Main Criteria: Forward Education

Secondary Criteria: Alberta Programs of Study, British Columbia Curriculum, Manitoba Curriculum Frameworks, Montana Content Standards, New Brunswick Curriculum, Newfoundland and Labrador Curriculum Guides, Northern Territory Curriculum, Nova Scotia 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: 9, 10, Key Stage 3, Key Stage 4

Forward Education

Replanting our Forests with Automated Tree Seeders

Alberta Programs of Study

Mathematics

Grade **9** - Adopted: **2007/Updated 2016**

GENERAL OUTCOME / COURSE	AB.MP.	Mathematical Processes
GENERAL OUTCOME / SPECIFIC OUTCOME	[PS]	Problem Solving: Students are expected to develop and apply new mathematical knowledge through problem solving
GENERAL OUTCOME / SPECIFIC OUTCOME	[R]	Reasoning: Students are expected to develop mathematical reasoning
GENERAL OUTCOME / SPECIFIC OUTCOME	[V]	Visualization: Students are expected to develop visualization skills to assist in processing information, making connections and solving problems.

Grade **9** - Adopted: **2006/Revised 2009**

GENERAL OUTCOME / COURSE	AB1.9.1.	Number (Number Concepts and Number Operations)
GENERAL OUTCOME / SPECIFIC OUTCOME		**Students will: estimate and solve number problems in everyday home, workplace and community contexts, using technology as appropriate; develop and demonstrate number sense to describe quantities, represent numbers in multiple ways and apply appropriate arithmetic operations; assess the reasonableness of calculations and problem-solving strategies; communicate mathematically and investigate the application of number concepts and operations in a variety of career and workplace situations, working individually or as members of a team.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE		**General Outcome – Students will: demonstrate a number sense for whole numbers, common fractions, mixed numbers, decimals, percents and ratios; explore integers; and apply arithmetic operations to solve problems in everyday contexts.**
ILLUSTRATIVE EXAMPLE		**Specific Outcomes – Students will:**
EXPECTATION	9.1.11.	estimate and calculate mean (average) in relation to everyday contexts [C, CN, E, R, V]

Alberta Programs of Study

Mathematics

Grade **10** - Adopted: **2008**

GENERAL OUTCOME / COURSE	AB.10C.	Mathematics 10C
GENERAL OUTCOME / SPECIFIC OUTCOME	**10C.3.**	**Develop algebraic and graphical reasoning through the study of relations.**

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.3.	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]

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

GENERAL OUTCOME / COURSE	**AB.30-2.**	**Mathematics 30-2**
GENERAL OUTCOME / SPECIFIC OUTCOME	**30-2.1.**	**Develop logical reasoning.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	1.1.	Analyze puzzles and games that involve numerical and logical reasoning, using problem-solving strategies. [CN, ME, PS, R]

GENERAL OUTCOME / COURSE	**AB.10-3.**	**Mathematics 10-3**
GENERAL OUTCOME / SPECIFIC OUTCOME	**10-3.2.**	**Develop spatial sense.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	2.1.	Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies. [C, CN, PS, R]

GENERAL OUTCOME / COURSE	**AB.20-3.**	**Mathematics 20-3**
GENERAL OUTCOME / SPECIFIC OUTCOME	**20-3.3.**	**Develop number sense and critical thinking skills.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.1.	Analyze puzzles and games that involve numerical reasoning, using problem-solving strategies. [C, CN, PS, R]

GENERAL OUTCOME / COURSE	**AB.20-3.**	**Mathematics 20-3**

GENERAL OUTCOME / SPECIFIC OUTCOME	**20-3.4.**	**Develop algebraic reasoning.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	4.1.	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]
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	4.2.	Demonstrate an understanding of slope: as rise over run, as rate of change, by solving problems. [C, CN, PS, V]
GENERAL OUTCOME / COURSE	**AB.30-3.**	**Mathematics 30-3**
GENERAL OUTCOME / SPECIFIC OUTCOME	**30-3.3.**	**Develop number sense and critical thinking skills.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	3.1.	Analyze puzzles and games that involve logical reasoning, using problem-solving strategies. [C, CN, PS, R]
GENERAL OUTCOME / COURSE	**AB.30-3.**	**Mathematics 30-3**
GENERAL OUTCOME / SPECIFIC OUTCOME	**30-3.5.**	**Develop statistical reasoning.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	5.1.	Solve problems that involve measures of central tendency, including: mean, median, mode, weighted mean, trimmed mean. [C, CN, PS, R]
GENERAL OUTCOME / COURSE	**AB.P10.**	**Mathematics Preparation 10**
GENERAL OUTCOME / SPECIFIC OUTCOME	**P10.2.**	**Students will demonstrate an understanding of and proficiency with calculations, decide which arithmetic operation or operations can be used to solve a problem, and then solve the problem.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**2.4.**	**Illustrate and apply the concepts of rates, ratios, percentages and proportions to solve problems.**
ILLUSTRATIVE EXAMPLE	2.4.1.	Understand the meaning of rate, ratio, percentage and proportion; and apply these concepts to solve problems. [E, PS, T] (8-12)

GENERAL OUTCOME / COURSE	**AB.9.A.**	**Unit A: Biological Diversity (Social and Environmental Emphasis)**
GENERAL OUTCOME / SPECIFIC OUTCOME	**9.A.STS.**	**Outcomes for Science, Technology and Society (STS) and Knowledge - Students will:**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**9.A.STS.1.**	**Investigate and interpret diversity among species and within species, and describe how diversity contributes to species survival**
ILLUSTRATIVE EXAMPLE	9.A.STS.1.1.	Observe variation in living things, and describe examples of variation among species and within species (e.g., observe and describe characteristics that distinguish two closely related species)

GENERAL OUTCOME / COURSE	**AB.9.A.**	**Unit A: Biological Diversity (Social and Environmental Emphasis)**
GENERAL OUTCOME / SPECIFIC OUTCOME	**9.A.STS.**	**Outcomes for Science, Technology and Society (STS) and Knowledge - Students will:**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**9.A.STS.4.**	**Identify impacts of human action on species survival and variation within species, and analyze related issues for personal and public decision making**
ILLUSTRATIVE EXAMPLE	9.A.STS.4.1.	Describe the relative abundance of species on Earth and in different environments (e.g., note the overall abundance of insect species; note that in harsh environments there are relatively fewer species found than in temperate and tropical environments)
ILLUSTRATIVE EXAMPLE	9.A.STS.4.2.	Describe ongoing changes in biological diversity through extinction and extirpation of native species, and investigate the role of environmental factors in causing these changes (e.g., investigate the effect of changing river characteristics on the variety of species living in the river; investigate the effect of changing land use on the survival of wolf or grizzly bear populations)
ILLUSTRATIVE EXAMPLE	9.A.STS.4.3.	Evaluate the success and limitations of various local and global strategies for minimizing loss of species diversity (e.g., breeding of endangered populations in zoos, development of seed banks, designating protected areas, development of international treaties regulating trade of protected species and animal parts)

GENERAL OUTCOME / COURSE	**AB.9.A.**	**Unit A: Biological Diversity (Social and Environmental Emphasis)**
GENERAL OUTCOME / SPECIFIC OUTCOME	**9.A.SO.**	**Skill Outcomes (focus on the use of research and inquiry skills to inform the decision-making process)**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**9.A.SO.IP.**	**Initiating and Planning - Students will:**
ILLUSTRATIVE EXAMPLE	**9.A.SO.IP.1.**	**Ask questions about the relationships between and among observable variables, and plan investigations to address those questions**
EXPECTATION	9.A.SO.IP.1.1.	Identify science-related issues (e.g., identify issues related to loss of species diversity)

GENERAL OUTCOME / COURSE	**AB.9.A.**	**Unit A: Biological Diversity (Social and Environmental Emphasis)**

GENERAL OUTCOME / SPECIFIC OUTCOME	**9.A.SO.**	**Skill Outcomes (focus on the use of research and inquiry skills to inform the decision-making process)**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**9.A.SO.CT.**	**Communication and Teamwork - Students will:**
ILLUSTRATIVE EXAMPLE	**9.A.SO.CT.1.**	**Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results**
EXPECTATION	9.A.SO.CT.1.1.	Communicate questions, ideas, intentions, plans and results, using lists, notes in point form, sentences, data tables, graphs, drawings, oral language and other means (e.g., illustrate and compare methods of reproduction in sample organisms studied)

GENERAL OUTCOME / COURSE	**AB.9.C.**	**Unit C: Environmental Chemistry (Social and Environmental Emphasis)**
GENERAL OUTCOME / SPECIFIC OUTCOME	**9.C.STS.**	**Outcomes for Science, Technology and Society (STS) and Knowledge - Students will:**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**9.C.STS.3.**	**Analyze and evaluate mechanisms affecting the distribution of potentially harmful substances within an environment**
ILLUSTRATIVE EXAMPLE	9.C.STS.3.5.	Investigate and evaluate potential risks resulting from consumer practices and industrial processes, and identify processes used in providing information and setting standards to manage these risks (e.g., interpret and explain the significance of manufacturer's information on how wood preservatives can be safely applied; recognize that some individuals may have greater sensitivity to particular chemical substances than do others in the general population)
ILLUSTRATIVE EXAMPLE	9.C.STS.3.6.	Identify and evaluate information and evidence related to an issue in which environmental chemistry plays a major role (e.g., evaluate evidence that the use of insecticides to control mosquitoes has an effect/has no effect on bird populations)

Alberta Programs of Study

Science

Grade **10** - Adopted: **2014**

GENERAL OUTCOME / COURSE	**AB.S10.**	**Science 10**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S10.5.C.**	**Unit C: Cycling of Matter in Living Systems (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**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.5.C.6.	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, or summarize articles based on the scientific principles and/or technological developments)

GENERAL OUTCOME / COURSE	**AB.S10.**	**Science 10**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S10.7.C.**	**Unit C: Cycling of Matter in Living Systems (Nature of Science Emphasis): Communication and Teamwork: Work as members of a team in addressing problems, and apply the skills and conventions of science in communicating information and ideas and in assessing results**

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.7.C. 1.	Communicate questions, ideas and intentions; and receive, interpret, understand, support and respond to the ideas of others (e.g., describe cytoplasmic streaming in a single-celled organism, and communicate an inference about similar movement in the cells of a multicellular organism)
GENERAL OUTCOME / COURSE	**AB.S10.**	**Science 10**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S10.1.D.**	**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**
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)
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
GENERAL OUTCOME / COURSE	**AB.S10.**	**Science 10**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S10.3.D.**	**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**
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)
GENERAL OUTCOME / COURSE	**AB.S10.**	**Science 10**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S10.4.D.**	**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**
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))
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)
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)

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)
GENERAL OUTCOME / COURSE	**AB.S10.**	**Science 10**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S10.5.D.**	**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**
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.**	**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**
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.S10.**	**Science 10**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S10.8.D.**	**Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis): Communication and Teamwork: Work as members of a team in addressing problems, and apply the skills and conventions of science in communicating information and ideas and in assessing results**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S10.8.D.4.	Identify multiple perspectives that influence a science-related decision or issue (e.g., consult a wide variety of electronic sources that reflect varied viewpoints and economic, social, scientific and other perspectives on global warming and climate change)
GENERAL OUTCOME / COURSE	**AB.S14.**	**Science 14**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S14.7.C.**	**Unit C: Investigating Matter and Energy in Living Systems (Science and Technology Emphasis): Analyzing and Interpreting: Analyze qualitative and quantitative data, and develop and assess possible explanations**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.7.C.2.	Critique the design of a constructed device or system (e.g., model of cell, stethoscope)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.7.C.3.	Identify and correct problems in the way a prototype or constructed device functions (e.g., analyze models of organs that perform a specific function)

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.7.C.4.	Evaluate designs and prototypes in terms of function, reliability, safety, efficiency, use of materials and impact on the environment (e.g., a device built to monitor life functions)
GENERAL OUTCOME / COURSE	**AB.S14.**	**Science 14**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S14.8.C.**	**Unit C: Investigating Matter and Energy in Living Systems (Science and Technology Emphasis): Communication and Teamwork: Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.8.C.1.	Receive, understand and act on the ideas of others (e.g., revise designs of prototypes, based on the feedback of others)
GENERAL OUTCOME / COURSE	**AB.S14.**	**Science 14**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S14.1.D.**	**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**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.1.D.4.	Describe, in general terms, how water, carbon, oxygen and nitrogen are cycled through the biosphere
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.1.D.6.	Compare the recycling of matter by society with the natural cycling of matter through ecosystems
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)
GENERAL OUTCOME / COURSE	**AB.S14.**	**Science 14**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S14.2.D.**	**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**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.2.D.3.	Describe how various abiotic factors influence biodiversity in an ecosystem (e.g., climate, substrate, temperature, elevation)

