fossil fuel resources in Saskatchewan are influenced by their depositional setting and geologic history including depth of deposit and geological stability/instability. (K)
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INDICATOR	ES30-LS3.k.	Recognize the importance of water in enhanced oil recovery and in various mining techniques such as solution mining. (K, STSE)
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<b>OUTCOME / COURSE</b>	<b>SK.ES30.</b>	<b>Earth Science 30</b>
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<b>FOCUS</b>	<b>ES30-AH.</b>	<b>Atmosphere and Hydrosphere</b>
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<b>OUTCOME</b>	<b>ES30-AH1.</b>	<b>Correlate major changes in Earth's atmosphere over geologic time with corresponding changes in the biosphere and other components of the geosphere.</b>
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INDICATOR	ES30-AH1.a.	Inquire as to the origins and sources of nitrogen, oxygen and other gases (e.g., argon, carbon dioxide, neon, helium and methane) in Earth's atmosphere. (K, S)
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INDICATOR	ES30-AH1.g.	Identify the role of atmospheric layers in protecting Earth's surface from extra-terrestrial dangers (e.g., ultraviolet light, solar wind and meteors) and insulating Earth thereby maintaining the Earth's magnetic field. (K)
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<b>OUTCOME / COURSE</b>	<b>SK.ES30.</b>	<b>Earth Science 30</b>
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<b>FOCUS</b>	<b>ES30-AH.</b>	<b>Atmosphere and Hydrosphere</b>
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<b>OUTCOME</b>	<b>ES30-AH3.</b>	<b>Investigate the impact of atmospheric and hydrospheric processes on society and the environment. [SI, DM]</b>
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INDICATOR	ES30-AH3.d.	Assess the effectiveness of technologies (e.g., carbon capture, energy conservation and renewable energy) and policies (e.g., carbon pricing, taxation and financial incentives) that are intended to manage climate change. (STSE)
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**Saskatchewan Curriculum  
Science  
Grade 12 - Adopted: 2016**

<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
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<b>FOCUS</b>	<b>SCI10-CD.</b>	<b>Climate and Ecosystem Dynamics</b>
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<b>OUTCOME</b>	<b>SCI10-CD1.</b>	<b>Assess the implications of human actions on the local and global climate and the sustainability of ecosystems. [CP, DM]</b>
INDICATOR	SCI10-CD1.a.	Pose questions or problems relating to the effects of human actions on global climate change and the sustainability of ecosystems that arise from personal research. (A, S, STSE)
INDICATOR	SCI10-CD1.h.	Provide examples of human actions that have contributed to the anthropogenic greenhouse effect. (K, STSE)
INDICATOR	SCI10-CD1.i.	Research how scientists examine changes to the key indicators of climate change (e.g., CO <sub>2</sub> concentration, global surface temperature, Arctic sea ice area, land ice mass and sea level) to support the scientific understanding of climate change. (K, STSE, A)
INDICATOR	SCI10-CD1.j.	Reflect upon individual and societal behavioural and lifestyle choices that can help to minimize anthropogenic sources of global climate change. (K, STSE)

<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
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<b>FOCUS</b>	<b>SCI10-CD.</b>	<b>Climate and Ecosystem Dynamics</b>
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<b>OUTCOME</b>	<b>SCI10-CD2.</b>	<b>Investigate factors that influence Earth's climate system, including the role of the natural greenhouse effect. [DM, SI]</b>
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INDICATOR	SCI10-CD2.e.	Explain how greenhouse gases (e.g., water vapour, carbon dioxide, methane, nitrous oxide, sulphur dioxide and ozone), particles, clouds and surface albedo affect the amount of solar energy absorbed and re-radiated at various locations on Earth. (K)
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INDICATOR	SCI10-CD2.f.	Explain the role of natural sources (e.g., volcanoes, fire, evaporation and living organisms) of the primary greenhouse gases in Earth's atmosphere and how they contribute to the natural greenhouse effect. (K, A)
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INDICATOR	SCI10-CD2.g.	Design, construct and evaluate the effectiveness of a model used to illustrate the natural greenhouse effect, the reflectivity of Earth's surface or the relationship between Earth's axial tilt and the seasons. (S, STSE, A)
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<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
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<b>FOCUS</b>	<b>SCI10-CD.</b>	<b>Climate and Ecosystem Dynamics</b>
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<b>OUTCOME</b>	<b>SCI10-CD3.</b>	<b>Examine biodiversity through the analysis of interactions among populations within communities. [DM, SI]</b>
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INDICATOR	SCI10-CD3.k.	Examine how factors such as invasive species, habitat loss and climate change affect biodiversity within an ecosystem, and can result in species becoming at-risk (i.e., vulnerable, threatened and extirpated). (K, STSE)
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<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
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<b>FOCUS</b>	<b>SCI10-CR.</b>	<b>Chemical Reactions</b>
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<b>OUTCOME</b>	<b>SCI10-CR1.</b>	<b>Explore the properties of chemical reactions, including the role of energy changes, and applications of acids and bases. [CP, SI]</b>
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INDICATOR	SCI10-CR1.a.	Create a representation about the prevalence of chemistry in our lives. (A, S)
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INDICATOR	SCI10-CR1.b.	Research the ways in which people, including First Nations and Métis, from various times and cultures have applied their understanding of the transformation of materials to produce new substances. (STSE)
INDICATOR	SCI10-CR1.c.	Observe and describe a variety of chemical reactions, including synthesis, decomposition, combustion, single replacement and double replacement. (S, K)
INDICATOR	SCI10-CR1.g.	Investigate the properties of endothermic and exothermic chemical reactions, including identifying where or how energy is absorbed or released in the reaction and identifying potential benefits and consequences of the reaction. (K, S)

<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
<b>FOCUS</b>	<b>SCI10-CR.</b>	<b>Chemical Reactions</b>
<b>OUTCOME</b>	<b>SCI10-CR3.</b>	<b>Represent chemical reactions and conservation of mass symbolically using models, word and skeleton equations and balanced chemical equations. [SI, DM]</b>

INDICATOR	SCI10-CR3.g.	Categorize chemical reactions as synthesis, decomposition, combustion, single replacement and double replacement, including acid base neutralization. (S, K, A)
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<b>OUTCOME / COURSE</b>	<b>SK.SCI10.</b>	<b>Science 10</b>
<b>FOCUS</b>	<b>SCI10-FM.</b>	<b>Force and Motion in Our World</b>
<b>OUTCOME</b>	<b>SCI10-FM1.</b>	<b>Explore the development of motion-related technologies and their impacts on self and society. [DM, TPS]</b>

INDICATOR	SCI10-FM1.a.	Create a representation of different types of motion and motion-related technologies from various cultures, including First Nations and Métis. (S, STSE)
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INDICATOR	SCI10-FM1.d.	Design, construct and evaluate a prototype of an object that meets a student-identified need related to motion. (STSE, S, A)
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INDICATOR	SCI10-FM1.e.	Evaluate the design and function of a motion-related technology using student-identified criteria such as safety, cost, availability and impact on everyday life and the environment. (STSE)
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<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
<b>FOCUS</b>	<b>ES20-SDS.</b>	<b>Student-Directed Study</b>
<b>OUTCOME</b>	<b>ES20-SDS1.</b>	<b>Create and carry out a plan to explore one or more topics of personal interest relevant to Environmental Science 20 in depth. [CP, DM, SI, TPS]</b>

INDICATOR	ES20-SDS1.g.	Develop an action plan, including a desired future state, goals, targets, strategies and performance measures, to address a specific environmental issue. (S, STSE)
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INDICATOR	ES20-SDS1.h.	Assess the extent to which a global issue (e.g., climate change, water shortages, habitat destruction, invasive species and air pollution) is evident within a local context. (A, STSE)
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<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
<b>FOCUS</b>	<b>ES20-ES.</b>	<b>The Nature of Environmental Science</b>