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.2.D.8.	Describe the relationship between land use practices and altering ecosystems (e.g., swamp drainage, slash and burn forestry, agriculture)
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)
GENERAL OUTCOME / COURSE	**AB.S14.**	**Science 14**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S14.3.D.**	**Unit D: Investigating Matter and Energy in the Environment (Social and Environmental Emphasis): Initiating and Planning: Ask questions about relationships between and among observable variables, and plan investigations to address those questions**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.3.D.1.	Identify questions to investigate arising from practical problems and issues (e.g., develop questions related to recycling, ozone depletion or introduction of exotic species)
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.3.D.2.	Define questions and problems to facilitate investigation (e.g., develop questions to guide investigations on composting, recycling, impact of farming practices on local ecosystems)
GENERAL OUTCOME / COURSE	**AB.S14.**	**Science 14**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S14.4.D.**	**Unit D: Investigating Matter and Energy in the Environment (Social and Environmental Emphasis): Performing and Recording: Conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.4.D.4.	Select and integrate information from various print and electronic sources (e.g., research the influence of a specific living organism—nitrogen bacteria, sulfur bacteria, sea birds, mollusks—on the cycling of matter through the biosphere, and communicate information in the form of a clearly written report; create a database or use spreadsheets to convey information on populations)
GENERAL OUTCOME / COURSE	**AB.S14.**	**Science 14**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S14.5.D.**	**Unit D: Investigating Matter and Energy in the Environment (Social and Environmental Emphasis): Analyzing and Interpreting: Analyze qualitative and quantitative data, and develop and assess possible explanations**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.5.D.5.	Identify new questions and problems that arise from what was learned (e.g., “Should there be more controls on bringing live animals and plants to Canada from the United States and other countries?”, “How can we reduce the amount of household wastes?”)
GENERAL OUTCOME / COURSE	**AB.S14.**	**Science 14**

GENERAL OUTCOME / SPECIFIC OUTCOME	**S14.6.D.**	**Unit D: Investigating Matter and Energy in the Environment (Social and Environmental Emphasis): Communication and Teamwork: Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	S14.6.D.2.	Communicate questions, ideas, intentions, plans and results, using lists, notes in point form, sentences, data tables, graphs, drawings, oral language and other means (e.g., represent the movement of matter and energy in an ecosystem, using food chains, webs or pyramids, and communicate this information in the form of a graphic illustration; describe the biogeochemical cycles of carbon, nitrogen or oxygen, and communicate this information in clearly labelled charts, models or diagrams)
GENERAL OUTCOME / COURSE	**AB.S24.**	**Science 24**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S24.4.A.**	**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**
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)
GENERAL OUTCOME / COURSE	**AB.S20.**	**Science 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S20-C4.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S20-C4.s.**	**Specific Outcomes for Skills (Nature of Science Emphasis)**
ILLUSTRATIVE EXAMPLE	**S20-C4.4s.**	**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**
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]
GENERAL OUTCOME / COURSE	**AB.S20.**	**Science 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S20-D1.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S20-D1.k.**	**Specific Outcomes for Knowledge**
ILLUSTRATIVE EXAMPLE	S20-D1.4k.	Describe the potential impact of habitat destruction on an ecosystem
GENERAL OUTCOME / COURSE	**AB.S20.**	**Science 20**

GENERAL OUTCOME / SPECIFIC OUTCOME	**S20-D1.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S20-D1.sts.**	**Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**S20-D1.2sts.**	**Explain that society and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F2-4.8, F3-4.1]**
EXPECTATION	S20-D1.2sts.2.	Assess the long-term implications of fire control and prevention on population and ecosystem stability, diversity and productivity
EXPECTATION	S20-D1.2sts.3.	Assess habitat loss and the responsibility of society to protect the environment for future generations
EXPECTATION	S20-D1.2sts.4.	Analyze the need for habitat reclamation, such as recreating wetlands and swamps, forests, and prairie grasslands, and describe steps to ensure species diversity
GENERAL OUTCOME / COURSE	**AB.S20.**	**Science 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S20-D1.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S20-D1.s.**	**Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**S20-D1.1s.**	**Initiating and Planning: Formulate questions about observed relationships and plan investigations of questions, ideas, problems and issues**
EXPECTATION	S20-D1.1s.2.	Inquire into the effect of logging on predation levels of deer as well as on food sources for deer (IP-NS1)
GENERAL OUTCOME / COURSE	**AB.S20.**	**Science 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S20-D1.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S20-D1.s.**	**Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**S20-D1.4s.**	**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**
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]
GENERAL OUTCOME / COURSE	**AB.S20.**	**Science 20**

GENERAL OUTCOME / SPECIFIC OUTCOME	**S20-D2.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S20-D2.k.**	**Specific Outcomes for Knowledge**
ILLUSTRATIVE EXAMPLE	S20-D2.1k.	Outline the biogeochemical cycles of nitrogen, carbon, oxygen and water and, in general terms, describe their interconnectedness, building on knowledge of the hydrologic cycle from Science 10, Unit D

GENERAL OUTCOME / COURSE	**AB.S20.**	**Science 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S20-D2.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S20-D2.k.**	**Specific Outcomes for Knowledge**
ILLUSTRATIVE EXAMPLE	**S20-D2.2k.**	**Describe artificial and natural factors that affect the biogeochemical cycles:**
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

GENERAL OUTCOME / COURSE	**AB.S20.**	**Science 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S20-D2.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S20-D2.s.**	**Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**S20-D2.1s.**	**Initiating and Planning: Formulate questions about observed relationships and plan investigations of questions, ideas, problems and issues**
EXPECTATION	S20-D2.1s.1.	Design an investigation to compare the carbon dioxide production of plants with that of animals (IP-NS1, IP-NS2, IP-NS3, IP-NS4)
EXPECTATION	S20-D2.1s.2.	Hypothesize how alternations in the carbon cycle as a result of the burning of fossil fuels might affect other biogeochemical cycles (sulfur, iron and water, for example) (IP-NS3)

GENERAL OUTCOME / COURSE	**AB.S20.**	**Science 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S20-D2.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S20-D2.s.**	**Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)**

ILLUSTRATIVE EXAMPLE	**S20-D2.4s.**	**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**
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]

GENERAL OUTCOME / COURSE	**AB.S30.**	**Science 30**
GENERAL OUTCOME / SPECIFIC OUTCOME	**S30-B2.**	**Unit B: Chemistry and the Environment: Students will analyze the sources of organic compounds and their effects on the environment.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**S30-B2.k.**	**Specific Outcomes for Knowledge**
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

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A1.**	**Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the constant flow of energy through the biosphere and ecosystems.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A1.s.**	**Specific Outcomes for Skills (Nature of Science Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-A1.4s.**	**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**
EXPECTATION	B20-A1.4s.4.	Work cooperatively as a team to investigate, synthesize and present information on the effect of organism diversity on an ecosystem (CT-SEC1, CT-SEC2, CT-SEC3) [ICT C1-4.4, C7-4.2]

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A2.**	**Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A2.k.**	**Specific Outcomes for Knowledge**
ILLUSTRATIVE EXAMPLE	B20-A2.1k.	Explain and summarize the biogeochemical cycling of carbon, oxygen, nitrogen and phosphorus and relate this to general reuse of all matter in the biosphere

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A2.**	**Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.**

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A2.sts.**	**Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-A2.1sts.**	**Explain that science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F3-4.1]**
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

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A2.**	**Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A2.s.**	**Specific Outcomes for Skills (Nature of Science Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-A2.1s.**	**Initiating and Planning: Formulate questions about observed relationships and plan investigations of questions, ideas, problems and issues**
EXPECTATION	B20-A2.1s.1.	Design an experiment to compare the carbon dioxide production of plants with that of animals (IP-NS1, IP-NS2, IP-NS3, IP-NS4)
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]

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A2.**	**Unit A: Energy and Matter Exchange in the Biosphere: Students will explain the cycling of matter through the biosphere.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A2.s.**	**Specific Outcomes for Skills (Nature of Science Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-A2.4s.**	**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**
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]

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A3.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A3.k.**	**Specific Outcomes for Knowledge**

ILLUSTRATIVE EXAMPLE	B20-A3.2k.	Explain how the equilibrium between gas exchanges in photosynthesis and cellular respiration influences atmospheric composition

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A3.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A3.sts.**	**Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-A3.2sts.**	**Explain that science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F3-4.1]**
EXPECTATION	B20-A3.2sts.1.	Describe how human activities can have a disrupting influence on the balance in the biosphere of photosynthetic and cellular respiratory activities: fossil fuel combustion; depletion of stratospheric ozone; forest destruction

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A3.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A3.s.**	**Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-A3.1s.**	**Initiating and Planning: Formulate questions about observed relationships and plan investigations of questions, ideas, problems and issues**
EXPECTATION	B20-A3.1s.1.	Predict the effects of changes in carbon dioxide and oxygen concentration on the atmospheric equilibrium due to a significant reduction of photosynthetic organisms through human activity (IP-NS3) [ICT C6-4.1]

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A3.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A3.s.**	**Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-A3.2s.**	**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**
EXPECTATION	B20-A3.2s.1.	Collect evidence from various print and electronic sources on how human activities can have a disrupting influence on photosynthetic and cellular respiratory activities (PR-SEC1, PR-SEC2) [ICT C1-4.1]

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**

GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-A3.**	**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.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-A3.s.**	**Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-A3.3s.**	**Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions**
EXPECTATION	B20-A3.3s.1.	Design and evaluate a model of a closed biological system in equilibrium with respect to carbon dioxide, water and oxygen exchange (PR-ST2, AI-ST1)
GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-B1.**	**Unit B: Ecosystems and Population Change: Students will explain that the biosphere is composed of ecosystems, each with distinctive biotic and abiotic characteristics.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-B1.sts.**	**Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-B1.1sts.**	**Explain how science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F3-4.1]**
EXPECTATION	B20-B1.1sts.1.	Evaluate the impact that human activity has had, or could have, on the biodiversity in an ecosystem: wetlands management; land use; interbasin water transfer; habitat fragmentation; urbanization; slash-and-burn and clearcutting practices; monoculturing of forests, lawns, field crops
GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-B1.**	**Unit B: Ecosystems and Population Change: Students will explain that the biosphere is composed of ecosystems, each with distinctive biotic and abiotic characteristics.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-B1.s.**	**Specific Outcomes for Skills (Nature of Science Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-B1.2s.**	**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**
EXPECTATION	B20-B1.2s.1.	Perform a field study to measure, quantitatively, appropriate abiotic characteristics of an ecosystem and to gather, both quantitatively and qualitatively, evidence for analysis of the diversity of life in the ecosystem studied (PR-NS3, PR-NS4, PR-NS5) [ICT F2-4.1]
EXPECTATION	B20-B1.2s.2.	Research and develop a land reclamation strategy for a disturbed area, as a solution to environmental damage; e.g., open-pit mine, garbage dump, school yard reclamation (PR-SEC1, PR-NS1, PR-NS4) [ICT C1-4.1]
GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-B1.**	**Unit B: Ecosystems and Population Change: Students will explain that the biosphere is composed of ecosystems, each with distinctive biotic and abiotic characteristics.**

SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-B1.s.**	**Specific Outcomes for Skills (Nature of Science Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-B1.3s.**	**Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions**
EXPECTATION	B20-B1.3s.4.	Compile and organize evidence from a variety of sources, for or against human activity being responsible for ecosystem change, and analyze the relationship between human activity and changing ecosystems (AI-NS2, AI-NS6, AI-SEC2) [ICT C2-4.1, C7-4.2]

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-B1.**	**Unit B: Ecosystems and Population Change: Students will explain that the biosphere is composed of ecosystems, each with distinctive biotic and abiotic characteristics.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-B1.s.**	**Specific Outcomes for Skills (Nature of Science Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-B1.4s.**	**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**
EXPECTATION	B20-B1.4s.3.	Develop, present and defend a strategy to improve wildlife habitats (CT-SEC3) [ICT C1-4.4]

GENERAL OUTCOME / COURSE	**AB.B20.**	**Biology 20**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B20-C2.**	**Unit C: Photosynthesis and Cellular Respiration: Students will explain the role of cellular respiration in releasing potential energy from organic compounds.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B20-C2.s.**	**Specific Outcomes for Skills (Nature of Science Emphasis)**
ILLUSTRATIVE EXAMPLE	**B20-C2.3s.**	**Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions**
EXPECTATION	B20-C2.3s.4.	Relate the Aboriginal metaphor “the trees are the lungs of Mother Earth” to the complementary role of the carbon and oxygen cycles (AI-NS6)

GENERAL OUTCOME / COURSE	**AB.B30.**	**Biology 30**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B30-D1.**	**Unit D: Population and Community Dynamics: Students will describe a community as a composite of populations in which individuals contribute to a gene pool that can change over time.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B30-D1.sts.**	**Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**B30-D1.1sts.**	**Explain that science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F3-4.1]**
EXPECTATION	B30-D1.1sts.5.	Assess habitat loss and the responsibility of society to protect the environment for future generations

GENERAL OUTCOME / COURSE	**AB.B30.**	**Biology 30**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B30-D2.**	**Unit D: Population and Community Dynamics: Students will explain the interaction of individuals in a population with one another and with members of other populations.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B30-D2.sts.**	**Specific Outcomes for Science, Technology and Society (STS) (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**B30-D2.1sts.**	**Explain why Canadian society supports scientific research and technological development to facilitate a sustainable society, economy and environment (SEC4a) [ICT F2-4.2, F2-4.8]**
EXPECTATION	B30-D2.1sts.3.	Assess the long-term implications of fire control and prevention on population and ecosystem stability, diversity and productivity

GENERAL OUTCOME / COURSE	**AB.B30.**	**Biology 30**
GENERAL OUTCOME / SPECIFIC OUTCOME	**B30-D2.**	**Unit D: Population and Community Dynamics: Students will explain the interaction of individuals in a population with one another and with members of other populations.**
SPECIFIC OUTCOME / ILLUSTRATIVE EXAMPLE	**B30-D2.s.**	**Specific Outcomes for Skills (Social and Environmental Contexts Emphasis)**
ILLUSTRATIVE EXAMPLE	**B30-D2.3s.**	**Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions**
EXPECTATION	B30-D2.3s.2.	Research and analyze the effects of clearcutting versus selective logging practices on ecosystems (PR-SEC1, AI-SEC2)

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

British Columbia Curriculum

Mathematics

Grade **9** - Adopted: **2016**

CURRICULUM ORGANIZER / COURSE	**BC.MA.9.CC.**	**Curricular Competencies**

PRESCRIBED LEARNING OUTCOME / ORGANIZER		**Students are expected to be able to do the following:**
EXPECTATION / SUB ORGANIZER	**9.CC.1.**	**Reasoning and analyzing**
PRESCRIBED LEARNING OUTCOME	9.CC.1.1.	Use logic and patterns to solve puzzles and play games
PRESCRIBED LEARNING OUTCOME	9.CC.1.2.	Use reasoning and logic to explore, analyze, and apply mathematical ideas
PRESCRIBED LEARNING OUTCOME	9.CC.1.6.	Model mathematics in contextualized experiences

CURRICULUM ORGANIZER / COURSE	**BC.MA.9.CC.**	**Curricular Competencies**
PRESCRIBED LEARNING OUTCOME / ORGANIZER		**Students are expected to be able to do the following:**
EXPECTATION / SUB ORGANIZER	**9.CC.2.**	**Understanding and solving**
PRESCRIBED LEARNING OUTCOME	9.CC.2.1.	Apply multiple strategies to solve problems in both abstract and contextualized situations
PRESCRIBED LEARNING OUTCOME	9.CC.2.2.	Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving
PRESCRIBED LEARNING OUTCOME	9.CC.2.3.	Visualize to explore mathematical concepts
PRESCRIBED LEARNING OUTCOME	9.CC.2.4.	Engage in problem-solving experiences that are connected to place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures

CURRICULUM ORGANIZER / COURSE	**BC.MA.9.CC.**	**Curricular Competencies**
PRESCRIBED LEARNING OUTCOME / ORGANIZER		**Students are expected to be able to do the following:**
EXPECTATION / SUB ORGANIZER	**9.CC.3.**	**Communicating and representing**

PRESCRIBED LEARNING OUTCOME	9.CC.3.2.	Explain and justify mathematical ideas and decisions
PRESCRIBED LEARNING OUTCOME	9.CC.3.3.	Communicate mathematical thinking in many ways
CURRICULUM ORGANIZER / COURSE	**BC.MA.9.CC.**	**Curricular Competencies**
PRESCRIBED LEARNING OUTCOME / ORGANIZER		**Students are expected to be able to do the following:**
EXPECTATION / SUB ORGANIZER	**9.CC.4.**	**Connecting and reflecting**
PRESCRIBED LEARNING OUTCOME	9.CC.4.1.	Reflect on mathematical thinking
PRESCRIBED LEARNING OUTCOME	9.CC.4.2.	Connect mathematical concepts to each other and to other areas and personal interests

British Columbia Curriculum

Mathematics

Grade **10** - Adopted: **2018**

CURRICULUM ORGANIZER / COURSE	**BC.MA.FMP10.**	**MATHEMATICS – Foundations of Mathematics and Pre-calculus**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**FMP10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to do the following:**
PRESCRIBED LEARNING OUTCOME	**FMP10.CC.1.**	**Reasoning and modelling**
OUTCOME	FMP10.CC.1.1.	Develop thinking strategies to solve puzzles and play games
OUTCOME	FMP10.CC.1.2.	Explore, analyze, and apply mathematical ideas using reason, technology, and other tools
OUTCOME	FMP10.CC.1.4.	Model with mathematics in situational contexts
OUTCOME	FMP10.CC.1.5.	Think creatively and with curiosity and wonder when exploring problems

CURRICULUM ORGANIZER / COURSE	**BC.MA.FMP10.**	**MATHEMATICS – Foundations of Mathematics and Pre-calculus**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**FMP10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to do the following:**
PRESCRIBED LEARNING OUTCOME	**FMP10.CC.2.**	**Understanding and solving**
OUTCOME	FMP10.CC.2.1.	Develop, demonstrate, and apply mathematical understanding through play, story, inquiry, and problem solving
OUTCOME	FMP10.CC.2.2.	Visualize to explore and illustrate mathematical concepts and relationships
OUTCOME	FMP10.CC.2.3.	Apply flexible and strategic approaches to solve problems
OUTCOME	FMP10.CC.2.4.	Solve problems with persistence and a positive disposition
OUTCOME	FMP10.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

CURRICULUM ORGANIZER / COURSE	**BC.MA.FMP10.**	**MATHEMATICS – Foundations of Mathematics and Pre-calculus**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**FMP10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to do the following:**
PRESCRIBED LEARNING OUTCOME	**FMP10.CC.3.**	**Communicating and representing**
OUTCOME	FMP10.CC.3.1.	Explain and justify mathematical ideas and decisions in many ways
OUTCOME	FMP10.CC.3.2.	Represent mathematical ideas in concrete, pictorial, and symbolic forms
OUTCOME	FMP10.CC.3.4.	Take risks when offering ideas in classroom discourse

CURRICULUM ORGANIZER / COURSE	**BC.MA.FMP10.**	**MATHEMATICS – Foundations of Mathematics and Pre-calculus**

PRESCRIBED LEARNING OUTCOME / ORGANIZER	**FMP10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to do the following:**
PRESCRIBED LEARNING OUTCOME	**FMP10.CC.4.**	**Connecting and reflecting**
OUTCOME	FMP10.CC.4.1.	Reflect on mathematical thinking
OUTCOME	FMP10.CC.4.3.	Use mistakes as opportunities to advance learning
CURRICULUM ORGANIZER / COURSE	**BC.MA.WM10.**	**MATHEMATICS – Workplace Mathematics**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**WM10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to do the following:**
PRESCRIBED LEARNING OUTCOME	**WM10.CC.1.**	**Reasoning and modelling**
OUTCOME	WM10.CC.1.1.	Develop thinking strategies to solve puzzles and play games
OUTCOME	WM10.CC.1.2.	Explore, analyze, and apply mathematical ideas using reason, technology, and other tools
OUTCOME	WM10.CC.1.4.	Model with mathematics in situational contexts
OUTCOME	WM10.CC.1.5.	Think creatively and with curiosity and wonder when exploring problems
CURRICULUM ORGANIZER / COURSE	**BC.MA.WM10.**	**MATHEMATICS – Workplace Mathematics**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**WM10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to do the following:**
PRESCRIBED LEARNING OUTCOME	**WM10.CC.2.**	**Understanding and solving**

OUTCOME	WM10.CC.2.1.	Develop, demonstrate, and apply conceptual understanding of mathematical ideas through play, story, inquiry, and problem solving
OUTCOME	WM10.CC.2.2.	Visualize to explore and illustrate mathematical concepts and relationships
OUTCOME	WM10.CC.2.3.	Apply flexible and strategic approaches to solve problems
OUTCOME	WM10.CC.2.4.	Solve problems with persistence and a positive disposition
OUTCOME	WM10.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
CURRICULUM ORGANIZER / COURSE	**BC.MA.WM10.**	**MATHEMATICS – Workplace Mathematics**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**WM10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to do the following:**
PRESCRIBED LEARNING OUTCOME	**WM10.CC.3.**	**Communicating and representing**
OUTCOME	WM10.CC.3.1.	Explain and justify mathematical ideas and decisions in many ways
OUTCOME	WM10.CC.3.2.	Represent mathematical ideas in concrete, pictorial, and symbolic forms
OUTCOME	WM10.CC.3.4.	Take risks when offering ideas in classroom discourse
CURRICULUM ORGANIZER / COURSE	**BC.MA.WM10.**	**MATHEMATICS – Workplace Mathematics**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**WM10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to do the following:**
PRESCRIBED LEARNING OUTCOME	**WM10.CC.4.**	**Connecting and reflecting**
OUTCOME	WM10.CC.4.1.	Reflect on mathematical thinking

OUTCOME	WM10.CC.4.3.	Use mistakes as opportunities to advance learning

CURRICULUM ORGANIZER / COURSE	**BC.MA.WM10.**	**MATHEMATICS – Workplace Mathematics**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**WM10.C.**	**Content**
EXPECTATION / SUB ORGANIZER		**Students are expected to know the following:**
PRESCRIBED LEARNING OUTCOME	WM10.C.5.	Central tendency

British Columbia Curriculum

Science

Grade **9** - Adopted: **2016**

CURRICULUM ORGANIZER / COURSE	**BC.SC.9.BI.**	**Big Ideas**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	9.BI.4.	The biosphere, geosphere, hydrosphere, and atmosphere are interconnected, as matter cycles and energy flows through them.

CURRICULUM ORGANIZER / COURSE	**BC.SC.9.CC.**	**Curricular Competencies**
PRESCRIBED LEARNING OUTCOME / ORGANIZER		**Students are expected to be able to do the following:**
EXPECTATION / SUB ORGANIZER	**9.CC.2.**	**Planning and conducting**
PRESCRIBED LEARNING OUTCOME	9.CC.2.3.	Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data

CURRICULUM ORGANIZER / COURSE	**BC.SC.9.CC.**	**Curricular Competencies**
PRESCRIBED LEARNING OUTCOME / ORGANIZER		**Students are expected to be able to do the following:**
EXPECTATION / SUB ORGANIZER	**9.CC.3.**	**Processing and analyzing data and information**

PRESCRIBED LEARNING OUTCOME	9.CC.3.6.	Analyze cause-and-effect relationships

CURRICULUM ORGANIZER / COURSE	BC.SC.9.CC.	Curricular Competencies
PRESCRIBED LEARNING OUTCOME / ORGANIZER		**Students are expected to be able to do the following:**
EXPECTATION / SUB ORGANIZER	**9.CC.5.**	**Applying and innovating**
PRESCRIBED LEARNING OUTCOME	9.CC.5.1.	Contribute to care for self, others, community, and world through individual or collaborative approaches
PRESCRIBED LEARNING OUTCOME	9.CC.5.2.	Transfer and apply learning to new situations
PRESCRIBED LEARNING OUTCOME	9.CC.5.3.	Generate and introduce new or refined ideas when problem solving
PRESCRIBED LEARNING OUTCOME	9.CC.5.4.	Contribute to finding solutions to problems at a local and/or global level through inquiry

CURRICULUM ORGANIZER / COURSE	BC.SC.9.CC.	Curricular Competencies
PRESCRIBED LEARNING OUTCOME / ORGANIZER		**Students are expected to be able to do the following:**
EXPECTATION / SUB ORGANIZER	**9.CC.6.**	**Communicating**
PRESCRIBED LEARNING OUTCOME	9.CC.6.2.	Communicate scientific ideas, claims, 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

CURRICULUM ORGANIZER / COURSE	BC.SC.9.C.	Content
PRESCRIBED LEARNING OUTCOME / ORGANIZER		**Students are expected to know the following:**
EXPECTATION / SUB ORGANIZER	9.C.8.	Matter cycles within biotic and abiotic components of ecosystems

EXPECTATION / SUB ORGANIZER	9.C.9.	Sustainability of systems

British Columbia Curriculum

Science

Grade **10** - Adopted: **2018**

CURRICULUM ORGANIZER / COURSE	**BC.SC.PCC10.**	**SCIENCE – Provincial Core Curriculum**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**PCC10.BI.**	**Big Ideas**
EXPECTATION / SUB ORGANIZER	PCC10.BI.3.	Energy is conserved, and its transformation can affect living things and the environment.