<b>OUTCOME</b>	<b>ES20-ES1.</b>	<b>Examine the methods, mindsets and purposes of environmental science. [CP, DM]</b>
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INDICATOR ES20-ES1.h. Examine how principles of sustainability (i.e., environmental, economic and social justice) are integral to environmental science. (STSE)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
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<b>FOCUS</b>	<b>ES20-AH.</b>	<b>Atmosphere and Human Health</b>
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<b>OUTCOME</b>	<b>ES20-AH1.</b>	<b>Assess the impact of human activities on indoor and outdoor air quality and the need for regulations and mitigating technologies to minimize risks to human health. [SI, DM]</b>
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INDICATOR ES20-AH1.g. Explain the scientific principles underlying technologies and processes such as air scrubbers, baghouse filters, electrostatic precipitators and catalytic converters that were developed to reduce contaminants in motor vehicle and industrial emissions or to improve indoor air quality. (K, STSE, S)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
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<b>FOCUS</b>	<b>ES20-AH.</b>	<b>Atmosphere and Human Health</b>
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<b>OUTCOME</b>	<b>ES20-AH2.</b>	<b>Analyze the production, reliability and uses of geoscience data to investigate the effects of a changing climate on society and the environment. [CP, DM, SI]</b>
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INDICATOR ES20-AH2.d. Examine how and why organizations such as the Intergovernmental Panel on Climate Change (IPCC), Canadian Centre for Climate Modeling and Analysis and Prairie Adaptation Research Collaborative (PARC) work to provide scientific research related to climate change and its potential environmental and societal implications. (STSE)

INDICATOR ES20-AH2.f. Examine the degree to which the scientific community has achieved consensus regarding the reality of anthropogenic climate change. (STSE)

INDICATOR ES20-AH2.g. Investigate potential environmental, economic and societal impacts of climate change in Saskatchewan on human health, population distribution and access to water and other resources. (STSE)

INDICATOR ES20-AH2.i. Hypothesize how life on earth might respond to a changing global climate given different scenarios change such as sea level rise, extreme weather events, water shortages, increased spread of disease, flooding and acidification of the oceans. (K, STSE, S, A)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
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<b>FOCUS</b>	<b>ES20-HP.</b>	<b>Human Population and Pollution</b>
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<b>OUTCOME</b>	<b>ES20-HP1.</b>	<b>Investigate technologies and processes used for mitigating and managing resource use, waste generation and pollution associated with a growing human population. [CP, DM, SI]</b>
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INDICATOR ES20-HP1.d. Discuss the strengths and limitations of models (e.g., I=PAT) that scientists use to quantify the impact of population, consumption, technology and stewardship on the environment. (STSE, A)

INDICATOR ES20-HP1.g. Describe technologies and processes that have been developed to minimize the impacts of mining, forestry and/or agricultural operations on air, water and soil quality and quantity. (STSE, K)

<b>OUTCOME / COURSE</b>	<b>SK.ES20.</b>	<b>Environmental Science 20</b>
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<b>FOCUS</b>	<b>ES20-TE.</b>	<b>Terrestrial Ecosystems</b>
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<b>OUTCOME</b>	<b>ES20-TE3.</b>	<b>Recognize the need for intact habitat to support animal populations and biodiversity. [SI, CP, DM]</b>
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INDICATOR ES20-TE3.g. Discuss the implications of the competitive exclusion principle with respect to animals and plants in an ecosystem, including the introduction of invasive species and the potential for shifting ecozones due to climate change. (K)

<b>OUTCOME / COURSE</b>	<b>SK.PS20.</b>	<b>Physical Science 20</b>
<b>FOCUS</b>	<b>PS20-SDS.</b>	<b>Student-Directed Study</b>
<b>OUTCOME</b>	<b>PS20-SDS1.</b>	<b>Create and carry out a plan to explore one or more topics of personal interest relevant to Physical Science 20 in depth. [DM, SI, TPS]</b>

INDICATOR PS20-SDS1.d. Design, construct and evaluate the effectiveness of a device, model or technique that demonstrates the scientific principles underlying a concept related to Physical Science 20. (STSE, S)

INDICATOR PS20-SDS1.g. Construct a tool (e.g., rubric, checklist, self-evaluation form or peer-evaluation form) to assess the process and products involved in a student-directed study. (S, A)

<b>OUTCOME / COURSE</b>	<b>SK.PS20.</b>	<b>Physical Science 20</b>
<b>FOCUS</b>	<b>PS20-HT.</b>	<b>Heat</b>
<b>OUTCOME</b>	<b>PS20-HT2.</b>	<b>Determine the quantities of heat involved in chemical reactions through experimentation and calculation. [SI, TPS]</b>

INDICATOR PS20-HT2.a. Distinguish between endothermic and exothermic chemical reactions, including those that occur in solutions. (K)

INDICATOR PS20-HT2.c. Measure, using a thermometer or temperature probe, and record the temperature change in an exothermic and/or endothermic chemical reaction. (S, K)

<b>OUTCOME / COURSE</b>	<b>SK.PS20.</b>	<b>Physical Science 20</b>
<b>FOCUS</b>	<b>PS20-FC.</b>	<b>Foundations of Chemistry</b>
<b>OUTCOME</b>	<b>PS20-FC1.</b>	<b>Predict products of the five basic types of chemical reactions and evaluate the impact of these reactions on society and the environment. [DM, SI]</b>

INDICATOR PS20-FC1.a. Observe and analyze synthesis, decomposition, combustion, single-replacement and double-replacement (including acid base neutralization) reactions. (S, K)

INDICATOR PS20-FC1.b. Represent synthesis, decomposition, combustion, single-replacement and double-replacement (including acid base neutralization) reactions using atomic models, other manipulatives, skeleton equations, balanced chemical equations and International Union of Pure and Applied Chemistry (IUPAC) nomenclature. (S)

INDICATOR PS20-FC1.g. Distinguish between the products of complete and incomplete combustion reactions and potential consequences of the latter for living things and the environment. (STSE, K)

INDICATOR PS20-FC1.h. Design, and carry out if practical, an investigation to demonstrate the difference between a complete and incomplete combustion reaction. (S)

INDICATOR PS20-FC1.j. Analyze and compare the fuel consumed and carbon output of various combustion reactions (e.g., methane, propane, octane and ethanol). (STSE, S)

<b>OUTCOME / COURSE</b>	<b>SK.CH30.</b>	<b>Chemistry 30</b>
<b>FOCUS</b>	<b>CH30-MS.</b>	<b>Chemical Bonding and Materials Science</b>
<b>OUTCOME</b>	<b>CH30-MS4.</b>	<b>Determine the suitability of materials for use in specific applications. [DM, TPS]</b>

INDICATOR CH30-MS4.d. Explore how First Nations and Métis people used their understanding of material properties to determine their use (e.g., different species of wood used for burning, smoking and creating structures for housing and transportation). (STSE, K)

INDICATOR CH30-MS4.e. Research First Nations and Métis beliefs regarding the ethical treatment of Mother Earth with respect to the gathering, creating, using and disposing of materials. (STSE, K)

INDICATOR CH30-MS4.f. Identify criteria (e.g., cost, availability, ethics, transportation cost and source of material) used to guide the choice of materials for a specific application. (STSE, A)

<b>OUTCOME / COURSE</b>	<b>SK.PH30.</b>	<b>Physics 30</b>
<b>FOCUS</b>	<b>PH30-SDS.</b>	<b>Student-Directed Study</b>
<b>OUTCOME</b>	<b>PH30-SDS1.</b>	<b>Create and carry out a plan to explore one or more topics of personal interest relevant to Physics 30 in depth. [DM, SI, TPS]</b>

INDICATOR PH30-SDS1.d. Design, construct and evaluate the effectiveness of a device, model or technique that demonstrates the scientific principles underlying concept related to a Physics 30 topic. (STSE, S)

INDICATOR PH30-SDS1.g. Construct a tool (e.g., rubric, checklist, self-evaluation form or peer-evaluation form) to assess the process and products involved in a student-directed study. (S, A)

<b>OUTCOME / COURSE</b>	<b>SK.PH30.</b>	<b>Physics 30</b>
<b>FOCUS</b>	<b>PH30-FI.</b>	<b>Fields</b>
<b>OUTCOME</b>	<b>PH30-FI2.</b>	<b>Investigate electric and magnetic fields and their interactions with matter. [SI, TPS]</b>

INDICATOR PH30-FI2.k. Design, construct and evaluate a prototype of a technology (e.g., electric motor, generator or electromagnet) to demonstrate principles of electromagnetism. (K, S)

<b>OUTCOME / COURSE</b>	<b>SK.ES30.</b>	<b>Earth Science 30</b>
<b>FOCUS</b>	<b>ES30-LS.</b>	<b>Lithosphere</b>
<b>OUTCOME</b>	<b>ES30-LS3.</b>	<b>Investigate the processes and technologies used to locate and extract mineral resources and fossil fuels locally, provincially and globally. [DM, SI, TPS]</b>