CURRICULUM ORGANIZER / COURSE	**BC.SC.PCC10.**	**SCIENCE – Provincial Core Curriculum**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**PCC10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to be able to do the following:**
PRESCRIBED LEARNING OUTCOME	**PCC10.CC.2.**	**Planning and conducting**
OUTCOME	PCC10.CC.2.3.	Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data

CURRICULUM ORGANIZER / COURSE	**BC.SC.PCC10.**	**SCIENCE – Provincial Core Curriculum**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**PCC10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to be able to do the following:**
PRESCRIBED LEARNING OUTCOME	**PCC10.CC.3.**	**Processing and analyzing data and information**
OUTCOME	PCC10.CC.3.6.	Analyze cause-and-effect relationships

CURRICULUM ORGANIZER / COURSE	**BC.SC.PCC10.**	**SCIENCE – Provincial Core Curriculum**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**PCC10.CC.**	**Curricular Competencies**

EXPECTATION / SUB ORGANIZER		**Students are expected to be able to do the following:**
PRESCRIBED LEARNING OUTCOME	**PCC10.CC.4.**	**Evaluating**
OUTCOME	PCC10.CC.4.5.	Consider the changes in knowledge over time as tools and technologies have developed
OUTCOME	PCC10.CC.4.9.	Critically analyze the validity of information in secondary sources and evaluate the approaches used to solve problems
CURRICULUM ORGANIZER / COURSE	**BC.SC.PCC10.**	**SCIENCE – Provincial Core Curriculum**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**PCC10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to be able to do the following:**
PRESCRIBED LEARNING OUTCOME	**PCC10.CC.5.**	**Applying and innovating**
OUTCOME	PCC10.CC.5.1.	Contribute to care for self, others, community, and world through individual or collaborative approaches
OUTCOME	PCC10.CC.5.2.	Transfer and apply learning to new situations
OUTCOME	PCC10.CC.5.3.	Generate and introduce new or refined ideas when problem solving
CURRICULUM ORGANIZER / COURSE	**BC.SC.PCC10.**	**SCIENCE – Provincial Core Curriculum**
PRESCRIBED LEARNING OUTCOME / ORGANIZER	**PCC10.CC.**	**Curricular Competencies**
EXPECTATION / SUB ORGANIZER		**Students are expected to be able to do the following:**
PRESCRIBED LEARNING OUTCOME	**PCC10.CC.6.**	**Communicating**
OUTCOME	PCC10.CC.6.2.	Communicate scientific ideas, claims, 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	PCC10.CC.6.3.	Express and reflect on a variety of experiences, perspectives, and worldviews through place

Grade **10** - Adopted: **2014**

STRAND / COURSE / GENERAL OUTCOME	**MB.20S-I.10.**	**Grade 10 Introduction to Applied and Pre-Calculus Mathematics (20S)**
STRAND / SPECIFIC OUTCOME	**10I.R.**	**Relations and Functions: Develop algebraic and graphical reasoning through the study of relations.**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	10I.R.3.	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]

Manitoba Curriculum Frameworks

Science

Grade **9** - Adopted: **2006**

STRAND / COURSE / GENERAL OUTCOME	**MB.GLO-A.**	**Foundation A: Nature of Science and Technology**
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
STRAND / COURSE / GENERAL OUTCOME	**MB.GLO-B.**	**Foundation B: Science, Technology, Society, and Environment (STSE)**
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.**	**Foundation C: Scientific and Technological Skills and Attitudes**
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.S1-0.**	**Senior 1: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S1-0-1.**	**Initiating**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-1b.	Select and justify various methods for finding answers to specific questions. (GLO: C2)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-1c.	Identify STSE issues which could be addressed. (GLO: C4)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-1d.	Identify stakeholders and initiate research related to an STSE issue. (GLO: C4)
STRAND / COURSE / GENERAL OUTCOME	**MB.S1-0.**	**Senior 1: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S1-0-2.**	**Researching**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-2d.	Review effects of past decisions and various perspectives related to an STSE issue. (GLO: B1, C4)
STRAND / COURSE / GENERAL OUTCOME	**MB.S1-0.**	**Senior 1: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S1-0-3.**	**Planning**

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-3d.	Summarize relevant data and consolidate existing arguments and positions related to an STSE issue. (GLO: C4)
STRAND / COURSE / GENERAL OUTCOME	**MB.S1-0.**	**Senior 1: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S1-0-5.**	**Observing, Measuring, Recording**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-5d.	Evaluate, using pre-determined criteria, different STSE options leading to a possible decision. (GLO: B5, C1, C3, C4)
STRAND / COURSE / GENERAL OUTCOME	**MB.S1-0.**	**Senior 1: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S1-0-8.**	**Reflecting on Science and Technology**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-8b.	Explain the importance of using precise language in science and technology. (GLO: A2, A3, C2, C3)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-8c.	Describe examples of how scientific knowledge has evolved in light of new evidence, and the role of technology in this evolution. (GLO: A2, A5)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-8d.	Describe examples of how technologies have evolved in response to changing needs and scientific advances. (GLO: A5)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-8g.	Discuss social and environmental effects of past scientific and technological endeavours. (GLO: B1)
STRAND / COURSE / GENERAL OUTCOME	**MB.S1-0.**	**Senior 1: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S1-0-9.**	**Demonstrating Scientific and Technological Attitudes**

GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-9d.	Value skepticism, honesty, accuracy, precision, perseverance, and open-mindedness as scientific and technological habits of mind. (GLO: C2, C3, C4, C5)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-9e.	Be sensitive and responsible in maintaining a balance between the needs of humans and a sustainable environment. (GLO: B5, C4)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S1-0-9f.	Demonstrate personal involvement and be proactive with respect to STSE issues. (GLO: B5, C4)

Manitoba Curriculum Frameworks

Science

Grade **10** - Adopted: **2006**

STRAND / COURSE / GENERAL OUTCOME	**MB.GLO-A.**	**Foundation A: Nature of Science and Technology**
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
STRAND / COURSE / GENERAL OUTCOME	**MB.GLO-B.**	**Foundation B: Science, Technology, Society, and Environment (STSE)**
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.**	**Foundation C: Scientific and Technological Skills and Attitudes**

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.S2-0.**	**Senior 2, Cluster 0: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S2-0-1.**	**Initiating**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-1b	Select and justify various methods for finding the answers to specific questions (GLO: C2)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-1c	Identify STSE issues which could be addressed (GLO: C4)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-1d	Identify stakeholders and initiate research related to an STSE issue (GLO: C4)
STRAND / COURSE / GENERAL OUTCOME	**MB.S2-0.**	**Senior 2, Cluster 0: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S2-0-2.**	**Researching**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-2d	Review effects of past decisions and various perspectives related to an STSE issue (GLO: B1, C4)

STRAND / COURSE / GENERAL OUTCOME	**MB.S2-0.**	**Senior 2, Cluster 0: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S2-0-3.**	**Planning**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-3d	Summarize relevant data and consolidate existing arguments and positions related to an STSE issue (GLO: C4)

STRAND / COURSE / GENERAL OUTCOME	**MB.S2-0.**	**Senior 2, Cluster 0: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S2-0-5.**	**Observing, Measuring, Recording**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-5d	Evaluate, using pre-determined criteria, different STSE options leading to a possible decision. (GLO: B5, C1, C3, C4)

STRAND / COURSE / GENERAL OUTCOME	**MB.S2-0.**	**Senior 2, Cluster 0: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S2-0-8.**	**Reflecting on Science and Technology**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-8b	Explain the importance of using precise language in science and technology. (GLO: A2, A3, C2, C3)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-8c	Describe examples of how scientific knowledge has evolved in light of new evidence, and the role of technology in this evolution. (GLO: A2, A5)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-8d	Describe examples of how technologies have evolved in response to changing needs and scientific advances. (GLO: A5)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-8g	Discuss social and environmental effects of past scientific and technological endeavours. (GLO B1)

STRAND / COURSE / GENERAL OUTCOME	**MB.S2-0.**	**Senior 2, Cluster 0: Overall Skills and Attitudes - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	**S2-0-9.**	**Demonstrating Scientific and Technological Attitudes and Habits of Mind**
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-9d	Value skepticism, honesty, accuracy, precision, perseverance, and open-mindedness as scientific and technological habits of mind. (GLO: C2, C3, C4, C5)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-9e	Be sensitive and responsible in maintaining a balance between the needs of humans and a sustainable environment. (GLO: B5, C4)
GENERAL OUTCOME / SPECIFIC OUTCOME / SKILL	S2-0-9f	Demonstrate personal involvement and be proactive with respect to STSE issues. (GLO: B5, C4)
STRAND / COURSE / GENERAL OUTCOME	**MB.S2-1.**	**Senior 2, Cluster 1: Dynamics of Ecosystems - Specific Learning Outcomes**
STRAND / SPECIFIC OUTCOME	S2-1-01.	Illustrate and explain how carbon, nitrogen, and oxygen are cycled through an ecosystem. (GLO: D2, D3, D5, E2)
STRAND / SPECIFIC OUTCOME	S2-1-02.	Discuss factors that may disturb biogeochemical cycles. (GLO: A2, C8, D2, D5)
STRAND / SPECIFIC OUTCOME	S2-1-08.	Observe and document a range of organisms that illustrate the biodiversity within a local or regional ecosystem. (GLO: D2, E2, E3)
STRAND / SPECIFIC OUTCOME	S2-1-09.	Explain how the biodiversity of an ecosystem contributes to its sustainability. (GLO: B5, E1)
STRAND / SPECIFIC OUTCOME	S2-1-10.	Investigate how human activities affect an ecosystem and use the decision-making process to propose a course of action to enhance its sustainability. (GLO: B5, C4, C5, C8)
STRAND / COURSE / GENERAL OUTCOME	**MB.S2-4.**	**Senior 2, Cluster 4: Weather Dynamics - Specific Learning Outcomes**

STRAND / SPECIFIC OUTCOME	S2-4-02.	Outline factors influencing the Earth's radiation budget. (GLO: D4, D5, E2, E3)

Montana Content Standards

Mathematics

Grade **9** - Adopted: **2011**

CONTENT STANDARD / DOMAIN	MT.CC.MP.	Mathematical Practices
BENCHMARK / STANDARD	MP.1.	Make sense of problems and persevere in solving them.
BENCHMARK / STANDARD	MP.2.	Reason abstractly and quantitatively.
BENCHMARK / STANDARD	MP.3.	Construct viable arguments and critique the reasoning of others.
BENCHMARK / STANDARD	MP.4.	Model with mathematics.
BENCHMARK / STANDARD	MP.6.	Attend to precision.
BENCHMARK / STANDARD	MP.7.	Look for and make use of structure.
BENCHMARK / STANDARD	MP.8.	Look for and express regularity in repeated reasoning.

CONTENT STANDARD / DOMAIN	MT.CC.F.	Functions
BENCHMARK / STANDARD	**F-IF.**	**Interpreting Functions**
GRADE LEVEL EXPECTATION / BENCHMARK		**Interpret functions that arise in applications in terms of the context.**
EXPECTATION	F-IF.6.	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Montana Content Standards

Mathematics

Grade **10** - Adopted: **2011**

CONTENT STANDARD / DOMAIN	MT.CC.MP.	Mathematical Practices
BENCHMARK / STANDARD	MP.1.	Make sense of problems and persevere in solving them.