INDICATOR ES30-LS3.b. Identify the location, method of extraction, uses and economic impact of major fossil fuel and mineral (e.g., gold, diamond, rare earth elements, copper, zinc, kaolin, coal, potash, uranium, salt, and sodium sulphate) resources. (STSE)

INDICATOR ES30-LS3.c. Investigate how the location of major mineral and fossil fuel resources in Saskatchewan are influenced by their depositional setting and geologic history including depth of deposit and geological stability/instability. (K)

INDICATOR	ES30-LS3.k.	Recognize the importance of water in enhanced oil recovery and in various mining techniques such as solution mining. (K, STSE)
<b>OUTCOME / COURSE</b>	<b>SK.ES30.</b>	<b>Earth Science 30</b>
<b>FOCUS</b>	<b>ES30-AH.</b>	<b>Atmosphere and Hydrosphere</b>
<b>OUTCOME</b>	<b>ES30-AH1.</b>	<b>Correlate major changes in Earth's atmosphere over geologic time with corresponding changes in the biosphere and other components of the geosphere.</b>

INDICATOR	ES30-AH1.a.	Inquire as to the origins and sources of nitrogen, oxygen and other gases (e.g., argon, carbon dioxide, neon, helium and methane) in Earth's atmosphere. (K, S)
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INDICATOR	ES30-AH1.g.	Identify the role of atmospheric layers in protecting Earth's surface from extra-terrestrial dangers (e.g., ultraviolet light, solar wind and meteors) and insulating Earth thereby maintaining the Earth's magnetic field. (K)
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<b>OUTCOME / COURSE</b>	<b>SK.ES30.</b>	<b>Earth Science 30</b>
<b>FOCUS</b>	<b>ES30-AH.</b>	<b>Atmosphere and Hydrosphere</b>
<b>OUTCOME</b>	<b>ES30-AH3.</b>	<b>Investigate the impact of atmospheric and hydrospheric processes on society and the environment. [SI, DM]</b>

INDICATOR	ES30-AH3.d.	Assess the effectiveness of technologies (e.g., carbon capture, energy conservation and renewable energy) and policies (e.g., carbon pricing, taxation and financial incentives) that are intended to manage climate change. (STSE)
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**The Ontario Curriculum  
Mathematics  
Grade 12 - Adopted: 2007**

<b>STRAND / COURSE</b>		<b>Advanced Functions, Grade 12: University Preparation (MHF4U)</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>MHF4U.D.</b>	<b>Characteristics of Functions</b>
<b>STAGE / SKILLS</b>	<b>MHF4U.D.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>MHF4U.D.3.</b>	<b>Using Function Models to Solve Problems: By the end of this course, students will:</b>

EXPECTATION	MHF4U.D.3.3.	Solve problems, using a variety of tools and strategies, including problems arising from real-world applications, by reasoning with functions and by applying concepts and procedures involving functions (e.g., by constructing a function model from data, using the model to determine mathematical results, and interpreting and communicating the results within the context of the problem)
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<b>STRAND / COURSE</b>		<b>Calculus and Vectors, Grade 12: University Preparation (MCV4U)</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>MCV4U.B.</b>	<b>Derivatives and their Applications</b>
<b>STAGE / SKILLS</b>	<b>MCV4U.B.SE.</b>	<b>Specific Expectations</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION	MCV4U. B.2.	<b>Solving Problems Using Mathematical Models and Derivatives: By the end of this course, students will:</b>
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EXPECTATION MCV4U. B.2.4. Solve optimization problems involving polynomial, simple rational, and exponential functions drawn from a variety of applications, including those arising from real-world situations

STRAND / COURSE		<b>Calculus and Vectors, Grade 12: University Preparation (MCV4U)</b>
STRAND / OVERALL EXPECTATION	MCV4U. C.	<b>Geometry and Algebra of Vectors</b>
STAGE / SKILLS	MCV4U. C.OE.	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION MCV4U. C.3. Distinguish between the geometric representations of a single linear equation or a system of two linear equations in two-space and three-space, and determine different geometric configurations of lines and planes in three-space;

STRAND / COURSE		<b>Mathematics of Data Management, Grade 12: University Preparation (MDM4U)</b>
STRAND / OVERALL EXPECTATION	MDM4U. E.	<b>Culminating Data Management Investigation</b>
STAGE / SKILLS	MDM4U. E.SE.	<b>Specific Expectations</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION MDM4U. E.2. **Presenting and Critiquing the Culminating Investigation: By the end of this course, students will:**

EXPECTATION MDM4U. E.2.4. Critique the mathematical work of others in a constructive manner

STRAND / COURSE		<b>Mathematics for College Technology, Grade 12: College Preparation (MCT4C)</b>
STRAND / OVERALL EXPECTATION	MCT4C. B.	<b>Polynomial Functions</b>
STAGE / SKILLS	MCT4C. B.SE.	<b>Specific Expectations</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION MCT4C. B.3. **Solving Problems Involving Polynomial Equations: By the end of this course, students will:**

EXPECTATION MCT4C.B .3.6. Determine the value of a variable of degree no higher than three, using a formula drawn from an application, by first substituting known values and then solving for the variable, and by first isolating the variable and then substituting known values

STRAND / COURSE		<b>Foundations for College Mathematics, Grade 12: College Preparation (MAP4C)</b>
STRAND / OVERALL EXPECTATION	MAP4C. A.	<b>Mathematical Models</b>
STAGE / SKILLS	MAP4C. A.OE.	<b>Overall Expectations: By the end of this course, students will:</b>



SUB-ORGANIZER / SPECIFIC EXPECTATION MAP4C.A.3. Make connections between formulas and linear, quadratic, and exponential relations, solve problems using formulas arising from real-world applications, and describe applications of mathematical modelling in various occupations.

<b>STRAND / COURSE</b>		<b>Foundations for College Mathematics, Grade 12: College Preparation (MAP4C)</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>MAP4C.A.</b>	<b>Mathematical Models</b>
<b>STAGE / SKILLS</b>	<b>MAP4C.A.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>MAP4C.A.2.</b>	<b>Modelling Graphically: By the end of this course, students will:</b>

EXPECTATION MAP4C.A.2.6. Recognize that a linear model corresponds to a constant increase or decrease over equal intervals and that an exponential model corresponds to a constant percentage increase or decrease over equal intervals, select a model (i.e., linear, quadratic, exponential) to represent the relationship between numerical data graphically and algebraically, using a variety of tools (e.g., graphing technology) and strategies (e.g., finite differences, regression), and solve related problems

<b>STRAND / COURSE</b>		<b>Foundations for College Mathematics, Grade 12: College Preparation (MAP4C)</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>MAP4C.A.</b>	<b>Mathematical Models</b>
<b>STAGE / SKILLS</b>	<b>MAP4C.A.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>MAP4C.A.3.</b>	<b>Modelling Algebraically: By the end of this course, students will:</b>

EXPECTATION MAP4C.A.3.2. Determine the value of a variable of degree no higher than three, using a formula drawn from an application, by first substituting known values and then solving for the variable, and by first isolating the variable and then substituting known values

**The Ontario Curriculum  
Science  
Grade 11 - Adopted: 2008**

<b>STRAND / COURSE</b>	<b>ON.SBI3U</b>	<b>Biology, Grade 11 University Preparation SBI3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SBI3U.B</b>	<b>Diversity of Living Things</b>
<b>STAGE / SKILLS</b>	<b>SBI3U.B.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION SBI3U.B1. Analyse the effects of various human activities on the diversity of living things;

<b>STRAND / COURSE</b>	<b>ON.SBI3U</b>	<b>Biology, Grade 11 University Preparation SBI3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SBI3U.B</b>	<b>Diversity of Living Things</b>
<b>STAGE / SKILLS</b>	<b>SBI3U.B .SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SBI3U.B 1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>

EXPECTATION SBI3U.B1 .2. Analyse the impact that climate change might have on the diversity of living things (e.g., rising temperatures can result in habitat loss or expansion; changing rainfall levels can cause drought or flooding of habitats) [AI, C]

<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.B.</b>	<b>Matter, Chemical Trends, and Chemical Bonding</b>
<b>STAGE / SKILLS</b>	<b>SCH3U.B.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION SCH3U.B 1. Analyse the properties of commonly used chemical substances and their effects on human health and the environment, and propose ways to lessen their impact;

<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.C.</b>	<b>Chemical Reactions</b>
<b>STAGE / SKILLS</b>	<b>SCH3U.C.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION SCH3U.C 1. Analyse chemical reactions used in a variety of applications, and assess their impact on society and the environment;

SUB-ORGANIZER / SPECIFIC EXPECTATION SCH3U.C 3. Demonstrate an understanding of the different types of chemical reactions.