BENCHMARK / STANDARD	MP.2.	Reason abstractly and quantitatively.
BENCHMARK / STANDARD	MP.3.	Construct viable arguments and critique the reasoning of others.
BENCHMARK / STANDARD	MP.4.	Model with mathematics.
BENCHMARK / STANDARD	MP.6.	Attend to precision.
BENCHMARK / STANDARD	MP.7.	Look for and make use of structure.
BENCHMARK / STANDARD	MP.8.	Look for and express regularity in repeated reasoning.
CONTENT STANDARD / DOMAIN	**MT.CC.F.**	**Functions**
BENCHMARK / STANDARD	**F-IF.**	**Interpreting Functions**
GRADE LEVEL EXPECTATION / BENCHMARK		**Interpret functions that arise in applications in terms of the context.**
EXPECTATION	F-IF.6.	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Montana Content Standards

Science

Grade **9** - Adopted: **2016**

CONTENT STANDARD / DOMAIN	**MT.9-12.LS.**	**LIFE SCIENCE content standards for ninth through twelfth grades are that each student will:**
BENCHMARK / STANDARD	9-12.LS.8.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem
BENCHMARK / STANDARD	9-12.LS.9.	Use mathematical or computational representations to support arguments about environmental factors that affect carrying capacity, biodiversity, and populations in ecosystems
BENCHMARK / STANDARD	9-12.LS.11.	Design, evaluate, and refine a solution for reducing the direct and indirect impacts of human activities on the environment and biodiversity and analyze scientific concepts used by American Indians to maintain healthy relationships with environmental resources
CONTENT STANDARD / DOMAIN	**MT.9-12.LS.**	**LIFE SCIENCE content standards for ninth through twelfth grades are that each student will:**
BENCHMARK / STANDARD	**9-12.LS.19.**	**Evaluate the evidence supporting claims that changes in environmental conditions may result in:**

GRADE LEVEL EXPECTATION / BENCHMARK	9-12.LS.19.3.	The extinction of other species

CONTENT STANDARD / DOMAIN	**MT.9-12.ESS.**	**EARTH AND SPACE SCIENCE content standards for ninth through twelfth grades are that students will:**
BENCHMARK / STANDARD	9-12.ESS.11.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere
BENCHMARK / STANDARD	9-12.ESS.13.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate
BENCHMARK / STANDARD	9-12.ESS.15.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity
BENCHMARK / STANDARD	9-12.ESS.16.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios
BENCHMARK / STANDARD	9-12.ESS.17.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, biodiversity, and investigate and explain how some American Indian tribes use scientific knowledge and practices in managing natural resources

Grade **9** - Adopted: **2011**

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Key Ideas and Details**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.2.	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.3.	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Craft and Structure**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Integration of Knowledge**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments, and knowledge derived from American Indian cultures), noting when the findings support or contradict previous explanations or accounts.

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

CONTENT STANDARD / DOMAIN	**MT.WHST.9-10.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION / BENCHMARK	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION	WHST.9-10.2.d.	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.

CONTENT STANDARD / DOMAIN	**MT.WHST.9-10.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Production and Distribution of Writing**
GRADE LEVEL EXPECTATION / BENCHMARK	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GRADE LEVEL EXPECTATION / BENCHMARK	WHST.9-10.6.	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

Montana Content Standards

Science

Grade **10** - Adopted: **2016**

CONTENT STANDARD / DOMAIN	**MT.9-12.LS.**	**LIFE SCIENCE content standards for ninth through twelfth grades are that each student will:**
BENCHMARK / STANDARD	9-12.LS.8.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem

BENCHMARK / STANDARD	9-12.LS.9.	Use mathematical or computational representations to support arguments about environmental factors that affect carrying capacity, biodiversity, and populations in ecosystems
BENCHMARK / STANDARD	9-12.LS.11.	Design, evaluate, and refine a solution for reducing the direct and indirect impacts of human activities on the environment and biodiversity and analyze scientific concepts used by American Indians to maintain healthy relationships with environmental resources
CONTENT STANDARD / DOMAIN	**MT.9-12.LS.**	**LIFE SCIENCE content standards for ninth through twelfth grades are that each student will:**
BENCHMARK / STANDARD	**9-12.LS.19.**	**Evaluate the evidence supporting claims that changes in environmental conditions may result in:**
GRADE LEVEL EXPECTATION / BENCHMARK	9-12.LS.19.3.	The extinction of other species
CONTENT STANDARD / DOMAIN	**MT.9-12.ESS.**	**EARTH AND SPACE SCIENCE content standards for ninth through twelfth grades are that students will:**
BENCHMARK / STANDARD	9-12.ESS.11.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere
BENCHMARK / STANDARD	9-12.ESS.13.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate
BENCHMARK / STANDARD	9-12.ESS.15.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity
BENCHMARK / STANDARD	9-12.ESS.16.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios
BENCHMARK / STANDARD	9-12.ESS.17.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, biodiversity, and investigate and explain how some American Indian tribes use scientific knowledge and practices in managing natural resources

Grade **10** - Adopted: **2011**

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Key Ideas and Details**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.2.	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.3.	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Craft and Structure**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Integration of Knowledge**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments, and knowledge derived from American Indian cultures), noting when the findings support or contradict previous explanations or accounts.

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

CONTENT STANDARD / DOMAIN	**MT.WHST.9-10.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION / BENCHMARK	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION	WHST.9-10.2.d.	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.

CONTENT STANDARD / DOMAIN	**MT.WHST.9-10.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Production and Distribution of Writing**
GRADE LEVEL EXPECTATION / BENCHMARK	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

GRADE LEVEL EXPECTATION / BENCHMARK	WHST.9-10.6.	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

Montana Content Standards

Technology Education

Grade **9** - Adopted: **2020/Effective 2021**

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR NINTH THROUGH TWELFTH GRADE
BENCHMARK / STANDARD	**(4)**	**The innovative designer content standards for ninth-twelfth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(a)	initiate a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems;
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(b)	select and use digital tools to plan and manage design process that considers design constraints and calculated risks; and

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR NINTH THROUGH TWELFTH GRADE
BENCHMARK / STANDARD	**(5)**	**The computational thinker content standards for ninth-twelfth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(a)	identify problems suited for technology-assisted methods for data analysis, abstract models, and algorithmic thinking;
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(b)	collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making;
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(d)	explain how automation works and use algorithmic thinking to develop a sequence of steps to create and test automate solutions.

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR NINTH THROUGH TWELFTH GRADE
BENCHMARK / STANDARD	**(6)**	**The creative communicator content standards for ninth-twelfth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(6)(b)	create original works or responsibly repurpose or remix digital resources into new creative works;

CONTENT STANDARD / DOMAIN		COMPUTER SCIENCE CONTENT STANDARDS FOR NINTH THROUGH TWELFTH GRADE
BENCHMARK / STANDARD	**(1)**	**Computer science algorithms and programming standards for ninth through twelfth grades are that each student will:**

GRADE LEVEL EXPECTATION / BENCHMARK	(1)(a)	create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(c)	implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(s)	plan and develop programs for broad audiences using a software life cycle process;
CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR NINTH THROUGH TWELFTH GRADE**
BENCHMARK / STANDARD	**(4)**	**Computer science impacts of computing standards for ninth through twelfth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(c)	test and refine computational artifacts to reduce bias and equity deficits;

Montana Content Standards

Technology Education

Grade **10** - Adopted: **2020/Effective 2021**

CONTENT STANDARD / DOMAIN		**CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR NINTH THROUGH TWELFTH GRADE**
BENCHMARK / STANDARD	**(4)**	**The innovative designer content standards for ninth-twelfth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(a)	initiate a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems;
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(b)	select and use digital tools to plan and manage design process that considers design constraints and calculated risks; and
CONTENT STANDARD / DOMAIN		**CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR NINTH THROUGH TWELFTH GRADE**
BENCHMARK / STANDARD	**(5)**	**The computational thinker content standards for ninth-twelfth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(a)	identify problems suited for technology-assisted methods for data analysis, abstract models, and algorithmic thinking;
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(b)	collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making;
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(d)	explain how automation works and use algorithmic thinking to develop a sequence of steps to create and test automate solutions.

CONTENT STANDARD / DOMAIN		**CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR NINTH THROUGH TWELFTH GRADE**
BENCHMARK / STANDARD	**(6)**	**The creative communicator content standards for ninth-twelfth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(6)(b)	create original works or responsibly repurpose or remix digital resources into new creative works;

CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR NINTH THROUGH TWELFTH GRADE**
BENCHMARK / STANDARD	**(1)**	**Computer science algorithms and programming standards for ninth through twelfth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(a)	create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(c)	implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(s)	plan and develop programs for broad audiences using a software life cycle process;

CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR NINTH THROUGH TWELFTH GRADE**
BENCHMARK / STANDARD	**(4)**	**Computer science impacts of computing standards for ninth through twelfth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(c)	test and refine computational artifacts to reduce bias and equity deficits;

New Brunswick Curriculum

Mathematics

Grade **9** - Adopted: **2010**

DOCUMENT/GENERAL LEARNING OUTCOME		**Mathematics Grade 9**
CATEGORY		**MATHEMATICAL PROCESSES**
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	R.	develop mathematical reasoning (Reasoning: R)
SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).

New Brunswick Curriculum

Mathematics

Grade **10** - Adopted: **2011**

DOCUMENT/GENERAL LEARNING OUTCOME		**Geometry, Measurement and Finance 10**
CATEGORY		**MATHEMATICAL PROCESSES**
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	R.	develop mathematical reasoning (Reasoning: R)
SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).

DOCUMENT/GENERAL LEARNING OUTCOME		**Number, Relations and Functions 10**
CATEGORY		**MATHEMATICAL PROCESSES**
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	R.	develop mathematical reasoning (Reasoning: R)
SECTION/SPECIFIC LEARNING OUTCOME	V.	develop visualization skills to assist in processing information, making connections and solving problems (Visualization: V).

DOCUMENT/GENERAL LEARNING OUTCOME		**Number, Relations and Functions 10**
CATEGORY	**RF.**	**Relations (R) and Functions (F): Develop algebraic and graphical reasoning through the study of relations.**
SECTION/SPECIFIC LEARNING OUTCOME	RF3.	Demonstrate an understanding of slope with respect to: rise and run; line segments and lines; rate of change; parallel lines; and perpendicular lines. [PS, R, V]

New Brunswick Curriculum

Science

Grade **9** - Adopted: **2008/Implemented 2008**

DOCUMENT/GENERAL LEARNING OUTCOME		**Biology 111-112 Curriculum**
CATEGORY		**Biology 11: Unit 2 – Biodiversity**
SECTION/SPECIFIC LEARNING OUTCOME		**Biodiversity within Ecosystems**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected that students will: Explain how biodiversity of New Brunswick ecosystems is related to their sustainability. (318-6)
UNIT/SPECIFIC LEARNING OUTCOME		It is expected that students will: Compare New Brunswick eco-regions in terms of biodiversity, climate, physical geography, and location. (318-7)
UNIT/SPECIFIC LEARNING OUTCOME		It is expected that students will: Analyze the impact of human behaviour, and human population growth on biodiversity and ecosystems. (331-6, 318-10)

DOCUMENT/GENERAL LEARNING OUTCOME		**Biology 121-122 Curriculum**
CATEGORY		**Biology 12: Unit 2 – Evolution, Change and Diversity**
SECTION/SPECIFIC LEARNING OUTCOME		**Evolutionary Theory**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected that students will: Explain the modern theory of evolution, punctuated equilibrium, current examples of selective pressures (natural and artificial), and demonstrate an understanding of the scientific evidence to support it. (114-2, 115-7, 116-2, 118-6, 316-2, 316-3, 316-4)

Grade **9** - 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.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 1 – An Overview of Environmental Science**
SECTION/SPECIFIC LEARNING OUTCOME		**Population Growth and Resource Limitations**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: understand and be able to use of the term “natural capital “and “natural income”.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 1 – An Overview of Environmental Science**
SECTION/SPECIFIC LEARNING OUTCOME		**Researching Current Environmental Issues**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: become aware of the range of issues arising from overpopulation and human activity.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: explore one or a few local or regional issues with respect to the impact on the environment, and on history, economics and social systems.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: practice research and presentation skills including experimenting to test environmental impact, identifying and accessing various organizations for information and expertise, and considering the legislation which impacts on environmental issues.

UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: explore how technology is used to gather and communicate information, and to address the issues.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: choose an issue to explore in more depth, and develop a plan for a research project that will be presented during the last unit.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 2 – Sustainable Development**
SECTION/SPECIFIC LEARNING OUTCOME		**Ecology**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: demonstrate an awareness and understanding of the concepts of energy flow, and chemical cycling (carbon, nitrogen, phosphorus, water, oxygen) that support ecological systems
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
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 2 – Sustainable Development**
SECTION/SPECIFIC LEARNING OUTCOME		**Environmental Awareness**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: describe the variety of attitudes towards the environment in New Brunswick including traditional Indigenous and western scientific worldviews
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: describe how land and water use in New Brunswick has changed over the last 300 years.
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 how the development of technologies has affected land and water use.

UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: explore the people and ideas involved in the development of the Western environmental movement
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 2 – Sustainable Development**
SECTION/SPECIFIC LEARNING OUTCOME		**Sustainable Ecosystems and Communities**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: explain the principles of sustainable development.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: demonstrate an understanding of the requirements for sustainable human communities.
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.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**
SECTION/SPECIFIC LEARNING OUTCOME		**1. Agriculture**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: design and carry out an experiment to test the impact of agriculture on the environment.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**
SECTION/SPECIFIC LEARNING OUTCOME		**2. Forests**

UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: identify the value of forests as natural capital, economically, socially and ecologically.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: develop an understanding of the natural forest ecology and how it is and has been affected by forestry practices.
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.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**
SECTION/SPECIFIC LEARNING OUTCOME		**2. Forests**
UNIT/SPECIFIC LEARNING OUTCOME		**It is expected the student will: explain how to manage forests for sustainably. Include:**
SPECIFIC LEARNING OUTCOME		role of forest certification
SPECIFIC LEARNING OUTCOME		effect of harvesting methods
SPECIFIC LEARNING OUTCOME		effect of deforestation
SPECIFIC LEARNING OUTCOME		ways to prevent natural capital degradation
SPECIFIC LEARNING OUTCOME		role of provincial and national parks, conservation areas, reserves and protected areas
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**
SECTION/SPECIFIC LEARNING OUTCOME		**2. Forests**

UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: examine the history of old growth forests, second-growth forests, and tree farms in New Brunswick.

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

DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**
SECTION/SPECIFIC LEARNING OUTCOME		**7. Air and Water Pollution**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: research and report on prevention and cleanup strategies to reduce air and water pollution.

Grade **9** - Adopted: **2017/Implement 2018**

DOCUMENT/GENERAL LEARNING OUTCOME		**Advanced Environmental Science 120**
CATEGORY	**GCO 1.**	**Introduction to the human sphere: recognize and appreciate the variety of ways people understand and interact with the natural world**
SECTION/SPECIFIC LEARNING OUTCOME	SCO 1.2.	Demonstrate an understanding of different views of the natural world.

SECTION/SPECIFIC LEARNING OUTCOME	SCO 1.3.	Recognize factors that influence local, regional and global environmental decision-making.

DOCUMENT/GENERAL LEARNING OUTCOME		**Advanced Environmental Science 120**
CATEGORY	**GCO 1.**	**Introduction to the human sphere: recognize and appreciate the variety of ways people understand and interact with the natural world**
SECTION/SPECIFIC LEARNING OUTCOME	**SCO 1.4.**	**Briefly explore a range of current environmental issues.**

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.

DOCUMENT/GENERAL LEARNING OUTCOME		**Advanced Environmental Science 120**
CATEGORY	**GCO 2.**	**Earth Systems: Develop an understanding of the dynamics of biotic and abiotic components of the environment and the impact of current environmental issues**
SECTION/SPECIFIC LEARNING OUTCOME	**SCO 2.2.**	**Develop a general understanding of biosphere dynamics and the importance of biodiversity at the species, community and ecosystem levels**

UNIT/SPECIFIC LEARNING OUTCOME	Describe the concepts and dynamic patterns of distribution, migration, speciation and extinction.

DOCUMENT/GENERAL LEARNING OUTCOME		**Advanced Environmental Science 120**
CATEGORY	**GCO 2.**	**Earth Systems: Develop an understanding of issues impacting the dynamics of biotic and abiotic components of the environment**
SECTION/SPECIFIC LEARNING OUTCOME	SCO 2.3.	Examine and develop an understanding of soil composition and ecology, and current issues in agriculture and forestry
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 **9** - 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.
DOCUMENT/GENERAL LEARNING OUTCOME		**Physical Geography 110 – Portraits of a Planet**
CATEGORY		**Unit 7C: Natural Regions of the World (Climatological Emphasis)**
SECTION/SPECIFIC LEARNING OUTCOME		**How do the world's natural systems interact to produce a variety of natural habitats?**
UNIT/SPECIFIC LEARNING OUTCOME		**Students will be able to:**
SPECIFIC LEARNING OUTCOME		4. evaluate the impact of human activities on natural environments.
SPECIFIC LEARNING OUTCOME		5. explain the concept of sustainable development and develop strategies for informed use of global resources.

New Brunswick Curriculum

Science

Grade **10** - Adopted: **2002**

DOCUMENT/GENERAL LEARNING OUTCOME		**Science Grade 10 Curriculum**
CATEGORY		**Unit 1 – Life Science: Sustainability of Ecosystems**
SECTION/SPECIFIC LEARNING OUTCOME		**How does sustainability fit into your paradigm and society's paradigm?**
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to explain how a paradigm shift can change scientific world views in understanding sustainability explore and develop a concept of sustainability (114-1)
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to communicate questions, ideas, and intentions and receive, interpret, understand, support, and respond to the ideas of others with respect to environmental attitudes (215-1)
DOCUMENT/GENERAL LEARNING OUTCOME		**Science Grade 10 Curriculum**
CATEGORY		**Unit 1 – Life Science: Sustainability of Ecosystems**
SECTION/SPECIFIC LEARNING OUTCOME		**What are the factors affecting the sustainability of an ecosystem?**

UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to explain how biodiversity of an ecosystem contributes to its sustainability (318-6)
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to illustrate the cycling of matter through biotic and abiotic components of an ecosystem by tracking carbon, nitrogen, and oxygen (318-1)
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to plan changes to, predict the effects of, and analyse the impact of external factors on an ecosystem (331-6, 213-8, 212-4)
DOCUMENT/GENERAL LEARNING OUTCOME		**Science Grade 10 Curriculum**
CATEGORY		**Unit 1 – Life Science: Sustainability of Ecosystems**
SECTION/SPECIFIC LEARNING OUTCOME		**Sustainability Issues in an Ecosystem**
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to analyse the impact of external factors on the ecosystem (331-6)
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to explain why the ecosystem may respond differently to short-term stress and long-term change (318-4)
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to select, compile, and display evidence and information from various sources, in different formats, to support a given view in a presentation about ecosystem change (2143, 213-7)
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to communicate questions, ideas, and intentions, and receive, interpret, understand, support, and respond to the ideas of others in preparing a report about ecosystem change (215-1)
DOCUMENT/GENERAL LEARNING OUTCOME		**Science Grade 10 Curriculum**
CATEGORY		**Unit 1 – Life Science: Sustainability of Ecosystems**
SECTION/SPECIFIC LEARNING OUTCOME		**Extension to the biosphere.**
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to compare the risks and benefits to the biosphere of applying new scientific knowledge and technology to industrial processes (118-1)
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to propose and defend a course of action on a multi-perspective social issue (118-9, 215-4, 118-5)

UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to identify examples where scientific understanding about an ecosystem was enhanced or revised as a result of human invention or related technologies (116-1)

DOCUMENT/GENERAL LEARNING OUTCOME		**Science Grade 10 Curriculum**
CATEGORY		**Unit 4 – Physical Science: Motion**
SECTION/SPECIFIC LEARNING OUTCOME		**Investigate the relationship between velocity, time and acceleration**
UNIT/SPECIFIC LEARNING OUTCOME		Students will be expected to interpret patterns in data collected for motion and identify intervals of uniform motion and accelerated motion. (214-5)

Grade **10** - Adopted: **2008/Implemented 2008**

DOCUMENT/GENERAL LEARNING OUTCOME		**Biology 111-112 Curriculum**
CATEGORY		**Biology 11: Unit 2 – Biodiversity**
SECTION/SPECIFIC LEARNING OUTCOME		**Biodiversity within Ecosystems**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected that students will: Explain how biodiversity of New Brunswick ecosystems is related to their sustainability. (318-6)
UNIT/SPECIFIC LEARNING OUTCOME		It is expected that students will: Compare New Brunswick eco-regions in terms of biodiversity, climate, physical geography, and location. (318-7)
UNIT/SPECIFIC LEARNING OUTCOME		It is expected that students will: Analyze the impact of human behaviour, and human population growth on biodiversity and ecosystems. (331-6, 318-10)

DOCUMENT/GENERAL LEARNING OUTCOME		**Biology 121-122 Curriculum**
CATEGORY		**Biology 12: Unit 2 – Evolution, Change and Diversity**
SECTION/SPECIFIC LEARNING OUTCOME		**Evolutionary Theory**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected that students will: Explain the modern theory of evolution, punctuated equilibrium, current examples of selective pressures (natural and artificial), and demonstrate an understanding of the scientific evidence to support it. (114-2, 115-7, 116-2, 118-6, 316-2, 316-3, 316-4)

Grade **10** - 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.

DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 1 – An Overview of Environmental Science**
SECTION/SPECIFIC LEARNING OUTCOME		**Population Growth and Resource Limitations**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: understand and be able to use of the term “natural capital “and “natural income”.

DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 1 – An Overview of Environmental Science**
SECTION/SPECIFIC LEARNING OUTCOME		**Researching Current Environmental Issues**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: become aware of the range of issues arising from overpopulation and human activity.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: explore one or a few local or regional issues with respect to the impact on the environment, and on history, economics and social systems.

UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: practice research and presentation skills including experimenting to test environmental impact, identifying and accessing various organizations for information and expertise, and considering the legislation which impacts on environmental issues.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: explore how technology is used to gather and communicate information, and to address the issues.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: choose an issue to explore in more depth, and develop a plan for a research project that will be presented during the last unit.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 2 – Sustainable Development**
SECTION/SPECIFIC LEARNING OUTCOME		**Ecology**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: demonstrate an awareness and understanding of the concepts of energy flow, and chemical cycling (carbon, nitrogen, phosphorus, water, oxygen) that support ecological systems
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
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 2 – Sustainable Development**
SECTION/SPECIFIC LEARNING OUTCOME		**Environmental Awareness**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: describe the variety of attitudes towards the environment in New Brunswick including traditional Indigenous and western scientific worldviews
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: describe how land and water use in New Brunswick has changed over the last 300 years.
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 how the development of technologies has affected land and water use.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: explore the people and ideas involved in the development of the Western environmental movement
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 2 – Sustainable Development**
SECTION/SPECIFIC LEARNING OUTCOME		**Sustainable Ecosystems and Communities**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: explain the principles of sustainable development.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: demonstrate an understanding of the requirements for sustainable human communities.
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.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**
SECTION/SPECIFIC LEARNING OUTCOME		**1. Agriculture**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: design and carry out an experiment to test the impact of agriculture on the environment.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**

SECTION/SPECIFIC LEARNING OUTCOME		**2. Forests**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: identify the value of forests as natural capital, economically, socially and ecologically.
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: develop an understanding of the natural forest ecology and how it is and has been affected by forestry practices.
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.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**
SECTION/SPECIFIC LEARNING OUTCOME		**2. Forests**
UNIT/SPECIFIC LEARNING OUTCOME		**It is expected the student will: explain how to manage forests for sustainably. Include:**
SPECIFIC LEARNING OUTCOME		role of forest certification
SPECIFIC LEARNING OUTCOME		effect of harvesting methods
SPECIFIC LEARNING OUTCOME		effect of deforestation
SPECIFIC LEARNING OUTCOME		ways to prevent natural capital degradation
SPECIFIC LEARNING OUTCOME		role of provincial and national parks, conservation areas, reserves and protected areas
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**

SECTION/SPECIFIC LEARNING OUTCOME		**2. Forests**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: examine the history of old growth forests, second-growth forests, and tree farms in New Brunswick.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**
SECTION/SPECIFIC LEARNING OUTCOME		**6. Climate Change**
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.
DOCUMENT/GENERAL LEARNING OUTCOME		**Introduction to Environmental Science 120 Curriculum**
CATEGORY		**UNIT 3 – Investigating Environmental Issues**
SECTION/SPECIFIC LEARNING OUTCOME		**7. Air and Water Pollution**
UNIT/SPECIFIC LEARNING OUTCOME		It is expected the student will: research and report on prevention and cleanup strategies to reduce air and water pollution.