<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.C.</b>	<b>Chemical Reactions</b>
<b>STAGE / SKILLS</b>	<b>SCH3U.C.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH3U.C1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>

EXPECTATION	SCH3U.C 1.1.	Analyse, on the basis of research, chemical reactions used in various industrial processes (e.g., pulp and paper production, mining, chemical manufacturing) that can have an impact on the health and safety of local populations [IP, PR, AI, C]
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EXPECTATION	SCH3U.C 1.2.	Assess the effectiveness of some applications of chemical reactions that are used to address social and environmental needs and problems [AI, C]
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<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.C.</b>	<b>Chemical Reactions</b>
<b>STAGE / SKILLS</b>	<b>SCH3U.C.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH3U.C2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>

EXPECTATION	SCH3U.C 2.2.	Write balanced chemical equations to represent synthesis, decomposition, single displacement, double displacement, and combustion reactions, using the IUPAC nomenclature system [PR, AI, C]
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<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.C.</b>	<b>Chemical Reactions</b>
<b>STAGE / SKILLS</b>	<b>SCH3U.C.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH3U.C3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>

EXPECTATION	SCH3U.C 3.2.	Explain the difference between a complete combustion reaction and an incomplete combustion reaction (e.g., complete and incomplete combustion of hydrocarbon fuels)
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<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.D.</b>	<b>Quantities in Chemical Reactions</b>
<b>STAGE / SKILLS</b>	<b>SCH3U.D.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION	SCH3U.D 1.	Analyse processes in the home, the workplace, and the environmental sector that use chemical quantities and calculations, and assess the importance of quantitative accuracy in industrial chemical processes;
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<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.D.</b>	<b>Quantities in Chemical Reactions</b>
<b>STAGE / SKILLS</b>	<b>SCH3U.D.SE.</b>	<b>Specific Expectations</b>

<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH3U.D1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>
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EXPECTATION	SCH3U.D 1.1.	Analyse processes in the home, the workplace, and the environmental sector that involve the use of chemical quantities and calculations (e.g., mixing household cleaning solutions, calculating chemotherapy doses, monitoring pollen counts) [AI, C]
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EXPECTATION	SCH3U.D 1.2.	Assess, on the basis of research, the importance of quantitative accuracy in industrial chemical processes and the potential impact on the environment if quantitative accuracy is not observed [IP, PR, AI, C]
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<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.F.</b>	<b>Gases and Atmospheric Chemistry</b>
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<b>STAGE / SKILLS</b>	<b>SCH3U.F.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>
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SUB-ORGANIZER / SPECIFIC EXPECTATION	SCH3U.F 1.	Analyse the cumulative effects of human activities and technologies on air quality, and describe some Canadian initiatives to reduce air pollution, including ways to reduce their own carbon footprint;
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<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.F.</b>	<b>Gases and Atmospheric Chemistry</b>
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<b>STAGE / SKILLS</b>	<b>SCH3U.F.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH3U.F1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>
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EXPECTATION	SCH3U.F 1.1.	Analyse the effects on air quality of some technologies and human activities (e.g., smelting; driving gas-powered vehicles), including their own activities, and propose actions to reduce their personal carbon footprint [AI, C]
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EXPECTATION	SCH3U.F 1.2.	Assess air quality conditions for a given Canadian location, using Environment Canada's Air Quality Health Index, and report on some Canadian initiatives to improve air quality and reduce greenhouse gases (e.g., Ontario's Drive Clean program to control vehicle emissions) [AI, C]
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<b>STRAND / COURSE</b>	<b>ON.SCH3U.</b>	<b>Chemistry, Grade 11 University Preparation SCH3U</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH3U.F.</b>	<b>Gases and Atmospheric Chemistry</b>
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<b>STAGE / SKILLS</b>	<b>SCH3U.F.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH3U.F3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>
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EXPECTATION	SCH3U.F 3.1.	Identify the major and minor chemical components of Earth's atmosphere
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<b>STRAND / COURSE</b>	<b>ON.SVN3M.</b>	<b>Environmental Science, Grade 11 University/College Preparation SVN3M</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3M.B.</b>	<b>Scientific Solutions to Contemporary Environmental Challenges</b>
<b>STAGE / SKILLS</b>	<b>SVN3M.B.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION SVN3M.B 1. Analyse social and economic issues related to an environmental challenge, and how societal needs influence scientific endeavours related to the environment;

SUB-ORGANIZER / SPECIFIC EXPECTATION SVN3M.B 3. Demonstrate an understanding of major contemporary environmental challenges and how we acquire knowledge about them.

<b>STRAND / COURSE</b>	<b>ON.SVN3M.</b>	<b>Environmental Science, Grade 11 University/College Preparation SVN3M</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3M.B.</b>	<b>Scientific Solutions to Contemporary Environmental Challenges</b>
<b>STAGE / SKILLS</b>	<b>SVN3M.B.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3M.B1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>

EXPECTATION SVN3M.B 1.1. Analyse, on the basis of research, social and economic issues related to a particular environmental challenge (e.g., overfishing, deforestation, acid rain, melting of the polar ice cap) and to efforts to address it [IP, PR, AI, C]

EXPECTATION SVN3M.B 1.2. Analyse ways in which societal needs or demands have influenced scientific endeavours related to the environment (e.g., the development of drought- and pest-resistant crops to address the rising global need for food; research into alternative energy sources in response to demands to address the impact on climate change of burning fossil fuels) [AI, C]

<b>STRAND / COURSE</b>	<b>ON.SVN3M.</b>	<b>Environmental Science, Grade 11 University/College Preparation SVN3M</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3M.B.</b>	<b>Scientific Solutions to Contemporary Environmental Challenges</b>
<b>STAGE / SKILLS</b>	<b>SVN3M.B.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3M.B2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>

EXPECTATION SVN3M.B 2.1. Use appropriate terminology related to the application of scientific knowledge and procedures to environmental issues, including, but not limited to: fact, inference, paradigm, objectivity, and causality [C]

<b>STRAND / COURSE</b>	<b>ON.SVN3M.</b>	<b>Environmental Science, Grade 11 University/College Preparation SVN3M</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3M. B.</b>	<b>Scientific Solutions to Contemporary Environmental Challenges</b>
<b>STAGE / SKILLS</b>	<b>SVN3M. B.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3M. B3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>
EXPECTATION	SVN3M.B 3.1.	Identify some major contemporary environmental challenges (e.g., global warming, acid precipitation), and explain their causes (e.g., deforestation, carbon and sulfur emissions) and effects (e.g., desertification, the creation of environmental refugees, the destruction of aquatic and terrestrial habitats)
EXPECTATION	SVN3M.B 3.2.	Describe how scientists use a variety of processes (e.g., environmental impact assessments, environmental scans) to solve problems and answer questions related to the environment
EXPECTATION	SVN3M.B 3.3.	Explain how new evidence affects scientific knowledge about the environment and leads to modifications of theory and/or shifts in paradigms (e.g., the impact of evidence of the effects of carbon dioxide emissions on theories of global warming)
EXPECTATION	SVN3M.B 3.4.	Explain how an environmental challenge has led to advances in science or technology (e.g., scrubbers on smokestacks to decrease sulfur dioxide emissions, hybrid cars)
EXPECTATION	SVN3M.B 3.5.	Describe a variety of human activities that have led to environmental problems (e.g., burning fossil fuels for transportation or power generation; waste disposal) and/or contributed to their solution (e.g., the development of renewable sources of energy; programs to reduce, reuse, and recycle)
<b>STRAND / COURSE</b>	<b>ON.SVN3 M.</b>	<b>Environmental Science, Grade 11 University/College Preparation SVN3M</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3M. C.</b>	<b>Human Health and the Environment</b>
<b>STAGE / SKILLS</b>	<b>SVN3M. C.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>
SUB-ORGANIZER / SPECIFIC EXPECTATION	SVN3M.C 1.	Analyse initiatives, both governmental and non-governmental, that are intended to reduce the impact of environmental factors on human health;
SUB-ORGANIZER / SPECIFIC EXPECTATION	SVN3M.C 2.	Investigate environmental factors that can affect human health, and analyse related data;
SUB-ORGANIZER / SPECIFIC EXPECTATION	SVN3M.C 3.	Demonstrate an understanding of various environmental factors that can affect human health, and explain how the impact of these factors can be reduced.
<b>STRAND / COURSE</b>	<b>ON.SVN3 M.</b>	<b>Environmental Science, Grade 11 University/College Preparation SVN3M</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3M. F.</b>	<b>Conservation of Energy</b>