Grade **10** - Adopted: **2017/Implement 2018**

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

SECTION/SPECIFIC LEARNING OUTCOME	SCO 1.2.	Demonstrate an understanding of different views of the natural world.
SECTION/SPECIFIC LEARNING OUTCOME	SCO 1.3.	Recognize factors that influence local, regional and global environmental decision-making.
DOCUMENT/GENERAL LEARNING OUTCOME		**Advanced Environmental Science 120**
CATEGORY	**GCO 1.**	**Introduction to the human sphere: recognize and appreciate the variety of ways people understand and interact with the natural world**
SECTION/SPECIFIC LEARNING OUTCOME	**SCO 1.4.**	**Briefly explore a range of current environmental issues.**
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.
DOCUMENT/GENERAL LEARNING OUTCOME		**Advanced Environmental Science 120**
CATEGORY	**GCO 2.**	**Earth Systems: Develop an understanding of the dynamics of biotic and abiotic components of the environment and the impact of current environmental issues**
SECTION/SPECIFIC LEARNING OUTCOME	**SCO 2.2.**	**Develop a general understanding of biosphere dynamics and the importance of biodiversity at the species, community and ecosystem levels**
UNIT/SPECIFIC LEARNING OUTCOME		Describe the concepts and dynamic patterns of distribution, migration, speciation and extinction.
DOCUMENT/GENERAL LEARNING OUTCOME		**Advanced Environmental Science 120**
CATEGORY	**GCO 2.**	**Earth Systems: Develop an understanding of issues impacting the dynamics of biotic and abiotic components of the environment**
SECTION/SPECIFIC LEARNING OUTCOME	SCO 2.3.	Examine and develop an understanding of soil composition and ecology, and current issues in agriculture and forestry
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 **10** - 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.
DOCUMENT/GENERAL LEARNING OUTCOME		**Physical Geography 110 – Portraits of a Planet**
CATEGORY		**Unit 7C: Natural Regions of the World (Climatological Emphasis)**
SECTION/SPECIFIC LEARNING OUTCOME		**How do the world's natural systems interact to produce a variety of natural habitats?**
UNIT/SPECIFIC LEARNING OUTCOME		**Students will be able to:**
SPECIFIC LEARNING OUTCOME		4. evaluate the impact of human activities on natural environments.
SPECIFIC LEARNING OUTCOME		5. explain the concept of sustainable development and develop strategies for informed use of global resources.

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Mathematics

Grade **10** - Adopted: **2015**

COURSE / STRAND	**NL.1201.**	**Mathematics 1201**
STRAND / GCO	**1201.RF.**	**Relations and Functions**
GCO / SCO		**Develop algebraic and graphical reasoning through the study of relations.**
OUTCOME / INDICATOR	**RF3.**	**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]**
INDICATOR	RF3.2.	Explain, using examples, slope as a rate of change.
INDICATOR	RF3.3.	Solve a contextual problem involving slope.
COURSE / STRAND	**NL.1201.**	**Mathematics 1201**
STRAND / GCO	**1201.RF.**	**Relations and Functions**
GCO / SCO		**Develop algebraic and graphical reasoning through the study of relations.**
OUTCOME / INDICATOR	**RF4.**	**Describe and represent linear relations, using: words; ordered pairs; table of values; graphs; equations. [C, R, V]**
INDICATOR	RF4.1.	Match corresponding representations of linear relations.

COURSE / STRAND	**NL.1201.**	**Mathematics 1201**
STRAND / GCO	**1201.RF.**	**Relations and Functions**
GCO / SCO		**Develop algebraic and graphical reasoning through the study of relations.**
OUTCOME / INDICATOR	**RF5.**	**Determine the characteristics of the graphs of linear relations, including the: intercepts; rate of change; domain; range. [CN, PS, R, V]**
INDICATOR	RF5.1.	Determine the rate of change of the graph of a linear relation.

COURSE / STRAND	**NL.1201.**	**Mathematics 1201**
STRAND / GCO	**1201.RF.**	**Relations and Functions**
GCO / SCO		**Develop algebraic and graphical reasoning through the study of relations.**
OUTCOME / INDICATOR	**RF6.**	**Relate linear relations expressed in: slope-intercept form y = mx + b; general form Ax + By + C = 0; slope-point form; y − y1 = m(x−x1) to their graphs. [CN, R, T, V]**
INDICATOR	RF6.1.	Express a linear relation in different forms, and compare their graphs.
INDICATOR	RF6.6.	Identify equivalent linear relations from a set of linear relations.

COURSE / STRAND	**NL.1202.**	**Applied Mathematics 1202**
STRAND / GCO	**1202.G.**	**Geometry**
GCO / SCO		**Develop spatial sense.**
OUTCOME / INDICATOR	**G1.**	**Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies. [C, CN, PS, R]**
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 **10** - Adopted: **2016**

COURSE / STRAND	**NL.2201.**	**Academic Mathematics 2201**
STRAND / GCO	**2201.NL.**	**Number and Logic**
GCO / SCO		**Develop number sense and logical reasoning.**
OUTCOME / INDICATOR	**NL1.**	**Analyze and prove conjectures, using inductive and deductive reasoning, to solve problems. [C, CN, PS, R]**
INDICATOR	NL1.7.	Compare, using examples, inductive and deductive reasoning.
INDICATOR	NL1.9.	Solve a contextual problem that involves inductive or deductive reasoning.

COURSE / STRAND	**NL.2201.**	**Academic Mathematics 2201**

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

COURSE / STRAND	**NL.2201.**	**Academic Mathematics 2201**
STRAND / GCO	**2201.M.**	**Measurement**
GCO / SCO		**Develop spatial sense and proportional reasoning.**
OUTCOME / INDICATOR	**M1.**	**Solve problems that involve the application of rates. [CN, PS, R]**
INDICATOR	M1.5.	Explain, using examples, the relationship between the slope of a graph and a rate.

Grade **10** - Adopted: **2012**

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

COURSE / STRAND	**NL.2202.**	**Applied Mathematics 2202**
STRAND / GCO	**2202.A.**	**Algebra**
GCO / SCO		**Develop algebraic reasoning.**
OUTCOME / INDICATOR	**A2.**	**Demonstrate an understanding of slope: as rise over run; as rate of change; by solving problems. [C, CN, PS, V]**
INDICATOR	A2.4.	Explain, using examples and illustrations, slope as rise over run.
INDICATOR	A2.8.	Explain, using examples and illustrations, slope as rate of change.
INDICATOR	A2.9.	Solve a contextual problem that involves slope or rate of change.

Grade **10** - Adopted: **2016**

COURSE / STRAND	**NL.3201.**	**Academic Mathematics 3201**
STRAND / GCO	**3201.LR.**	**Logical Reasoning**
GCO / SCO		**Develop logical reasoning.**
OUTCOME / INDICATOR	**LR1.**	**Analyze puzzles and games that involve numerical and logical reasoning, using problem-solving strategies. [C, CN, ME, PS, R]**
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 **10** - Adopted: **2013**

COURSE / STRAND	**NL.3202.**	**Applied Mathematics 3202**
STRAND / GCO	**3202.S.**	**Statistics**
GCO / SCO		**Develop statistical reasoning.**
OUTCOME / INDICATOR	**S1.**	**Solve problems that involve measures of central tendency, including: mean; median; mode; weighted mean; trimmed mean. [C, CN, PS, R]**
INDICATOR	S1.1.	Determine the mean, median and mode for a set of data.
INDICATOR	S1.2.	Solve a contextual problem that involves measures of central tendency.
INDICATOR	S1.3.	Identify and correct errors in a calculation of a measure of central tendency.
INDICATOR	S1.9.	Calculate the trimmed mean for a set of data, and justify the removal of the outliers.

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Science

Grade **10** - Adopted: **2018**

COURSE / STRAND	**NL.HS.CH.**	**Chemistry 2202**
STRAND / GCO	**NL.HS.CH.GCO.**	**General Curriculum Outcomes**
GCO / SCO	**HS.CH.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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to**
INDICATOR	CH.GCO.3.1.	Identify and explain the diversity of organic compounds and their impact on the environment

COURSE / STRAND	**NL.HS.CH.**	**Chemistry 2202**
STRAND / GCO	**NL.HS.CH.GCO.**	**General Curriculum Outcomes**

GCO / SCO	**HS.CH.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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to**
INDICATOR	CH.GCO.4.11.	Have a sense of personal and shared responsibility for maintaining a sustainable environment
INDICATOR	CH.GCO.4.13.	Want to take action for maintaining a sustainable environment

COURSE / STRAND	**NL.HS.CH.**	**Chemistry 2202**
STRAND / GCO	**NL.HS.CH.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.CH.SCO.i.**	**Unit i: Integrated Skills**
OUTCOME / INDICATOR		**Performing and Recording**
INDICATOR	CH.SCO.i.6.0.	Implement appropriate sampling procedures [GCO 2]

Grade **10** - Adopted: **2019**

COURSE / STRAND		**Chemistry 3202**
STRAND / GCO		**General Curriculum Outcomes**
GCO / SCO		**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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to**
INDICATOR		identify and explain the diversity of organic compounds and their impact on the environment

COURSE / STRAND		**Chemistry 3202**
STRAND / GCO		**General Curriculum Outcomes**
GCO / SCO		**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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to**
INDICATOR		have a sense of personal and shared responsibility for maintaining a sustainable environment
INDICATOR		want to take action for maintaining a sustainable environment

Grade **10** - Adopted: **2005**

COURSE / STRAND	**NL.HS.ES 3209.**	**Earth Systems 3209**

STRAND / GCO	**ES3209.2.**	**Unit 2: Historical Geology**
GCO / SCO	**ES3209.2.1.**	**Historical Developments and Geologic Time: Students will be expected to:**
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)

Grade **10** - Adopted: **2010**

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

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.3.**	**An Introduction to Environmental Science: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.3.3.**	**List some applications of Environmental Science. Include:**
INDICATOR	ENV3205.1.3.3.iii.	Risk assessment
INDICATOR	ENV3205.1.3.3.iv.	Decision making and policy development

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

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**

GCO / SCO	**ENV3205.1.4.**	**Environmental Issues and Human Needs: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.4.4.**	**Outline how balance is maintained in ecosystems. Include:**
INDICATOR	ENV3205.1.4.4.ii.	Nutrient cycling

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.5.**	**Conservation, Sustainability and Stewardship: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.1.5.1.	Define environmental Conservation.
OUTCOME / INDICATOR	ENV3205.1.5.2.	Define stewardship in relation to sustainability.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.5.**	**Conservation, Sustainability and Stewardship: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.5.3.**	**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

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.5.**	**Conservation, Sustainability and Stewardship: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.1.5.4.	Define precautionary principle.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**

GCO / SCO	**ENV3205.1.6.**	**Our Ecological Footprint: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.6.1.**	**Recognize some widely-held misconceptions related to sustainability. Include:**
INDICATOR	ENV3205.1.6.1.i.	Environment damage is permanent
INDICATOR	ENV3205.1.6.1.ii.	Forest fires are bad
INDICATOR	ENV3205.1.6.1.iii.	One person cannot make a difference
INDICATOR	ENV3205.1.6.1.iv.	Science can solve all of our problems
INDICATOR	ENV3205.1.6.1.vi.	All human activity in nature is bad
COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.6.**	**Our Ecological Footprint: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.1.6.2.	Identify individual impacts on the environment using the concept of ecological footprint.
OUTCOME / INDICATOR	ENV3205.1.6.3.	Describe your community's impact on the environment.
COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.6.**	**Our Ecological Footprint: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.6.4.**	**Describe environmental responsibility. Include the role of:**
INDICATOR	ENV3205.1.6.4.i.	Individuals
INDICATOR	ENV3205.1.6.4.ii.	Community
INDICATOR	ENV3205.1.6.4.iii.	Industry
COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**

STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.7.**	**Eco-citizenship: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.7.1.**	**Define eco-citizenship. Include:**
INDICATOR	ENV3205.1.7.1.i.	Knowledge
INDICATOR	ENV3205.1.7.1.ii.	Attitude
INDICATOR	ENV3205.1.7.1.iii.	Practice

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.7.**	**Eco-citizenship: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.7.2.**	**Identify examples of eco-citizenship at different levels. Includes:**
INDICATOR	ENV3205.1.7.2.i.	Household
INDICATOR	ENV3205.1.7.2.ii.	Community
INDICATOR	ENV3205.1.7.2.iii.	Provincial

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.7.**	**Eco-citizenship: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.1.7.3.	Identify the conflict that may exist between eco-citizenship and economic realities.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.8.**	**Eco-Regions and Biodiversity: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.1.8.2.	Define biodiversity.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.8.**	**Eco-Regions and Biodiversity: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.8.3.**	**Identify factors that relate to biodiversity. Include:**
INDICATOR	ENV3205.1.8.3.ii.	Species diversity
INDICATOR	ENV3205.1.8.3.iii.	Genetic diversity