<b>STAGE / SKILLS</b>	<b>SVN3M.F.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>
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SUB-ORGANIZER / SPECIFIC EXPECTATION	SVN3M.F.1.	Assess the impact on society and the environment of the use of various renewable and non-renewable energy sources, and propose a plan to reduce energy consumption;
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SUB-ORGANIZER / SPECIFIC EXPECTATION	SVN3M.F.3.	Demonstrate an understanding of energy production, consumption, and conservation with respect to a variety of renewable and non-renewable sources.
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<b>STRAND / COURSE</b>	<b>ON.SVN3M.</b>	<b>Environmental Science, Grade 11 University/College Preparation SVN3M</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3M.F.</b>	<b>Conservation of Energy</b>
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<b>STAGE / SKILLS</b>	<b>SVN3M.F.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3M.F1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>
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EXPECTATION	SVN3M.F.1.1.	Evaluate the impact on the environment of renewable and non-renewable energy sources, and propose an environmentally friendly solution to reduce non-renewable energy consumption (e.g., a plan for broader use of hybrid cars or solar panels) [AI, C]
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EXPECTATION	SVN3M.F.1.2.	Assess the costs and benefits to society of the use of renewable and non-renewable energy sources, using a variety of criteria (e.g., associated health concerns, reliability, ability to meet demand, start-up and production costs) [AI, C]
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<b>STRAND / COURSE</b>	<b>ON.SVN3M.</b>	<b>Environmental Science, Grade 11 University/College Preparation SVN3M</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3M.F.</b>	<b>Conservation of Energy</b>
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<b>STAGE / SKILLS</b>	<b>SVN3M.F.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3M.F2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>
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EXPECTATION	SVN3M.F.2.4.	Design and construct a working model of a device that uses an alternative energy source (e.g., a wind generator, a solar-powered car, a "fan boat") [IP, PR]
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<b>STRAND / COURSE</b>	<b>ON.SVN3M.</b>	<b>Environmental Science, Grade 11 University/College Preparation SVN3M</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3M.F.</b>	<b>Conservation of Energy</b>
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<b>STAGE / SKILLS</b>	<b>SVN3M.F.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3M.F3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>
EXPECTATION	SVN3M.F3.1.	Explain the historical significance of a variety of energy sources (e.g., whale oil, coal), and describe their long-term impact on the environment
EXPECTATION	SVN3M.F3.3.	Explain the basic principles and characteristics of various types of renewable (e.g., tidal, geothermal, solar, wind) and non-renewable (e.g., coal, oil, gas) energy production and their impact on the environment
EXPECTATION	SVN3M.F3.4.	Describe methods of energy production and conservation intended to reduce greenhouse gas emissions (e.g., energy production methods at the Prince Edward Island Wind-Hydrogen Village; charging higher prices for energy used during peak hours)

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.B.</b>	<b>Human Impact on the Environment</b>
<b>STAGE / SKILLS</b>	<b>SVN3E.B.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION SVN3E.B1. Analyse selected current environmental problems in terms of the role human activities have played in creating or perpetuating them, and propose possible solutions to one such problem;

SUB-ORGANIZER / SPECIFIC EXPECTATION SVN3E.B3. Demonstrate an understanding of some of the ways in which human activities affect the environment and how the impact of those activities is measured and monitored.

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.B.</b>	<b>Human Impact on the Environment</b>
<b>STAGE / SKILLS</b>	<b>SVN3E.B.SE.</b>	<b>Specific Expectations</b>

**SUB-ORGANIZER / SPECIFIC EXPECTATION SVN3E.B1. Relating Science to Technology, Society, and the Environment: By the end of this course, students will:**

EXPECTATION SVN3E.B1.1. Propose possible solutions, on the basis of research, to a current practical environmental problem that is caused, directly or indirectly, by human activities [IP, PR, AI, C]

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.B.</b>	<b>Human Impact on the Environment</b>
<b>STAGE / SKILLS</b>	<b>SVN3E.B.SE.</b>	<b>Specific Expectations</b>



<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3E.B2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>
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EXPECTATION SVN3E.B2.1. Use appropriate terminology relating to the environmental impact of human activity, including, but not limited to: carbon footprint, carbon neutral, biodegradable, biodiversity, carrying capacity, sustainability, and invasive and native species [C]

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.B.</b>	<b>Human Impact on the Environment</b>
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<b>STAGE / SKILLS</b>	<b>SVN3E.B.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3E.B3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>
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EXPECTATION SVN3E.B3.4. Explain the concept of a "carbon footprint" and how it is used to measure the impact on the environment of a range of human activities

EXPECTATION SVN3E.B3.5. Explain the effects of human activity on an aquatic or terrestrial ecosystem (e.g., the impact of fertilizer run-off, acid precipitation, or an oil spill on an aquatic ecosystem)

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.C.</b>	<b>Human Health and the Environment</b>
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<b>STAGE / SKILLS</b>	<b>SVN3E.C.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>
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SUB-ORGANIZER / SPECIFIC EXPECTATION SVN3E.C3. Demonstrate an understanding of the ways in which environmental factors can affect human health and how their impact can be reduced.

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.C.</b>	<b>Human Health and the Environment</b>
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<b>STAGE / SKILLS</b>	<b>SVN3E.C.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3E.C2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>
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EXPECTATION SVN3E.C2.1. Use appropriate vocabulary related to human health and the environment, including, but not limited to: smog, environmental contaminants, pathogens, inhalation, ingestion, and absorption [C]

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.D.</b>	<b>Energy Conservation</b>
<b>STAGE / SKILLS</b>	<b>SVN3E.D.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION  
 SVN3E.D 1. Evaluate initiatives and technological innovations related to energy consumption and conservation, and assess their impact on personal lifestyles, social attitudes, and the environment;

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.D.</b>	<b>Energy Conservation</b>
<b>STAGE / SKILLS</b>	<b>SVN3E.D.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3E.D1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>

EXPECTATION  
 SVN3E.D 1.2. Evaluate, on the basis of research, some of the advantages or disadvantages of technological innovations that contribute to the production of renewable energy and/or aid in conservation (e.g., bio-oil, biodiesel, wind turbines, improved insulation, programmable thermostats) [IP, PR, AI, C]

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.D.</b>	<b>Energy Conservation</b>
<b>STAGE / SKILLS</b>	<b>SVN3E.D.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3E.D2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>

EXPECTATION  
 SVN3E.D 2.1. Use appropriate terminology related to energy conservation and consumption, including, but not limited to: conventional source, alternative source, efficiency, watt, kilowatt-hour [kWh], joule, BTU, gas meter, electric meter, thermostat, and EnerGuide [C]

EXPECTATION  
 SVN3E.D 2.4. Conduct a risk-benefit analysis of different types of electricity generation (e.g., fossil fuel, hydro, nuclear, wind, and/or solar power) [PR, AI]

<b>STRAND / COURSE</b>	<b>ON.SVN3E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.D.</b>	<b>Energy Conservation</b>
<b>STAGE / SKILLS</b>	<b>SVN3E.D.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3E.D3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>

EXPECTATION	SVN3E.D 3.1.	Explain the basic principles and characteristics of various types of power generation from nonrenewable sources (e.g., coal, oil, natural gas, nuclear) and renewable sources (e.g., hydroelectric, tidal, geothermal, solar, wind, hydrogen fuel cells)
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EXPECTATION	SVN3E.D 3.2.	Compare and contrast renewable and nonrenewable energy sources, using criteria such as availability, cost, and environmental impact (e.g., compare a fossil fuel and geothermal energy, using a graphic organizer)
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<b>STRAND / COURSE</b>	<b>ON.SVN3 E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.E .</b>	<b>Natural Resource Science and Management</b>
<b>STAGE / SKILLS</b>	<b>SVN3E.E.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION	SVN3E.E 2.	Investigate methods scientists use to classify and monitor natural resources, and conduct investigations using those methods;
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<b>STRAND / COURSE</b>	<b>ON.SVN3 E.</b>	<b>Environmental Science, Grade 11 Workplace Preparation SVN3E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SVN3E.E .</b>	<b>Natural Resource Science and Management</b>
<b>STAGE / SKILLS</b>	<b>SVN3E.E.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SVN3E.E 3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>

EXPECTATION	SVN3E.E 3.1.	Describe the main types of natural resources found in Canada (e.g., forests, minerals, fisheries, wildlife, water, fossil fuels)
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<b>STRAND / COURSE</b>	<b>ON.SPH3 U.</b>	<b>Physics, Grade 11 University Preparation SPH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH3U.A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
<b>STAGE / SKILLS</b>	<b>SPH3U.A.OE.</b>	<b>Overall Expectations: Throughout this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION	SPH3U.A 1.	Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);
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<b>STRAND / COURSE</b>	<b>ON.SPH3 U.</b>	<b>Physics, Grade 11 University Preparation SPH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH3U.A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
<b>STAGE / SKILLS</b>	<b>SPH3U.A.SE.</b>	<b>Specific Expectations</b>

<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SPH3U.A1.</b>	<b>Scientific Investigation Skills: Throughout this course, students will:</b>
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EXPECTATION    SPH3U.A 1.11.    Communicating [C]: Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models)

<b>STRAND / COURSE</b>	<b>ON.SPH3U.</b>	<b>Physics, Grade 11 University Preparation SPH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH3U.D.</b>	<b>Energy and Society</b>
<b>STAGE / SKILLS</b>	<b>SPH3U.D.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION    SPH3U.D 1.    Analyse technologies that apply principles of and concepts related to energy transformations, and assess the technologies' social and environmental impact;

SUB-ORGANIZER / SPECIFIC EXPECTATION    SPH3U.D 2.    Investigate energy transformations and the law of conservation of energy, and solve related problems;

<b>STRAND / COURSE</b>	<b>ON.SPH3U.</b>	<b>Physics, Grade 11 University Preparation SPH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH3U.F</b>	<b>Electricity and Magnetism</b>
<b>STAGE / SKILLS</b>	<b>SPH3U.F.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION    SPH3U.F 1.    Analyse the social, economic, and environmental impact of electrical energy production and technologies related to electromagnetism, and propose ways to improve the sustainability of electrical energy production;

<b>STRAND / COURSE</b>	<b>ON.SPH3U.</b>	<b>Physics, Grade 11 University Preparation SPH3U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH3U.F</b>	<b>Electricity and Magnetism</b>
<b>STAGE / SKILLS</b>	<b>SPH3U.F.SE.</b>	<b>Specific Expectations</b>

**SUB-ORGANIZER / SPECIFIC EXPECTATION**    **SPH3U.F 3.**    **Understanding Basic Concepts: By the end of this course, students will:**

EXPECTATION    SPH3U.F 3.4.    Explain Ohm's law, Kirchhoff's laws, Oersted's principle, the motor principle, Faraday's law, and Lenz's law in relation to electricity and magnetism

EXPECTATION    SPH3U.F 3.5.    Describe the production and interaction of magnetic fields, using diagrams and the principles of electromagnetism (e.g., Oersted's principle, the motor principle, Faraday's law, Lenz's law)

EXPECTATION SPH3U.F 3.6. Explain the operation of an electric motor and a generator, including the roles of their respective components

**The Ontario Curriculum  
Science  
Grade 12 - Adopted: 2008**

<b>STRAND / COURSE</b>	<b>ON.SPH4U.</b>	<b>Physics, Grade 12 University Preparation SPH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4U.A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
<b>STAGE / SKILLS</b>	<b>SPH4U.A.OE.</b>	<b>Overall Expectations: Throughout this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION SPH4U.A.1. Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);

<b>STRAND / COURSE</b>	<b>ON.SPH4U.</b>	<b>Physics, Grade 12 University Preparation SPH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4U.A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
<b>STAGE / SKILLS</b>	<b>SPH4U.A.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SPH4U.A1.</b>	<b>Scientific Investigation Skills: Throughout this course, students will:</b>

EXPECTATION SPH4U.A.1.11. Communicating [C]: Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models)

<b>STRAND / COURSE</b>	<b>ON.SPH4U.</b>	<b>Physics, Grade 12 University Preparation SPH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4U.B.</b>	<b>Dynamics</b>
<b>STAGE / SKILLS</b>	<b>SPH4U.B.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION SPH4U.B.1. Analyse technological devices that apply the principles of the dynamics of motion, and assess the technologies' social and environmental impact;

<b>STRAND / COURSE</b>	<b>ON.SPH4U.</b>	<b>Physics, Grade 12 University Preparation SPH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4U.C.</b>	<b>Energy and Momentum</b>
<b>STAGE / SKILLS</b>	<b>SPH4U.C.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION	SPH4U.C 1.	Analyse, and propose ways to improve, technologies or procedures that apply principles related to energy and momentum, and assess the social and environmental impact of these technologies or procedures;
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<b>STRAND / COURSE</b>	<b>ON.SPH4C.</b>	<b>Physics, Grade 12 College Preparation SPH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4C.A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
<b>STAGE / SKILLS</b>	<b>SPH4C.A.OE.</b>	<b>Overall Expectations: Throughout this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION	SPH4C.A 1.	Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);
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<b>STRAND / COURSE</b>	<b>ON.SPH4C.</b>	<b>Physics, Grade 12 College Preparation SPH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4C.A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
<b>STAGE / SKILLS</b>	<b>SPH4C.A.SE.</b>	<b>Specific Expectations</b>

<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SPH4C.A1.</b>	<b>Scientific Investigation Skills: Throughout this course, students will:</b>
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EXPECTATION	SPH4C.A 1.11.	Communicating [C]: Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models)
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<b>STRAND / COURSE</b>	<b>ON.SPH4C.</b>	<b>Physics, Grade 12 College Preparation SPH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4C.B.</b>	<b>Motion and Its Applications</b>
<b>STAGE / SKILLS</b>	<b>SPH4C.B.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION	SPH4C.B 1.	Analyse selected technologies that are used to move objects or track their motion, and evaluate their impact on society and the environment, including their contribution to scientific knowledge;
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<b>STRAND / COURSE</b>	<b>ON.SPH4C.</b>	<b>Physics, Grade 12 College Preparation SPH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4C.B.</b>	<b>Motion and Its Applications</b>
<b>STAGE / SKILLS</b>	<b>SPH4C.B.SE.</b>	<b>Specific Expectations</b>

<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SPH4C.B1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>
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EXPECTATION	SPH4C.B 1.1.	Analyse the design and uses of a transportation technology (e.g., snowmobiles, automobiles, motorized personal water craft), and evaluate its social and environmental impact, including the impact on risk behaviour and accident rates [A], [C]
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<b>STRAND / COURSE</b>	<b>ON.SPH4C.</b>	<b>Physics, Grade 12 College Preparation SPH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4C.D.</b>	<b>Electricity and Magnetism</b>
<b>STAGE / SKILLS</b>	<b>SPH4C.D.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SPH4C.D2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>

EXPECTATION	SPH4C.D 2.1.	Use appropriate terminology related to electricity and magnetism, including, but not limited to: direct current, alternating current, electrical potential difference, resistance, power, energy, permanent magnet, electromagnet, magnetic field, motor principle, and electric motor [C]
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EXPECTATION	SPH4C.D 2.7.	Construct, or deconstruct and explain the components of, a basic electric device (e.g., a DC motor, a water-level detector) [PR, C]
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<b>STRAND / COURSE</b>	<b>ON.SPH4C.</b>	<b>Physics, Grade 12 College Preparation SPH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4C.D.</b>	<b>Electricity and Magnetism</b>
<b>STAGE / SKILLS</b>	<b>SPH4C.D.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SPH4C.D3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>

EXPECTATION	SPH4C.D 3.8.	State the motor principle, and use the right-hand rule to explain the direction of the force experienced by a conductor
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EXPECTATION	SPH4C.D 3.9.	Explain, using diagrams, the components and operation of a DC electric motor
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EXPECTATION	SPH4C.D 3.10.	Compare and contrast direct current and alternating current (AC) in qualitative terms (e.g., the difference between DC and AC motors), and describe situations in which each is used
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<b>STRAND / COURSE</b>	<b>ON.SPH4C.</b>	<b>Physics, Grade 12 College Preparation SPH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4C.E.</b>	<b>Energy Transformations</b>
<b>STAGE / SKILLS</b>	<b>SPH4C.E.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SPH4C.E1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>

EXPECTATION	SPH4C.E 1.1.	Analyse an energy-transformation technology (e.g., wind turbines, refrigerators, telephones, steam engines, coal-fired electrical plants), and evaluate its impact on society and the environment [AI, C]
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EXPECTATION	SPH4C.E 1.2.	Propose a course of practical action to improve the sustainability of an energy-transformation technology (e.g., solar panels, internal combustion engines, fuel cells, air conditioners) [PR, AI, C]
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<b>STRAND / COURSE</b>	<b>ON.SPH4C.</b>	<b>Physics, Grade 12 College Preparation SPH4C</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SPH4C.E.</b>	<b>Energy Transformations</b>
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<b>STAGE / SKILLS</b>	<b>SPH4C.E.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SPH4C.E3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>
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EXPECTATION	SPH4C.E 3.3.	Describe, with the aid of diagrams, the operation of selected energy-transformation technologies (e.g., wind turbines, photoelectric cells, heat engines)
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EXPECTATION	SPH4C.E 3.5.	Describe a variety of renewable and nonrenewable sources of energy (e.g., solar energy, fossil fuels, hydroelectric energy, energy generated from biomass), and identify the strengths and weaknesses of each
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<b>STRAND / COURSE</b>	<b>ON.SNC4M.</b>	<b>Science, Grade 12 University/College Preparation SNC4M</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SNC4M.A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
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<b>STAGE / SKILLS</b>	<b>SNC4M.A.OE.</b>	<b>Overall Expectations: Throughout this course, students will:</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SNC4M.A1.</b>	<b>Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);</b>
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<b>STRAND / COURSE</b>	<b>ON.SNC4M.</b>	<b>Science, Grade 12 University/College Preparation SNC4M</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SNC4M.A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
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<b>STAGE / SKILLS</b>	<b>SNC4M.A.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SNC4M.A1.</b>	<b>Scientific Investigation Skills: Throughout this course, students will:</b>
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EXPECTATION	SNC4M.A1.2.	Initiating and Planning [IP]: Select appropriate instruments (e.g., respirometer, titration apparatus) and materials (e.g., prepared slides, Petri dishes, food samples), and identify appropriate methods, techniques, and procedures, for each inquiry
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EXPECTATION	SNC4M.A1.11.	Communicating [C]: Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models)
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<b>STRAND / COURSE</b>	<b>ON.SNC4 E.</b>	<b>Science, Grade 12 Workplace Preparation SNC4E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SNC4E. A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
<b>STAGE / SKILLS</b>	<b>SNC4E. A.OE.</b>	<b>Overall Expectations: Throughout this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION      SNC4E.A 1.      Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);

<b>STRAND / COURSE</b>	<b>ON.SNC4 E.</b>	<b>Science, Grade 12 Workplace Preparation SNC4E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SNC4E. A.</b>	<b>Scientific Investigation Skills and Career Exploration</b>
<b>STAGE / SKILLS</b>	<b>SNC4E. A.SE.</b>	<b>Specific Expectations</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION      SNC4E. A1.      **Scientific Investigation Skills: Throughout this course, students will:**

EXPECTATION      SNC4E.A 1.2.      Initiating and Planning [IP]: Select appropriate instruments (e.g., a decibel meter, spot plates, glassware, thermometers) and materials (e.g., a heat lamp, agar plates, circuit boards), and identify appropriate methods, techniques, and procedures, for each inquiry

EXPECTATION      SNC4E.A 1.5.      Performing and Recording [PR]: Conduct inquiries, controlling relevant variables, adapting or extending procedures as required, and using appropriate materials and equipment safely, accurately, and effectively, to collect observations and data

EXPECTATION      SNC4E.A 1.11.      Communicating [C]: Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models)

<b>STRAND / COURSE</b>	<b>ON.SNC4 E.</b>	<b>Science, Grade 12 Workplace Preparation SNC4E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SNC4E. C.</b>	<b>Chemicals in Consumer Products</b>
<b>STAGE / SKILLS</b>	<b>SNC4E. C.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION      SNC4E.C 1.      Analyse chemical products used in the home and workplace, and issues related to their safe and environmentally responsible use and disposal;

SUB-ORGANIZER / SPECIFIC EXPECTATION      SNC4E.C 2.      Investigate chemical properties of, and chemical reactions used to produce, various consumer products;

SUB-ORGANIZER / SPECIFIC EXPECTATION	SNC4E.C.3.	Demonstrate an understanding of chemical reactions, and of properties of chemicals used in common household and workplace products.
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<b>STRAND / COURSE</b>	<b>ON.SNC4E.</b>	<b>Science, Grade 12 Workplace Preparation SNC4E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SNC4E.C.</b>	<b>Chemicals in Consumer Products</b>
<b>STAGE / SKILLS</b>	<b>SNC4E.C.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SNC4E.C1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>

EXPECTATION	SNC4E.C.1.1.	Analyse, on the basis of research, a chemical product used in a particular profession or in the home (e.g., pool chemicals, chlorine bleach, hair dye), and prepare guidelines for safe and responsible use of the product [IP, PR, AI, C]
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EXPECTATION	SNC4E.C.1.2.	Assess the environmental consequences of improper disposal of chemical products commonly used in the home (e.g., pouring paint down the drain; dumping batteries in garbage destined for landfill sites) [AI, C]
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EXPECTATION	SNC4E.C.1.3.	Evaluate the appropriateness of current disposal practices in their home, at school, or in the community, with particular reference to the disposal of chemical waste [AI, C]
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<b>STRAND / COURSE</b>	<b>ON.SNC4E.</b>	<b>Science, Grade 12 Workplace Preparation SNC4E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SNC4E.C.</b>	<b>Chemicals in Consumer Products</b>
<b>STAGE / SKILLS</b>	<b>SNC4E.C.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SNC4E.C2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>

EXPECTATION	SNC4E.C.2.6.	Investigate a variety of consumer products within a given category (e.g., shampoo, window cleaner, disinfectant), focusing on products claiming to be environmentally friendly, and analyse them with respect to selected factors (e.g., cost, effectiveness, impact on the environment) [PR, AI, C]
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<b>STRAND / COURSE</b>	<b>ON.SNC4E.</b>	<b>Science, Grade 12 Workplace Preparation SNC4E</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SNC4E.E.</b>	<b>Electricity at Home and Work</b>
<b>STAGE / SKILLS</b>	<b>SNC4E.E.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SNC4E.E2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>

EXPECTATION	SNC4E.E 2.3.	Build a simple electrical device or circuit (e.g., a loudspeaker, an electric motor, a D-cell, a circuit containing a 40W lightbulb and a dimmer switch), following a clear set of instructions and diagrams, and using appropriate tools safely [PR]
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<b>STRAND / COURSE</b>	<b>ON.SCH4U.</b>	<b>Chemistry, Grade 12 University Preparation SCH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4U.B.</b>	<b>Organic Chemistry</b>
<b>STAGE / SKILLS</b>	<b>SCH4U.B.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION	SCH4U.B 1.	Assess the social and environmental impact of organic compounds used in everyday life, and propose a course of action to reduce the use of compounds that are harmful to human health and the environment;
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<b>STRAND / COURSE</b>	<b>ON.SCH4U.</b>	<b>Chemistry, Grade 12 University Preparation SCH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4U.B.</b>	<b>Organic Chemistry</b>
<b>STAGE / SKILLS</b>	<b>SCH4U.B.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4U.B1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>

EXPECTATION	SCH4U.B 1.1.	Assess the impact on human health, society, and the environment of organic compounds used in everyday life (e.g., polymers, nutritional supplements, food additives, pharmaceuticals, pesticides) [A1, C]
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<b>STRAND / COURSE</b>	<b>ON.SCH4U.</b>	<b>Chemistry, Grade 12 University Preparation SCH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4U.C.</b>	<b>Structure and Properties of Matter</b>
<b>STAGE / SKILLS</b>	<b>SCH4U.C.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION	SCH4U.C 1.	Assess the benefits to society and evaluate the environmental impact of products and technologies that apply principles related to the structure and properties of matter;
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<b>STRAND / COURSE</b>	<b>ON.SCH4U.</b>	<b>Chemistry, Grade 12 University Preparation SCH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4U.C.</b>	<b>Structure and Properties of Matter</b>
<b>STAGE / SKILLS</b>	<b>SCH4U.C.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4U.C1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>

EXPECTATION	SCH4U.C 1.1.	Assess the benefits to society of technologies that are based on the principles of atomic and molecular structures (e.g., magnetic resonance imaging [MRI], infrared spectroscopy, X-ray crystallography, nuclear energy, medical applications of spectroscopy and mass spectrometry) [AI, C]
EXPECTATION	SCH4U.C 1.2.	Evaluate the benefits to society, and the impact on the environment, of specialized materials that have been created on the basis of scientific research into the structure of matter and chemical bonding (e.g., bulletproof fabric, nanotechnologies, superconductors, instant adhesives) [AI, C]
<b>STRAND / COURSE</b>	<b>ON.SCH4U.</b>	<b>Chemistry, Grade 12 University Preparation SCH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4U.D.</b>	<b>Energy Changes and Rates of Reaction</b>
<b>STAGE / SKILLS</b>	<b>SCH4U.D.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>
SUB-ORGANIZER / SPECIFIC EXPECTATION	SCH4U.D 2.	Investigate and analyse energy changes and rates of reaction in physical and chemical processes, and solve related problems;
SUB-ORGANIZER / SPECIFIC EXPECTATION	SCH4U.D 3.	Demonstrate an understanding of energy changes and rates of reaction.
<b>STRAND / COURSE</b>	<b>ON.SCH4U.</b>	<b>Chemistry, Grade 12 University Preparation SCH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4U.D.</b>	<b>Energy Changes and Rates of Reaction</b>
<b>STAGE / SKILLS</b>	<b>SCH4U.D.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4U.D1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>
EXPECTATION	SCH4U.D 1.1.	Analyse some conventional and alternative energy technologies (e.g., fossil fuel-burning power plants, hydro-powered generators, solar panels, wind turbines, fuel cells), and evaluate them in terms of their efficiency and impact on the environment [AI, C]
<b>STRAND / COURSE</b>	<b>ON.SCH4U.</b>	<b>Chemistry, Grade 12 University Preparation SCH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4U.D.</b>	<b>Energy Changes and Rates of Reaction</b>
<b>STAGE / SKILLS</b>	<b>SCH4U.D.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4U.D2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>
EXPECTATION	SCH4U.D 2.2.	Write thermochemical equations, expressing the energy change as a change in H value or as a heat term in the equation [AI, C]

<b>STRAND / COURSE</b>	<b>ON.SCH4U.</b>	<b>Chemistry, Grade 12 University Preparation SCH4U</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4U.D.</b>	<b>Energy Changes and Rates of Reaction</b>
<b>STAGE / SKILLS</b>	<b>SCH4U.D.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4U.D3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>

EXPECTATION SCH4U.D.3.1. Compare the energy changes resulting from physical change (e.g., boiling water), chemical reactions (e.g., bleaching a stain), and nuclear reactions (e.g., fission, fusion), in terms of whether energy is released or absorbed

EXPECTATION SCH4U.D.3.2. Compare the energy change from a reaction in which bonds are formed to one in which bonds are broken, and explain these changes in terms of endothermic and exothermic reactions

<b>STRAND / COURSE</b>	<b>ON.SCH4C.</b>	<b>Chemistry, Grade 12 College Preparation SCH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4C.B.</b>	<b>Matter and Qualitative Analysis</b>
<b>STAGE / SKILLS</b>	<b>SCH4C.B.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4C.B1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>

EXPECTATION SCH4C.B.1.1. Evaluate the risks and benefits to the environment of some commonly used chemical substances (e.g., substances used in fireworks, fire extinguishers, "green" cleaning products) [A1, C]

<b>STRAND / COURSE</b>	<b>ON.SCH4C.</b>	<b>Chemistry, Grade 12 College Preparation SCH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4C.C.</b>	<b>Organic Chemistry</b>
<b>STAGE / SKILLS</b>	<b>SCH4C.C.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>

SUB-ORGANIZER / SPECIFIC EXPECTATION SCH4C.C1. Evaluate the impact on society, human health, and the environment of products made using organic compounds;

SUB-ORGANIZER / SPECIFIC EXPECTATION SCH4C.C2. Investigate the physical and chemical properties of organic compounds, and analyse some common organic chemical reactions;

<b>STRAND / COURSE</b>	<b>ON.SCH4C.</b>	<b>Chemistry, Grade 12 College Preparation SCH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4C.C.</b>	<b>Organic Chemistry</b>

<b>STAGE / SKILLS</b>	<b>SCH4C.C.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4C.C2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>

EXPECTATION SCH4C.C2.6. Conduct an inquiry to identify some of the products of the combustion of a hydrocarbon and an alcohol [PR, AI]

<b>STRAND / COURSE</b>	<b>ON.SCH4C.</b>	<b>Chemistry, Grade 12 College Preparation SCH4C</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4C.E.</b>	<b>Chemical Calculations</b>
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<b>STAGE / SKILLS</b>	<b>SCH4C.E.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4C.E2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>
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EXPECTATION SCH4C.E2.7. Use qualitative observations of a chemical reaction to identify the chemical changes, presence of limiting reagents, and the products occurring in a chemical reaction (e.g., aluminum reacting with copper(II) chloride solution, steel wool reacting with oxygen) [PR, AI]

<b>STRAND / COURSE</b>	<b>ON.SCH4C.</b>	<b>Chemistry, Grade 12 College Preparation SCH4C</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4C.F.</b>	<b>Chemistry in the Environment</b>
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<b>STAGE / SKILLS</b>	<b>SCH4C.F.OE.</b>	<b>Overall Expectations: By the end of this course, students will:</b>
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SUB-ORGANIZER / SPECIFIC EXPECTATION SCH4C.F1. Evaluate the importance of government regulations, scientific analyses, and individual actions in improving air and water quality, and propose a personal plan of action to support these efforts;

SUB-ORGANIZER / SPECIFIC EXPECTATION SCH4C.F3. Demonstrate an understanding of chemical reactions that occur in the environment as a result of both natural processes and human activities.

<b>STRAND / COURSE</b>	<b>ON.SCH4C.</b>	<b>Chemistry, Grade 12 College Preparation SCH4C</b>
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<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4C.F.</b>	<b>Chemistry in the Environment</b>
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<b>STAGE / SKILLS</b>	<b>SCH4C.F.SE.</b>	<b>Specific Expectations</b>
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<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4C.F1.</b>	<b>Relating Science to Technology, Society, and the Environment: By the end of this course, students will:</b>
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EXPECTATION SCH4C.F1.1. Evaluate, on the basis of research, the effectiveness of government initiatives or regulations (e.g., the Great Lakes Action Plan), and the actions of individuals (e.g., use of public transportation), intended to improve air and water quality, and propose a personal action plan to support these efforts [IP, PR, AI, C]

EXPECTATION	SCH4C.F 1.2.	Evaluate the importance of quantitative chemical analysis in assessing air and water quality (e.g., the use of Environment Canada's Air Quality Index to determine when smog advisories need to be issued; systems to monitor the quality of drinking water), and explain how these analyses contribute to environmental awareness and responsibility [A1, C]
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<b>STRAND / COURSE</b>	<b>ON.SCH4C.</b>	<b>Chemistry, Grade 12 College Preparation SCH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4C.F.</b>	<b>Chemistry in the Environment</b>
<b>STAGE / SKILLS</b>	<b>SCH4C.F.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4C.F2.</b>	<b>Developing Skills of Investigation and Communication: By the end of this course, students will:</b>

EXPECTATION	SCH4C.F 2.1.	Use appropriate terminology related to chemical analysis and chemistry in the environment, including, but not limited to: ozone, hard water, titration, pH, ppm, and ppb [C]
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<b>STRAND / COURSE</b>	<b>ON.SCH4C.</b>	<b>Chemistry, Grade 12 College Preparation SCH4C</b>
<b>STRAND / OVERALL EXPECTATION</b>	<b>SCH4C.F.</b>	<b>Chemistry in the Environment</b>
<b>STAGE / SKILLS</b>	<b>SCH4C.F.SE.</b>	<b>Specific Expectations</b>
<b>SUB-ORGANIZER / SPECIFIC EXPECTATION</b>	<b>SCH4C.F3.</b>	<b>Understanding Basic Concepts: By the end of this course, students will:</b>

EXPECTATION	SCH4C.F 3.2.	Identify gases and particulates that are commonly found in the atmosphere, and explain how they affect air quality (e.g., greenhouse gases, tropospheric and stratospheric ozone, carbon monoxide, chlorofluorocarbons, soot)
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