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.9.**	**Biodiversity and Species at Risk: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.1.9.1.	Describe the importance of species diversity and genetic diversity in an ecosystem.
OUTCOME / INDICATOR	ENV3205.1.9.2.	Identify reasons why some organisms become species at risk.
OUTCOME / INDICATOR	ENV3205.1.9.3.	Recognize the importance of protecting species.
OUTCOME / INDICATOR	ENV3205.1.9.4.	Distinguish between natural extinctions and anthropogenic extinctions.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.10.**	**Protecting Biodiversity – Species: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.10.1.**	**Recognize the process of classifying an organism as a species at risk. Include:**
INDICATOR	ENV3205.1.10.1.i.	Species assessment
INDICATOR	ENV3205.1.10.1.ii.	COSEWIC's recommendation

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**

STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.10.**	**Protecting Biodiversity – Species: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.10.2.**	**Identify the COSEWIC listings that categorize species at risk. Include:**
INDICATOR	ENV3205.1.10.2.i.	Not at risk
INDICATOR	ENV3205.1.10.2.ii.	Data deficient
INDICATOR	ENV3205.1.10.2.iii.	Special concern
INDICATOR	ENV3205.1.10.2.iv.	Threatened
INDICATOR	ENV3205.1.10.2.v.	Endangered
INDICATOR	ENV3205.1.10.2.vi.	Extirpated
INDICATOR	ENV3205.1.10.2.vii.	Extinct

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.10.**	**Protecting Biodiversity – Species: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.10.3.**	**Describe the recovery process of a species at risk. Include:**
INDICATOR	ENV3205.1.10.3.i.	Research
INDICATOR	ENV3205.1.10.3.ii.	Monitoring
INDICATOR	ENV3205.1.10.3.iii.	Stewardship
INDICATOR	ENV3205.1.10.3.iv.	Education
INDICATOR	ENV3205.1.10.3.vi.	Socio-economic

INDICATOR	ENV3205.1.10.3.vii.	Recovery teams

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.1.**	**Unit 1: Introduction to Environmental Science**
GCO / SCO	**ENV3205.1.11.**	**Protecting Biodiversity – Spaces: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.1.11.5.**	**Identify the tools used in the management of protected areas. Include:**
INDICATOR	ENV3205.1.11.5.iv.	Stewardship

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.2.**	**Unit 2: Recreation and The Environment**
GCO / SCO	**ENV3205.2.3.**	**Ecological Integrity: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.2.3.1.	Define ecological integrity.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.2.**	**Unit 2: Recreation and The Environment**
GCO / SCO	**ENV3205.2.3.**	**Ecological Integrity: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.2.3.3.**	**Identify the values of ecotourism. Include:**
INDICATOR	ENV3205.2.3.3.iv.	Promotes the sustainable use of natural resources

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.2.**	**Unit 2: Recreation and The Environment**
GCO / SCO	**ENV3205.2.4.**	**Wilderness Access: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.2.4.2.**	**Identify the environmental impacts of routes of access to Newfoundland and Labrador wilderness. Include:**
INDICATOR	ENV3205.2.4.2.iii.	Fragmentation of habitat

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**

GCO / SCO	**ENV3205.3.1.**	**Introducing the Forest: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.3.1.4.**	**Outline the value of forest ecosystems. Include:**
INDICATOR	ENV3205.3.1.4.i.	Economic
INDICATOR	ENV3205.3.1.4.ii.	Ecological
INDICATOR	ENV3205.3.1.4.iii.	Social
COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.1.**	**Introducing the Forest: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.3.1.5.**	**List forest usage in Newfoundland and Labrador. Include:**
INDICATOR	ENV3205.3.1.5.i.	Recreational
INDICATOR	ENV3205.3.1.5.ii.	Domestic and commercial harvesting
INDICATOR	ENV3205.3.1.5.iii.	Other alternate uses (e.g. berry picking, woodworking, fungus picking, etc.)
COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.3.**	**Old Growth Forests: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.3.3.3.**	**List characteristics of old growth forests. Include:**
INDICATOR	ENV3205.3.3.3.iv.	Lacks natural and human disturbance
INDICATOR	ENV3205.3.3.3.v.	Presence of snags and deadfalls
COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.3.**	**Old Growth Forests: Students will be expected to:**

OUTCOME / INDICATOR	**ENV3205.3.3.4.**	**Describe the importance of an old growth forest. Include:**
INDICATOR	ENV3205.3.3.4.i.	Ecological
INDICATOR	ENV3205.3.3.4.ii.	Social
INDICATOR	ENV3205.3.3.4.iii.	Economic

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.3.**	**Old Growth Forests: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.3.3.5.	Evaluate environmental and social concerns related to the maintenance versus harvesting of old growth forests.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.4.**	**Forest Management: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.3.4.1.	Outline the history of forest management in Newfoundland and Labrador from the 19th century to present.
OUTCOME / INDICATOR	ENV3205.3.4.2.	Recognize the paradigm shift in forest management from exploitation to sustainable development.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.4.**	**Forest Management: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.3.4.3.**	**Describe Sustainable Forest Management (SFM) in terms of:**
INDICATOR	ENV3205.3.4.3.i.	Supporting multiple forest usage
INDICATOR	ENV3205.3.4.3.ii.	Protecting and manages forest ecosystems
INDICATOR	ENV3205.3.4.3.iii.	Requiring continual scientific practices and monitoring

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.4.**	**Forest Management: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.3.4.4.	Identify the role of the Canadian Model Forest Network in promoting SFM.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.4.**	**Forest Management: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.3.4.5.**	**List the components in forest management planning. Include:**
INDICATOR	ENV3205.3.4.5.i.	Twenty year forest development plans
INDICATOR	ENV3205.3.4.5.ii.	Five year operating plan
INDICATOR	ENV3205.3.4.5.iii.	Annual work schedule

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.4.**	**Forest Management: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.3.4.6.	Identify the role of the public in the development of a forest management plan.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.5.**	**Using and Caring for the Forests: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.3.5.1.	Distinguish between clear cutting and selective cutting as forest harvesting techniques in Newfoundland and Labrador.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**

GCO / SCO	**ENV3205.3.5.**	**Using and Caring for the Forests: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.3.5.2.**	**Identify the improvements made to clear cutting to reduce impacts on the forest ecosystem. Include:**
INDICATOR	ENV3205.3.5.2.i.	Mimicking natural disturbances
INDICATOR	ENV3205.3.5.2.ii.	Creation of buffer zones
INDICATOR	ENV3205.3.5.2.iii.	Improved access road construction
INDICATOR	ENV3205.3.5.2.iv.	Improved harvesting technologies

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.5.**	**Using and Caring for the Forests: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.3.5.3.	Define silviculture.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.5.**	**Using and Caring for the Forests: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.3.5.4.**	**Describe silviculture techniques. Include:**
INDICATOR	ENV3205.3.5.4.i.	Pre-commercial thinning
INDICATOR	ENV3205.3.5.4.ii.	Genetic enhancement
INDICATOR	ENV3205.3.5.4.iii.	Introduction of faster growing species
INDICATOR	ENV3205.3.5.4.iv.	Tree plantations

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**

GCO / SCO	**ENV3205.3.5.**	**Using and Caring for the Forests: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.3.5.5.	Contrast positive and negative effects of silvicultural practices.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.3.**	**Unit 3: Land Use and the Environment**
GCO / SCO	**ENV3205.3.5.**	**Using and Caring for the Forests: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.3.5.6.**	**Identify new technologies used in the forest industry. Include:**
INDICATOR	ENV3205.3.5.6.i.	Soft footprint technologies
INDICATOR	ENV3205.3.5.6.ii.	Computerized decision support tools (GIS, GPS, and remote sensing)

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.5.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.5.1.**	**Introduction to the Atmosphere: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.5.1.2.**	**List the major functions of Earth's atmosphere. Include:**
INDICATOR	ENV3205.5.1.2.ii.	Traps heat

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.5.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.5.2.**	**Interactions in the Atmosphere: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.5.2.1.**	**Identify natural interactions that affect Earth's atmosphere. Include:**
INDICATOR	ENV3205.5.2.1.i.	Plants/animals

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.5.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.5.4.**	**Air Quality and Airborne Pollutants: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.5.4.1.**	**Describe critical air contaminants effects on air quality. Include:**

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

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.5.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.5.5.**	**Persistant Organic Pollutants: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.5.5.1.**	**Describe how persistant organic pollutants affect air quality. Include:**
INDICATOR	ENV3205.5.5.1.i.	Sources in Newfoundland and Labrador

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.5.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.5.11.**	**Climate Change: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.5.11.1.**	**Identify that climate change can have a catastrophic affect on Earth. Include:**
INDICATOR	ENV3205.5.11.1.i.	Natural sources of green house gasses
INDICATOR	ENV3205.5.11.1.ii.	Anthropogenic sources of greenhouse gases

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.5.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.5.12.**	**Climate Change Impacts: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.5.12.1.**	**Describe the impacts of climate change in Canada on wildlife and natural ecosystems. Include:**
INDICATOR	ENV3205.5.12.1.i.	Types of vegetation
INDICATOR	ENV3205.5.12.1.ii.	Shifting ecosystem boundaries
INDICATOR	ENV3205.5.12.1.iii.	Biodiversity of species
INDICATOR	ENV3205.5.12.1.iv.	Adaptation of species

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**

STRAND / GCO	**ENV3205.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.12.**	**Climate Change Impacts: Students will be expected to:**
OUTCOME / INDICATOR	ENV3205.12.2.	Describe the impacts of climate change in forests.

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.12.**	**Climate Change Impacts: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.12.3.**	**Describe the impacts of climate change in Canada on agriculture. Include:**
INDICATOR	ENV3205.12.3.i.	Length of growing season
INDICATOR	ENV3205.12.3.ii.	Extreme weather events
INDICATOR	ENV3205.12.3.iii.	Types of crops
INDICATOR	ENV3205.12.3.iv.	Precipitation variability

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.12.**	**Climate Change Impacts: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.12.4.**	**Describe the impacts of climate change in Canada on fishery. Include:**
INDICATOR	ENV3205.12.4.i.	Water temperature effects
INDICATOR	ENV3205.12.4.ii.	Species distribution
INDICATOR	ENV3205.12.4.iii.	Growth rates

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.12.**	**Climate Change Impacts: Students will be expected to:**

OUTCOME / INDICATOR	**ENV3205.5.12.5.**	**Describe the impacts of climate change in Canada on coastal zones (sea level changes and areas of human habitat). Include:**
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

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.5.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.5.12.**	**Climate Change Impacts: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.5.12.6.**	**Describe the impacts of climate change in Canada on extreme weather events. Include:**
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

COURSE / STRAND	**NL.HS.ENV3205.**	**Environmental Science 3205**
STRAND / GCO	**ENV3205.5.**	**Unit 5: The Atmosphere and the Environment**
GCO / SCO	**ENV3205.5.12.**	**Climate Change Impacts: Students will be expected to:**
OUTCOME / INDICATOR	**ENV3205.5.12.7.**	**Describe the impacts of climate change in Canada on human health. Include:**
INDICATOR	ENV3205.5.12.7.i.	Heat stress
INDICATOR	ENV3205.5.12.7.ii.	Migration of diseases

Grade **10** - Adopted: **2018**

COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.GCO.**	**General Curriculum Outcomes**

GCO / SCO	**HS.SC.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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to**
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

COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.GCO.**	**General Curriculum Outcomes**
GCO / SCO	**HS.SC.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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to**
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

COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.GCO.**	**General Curriculum Outcomes**
GCO / SCO	**HS.SC.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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to**
INDICATOR	SC.GCO.3.4.	Chemistry: Identify and explain the diversity of organic compounds and their impact on the environment
INDICATOR	SC.GCO.3.19.	Life Science: Evaluate relationships that affect the biodiversity and sustainability of life within the biosphere

COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.GCO.**	**General Curriculum Outcomes**
GCO / SCO	**HS.SC.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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to**
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

COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.SC.SCO.i.**	**Unit i: Integrated Skills**
OUTCOME / INDICATOR		**Initiating and Planning**
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]

COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.SC.SCO.i.**	**Unit i: Integrated Skills**
OUTCOME / INDICATOR		**Performing and Recording**
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]

COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.SC.SCO.i.**	**Unit i: Integrated Skills**
OUTCOME / INDICATOR		**Communication and Teamwork**

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]
COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.SC.SCO.1.**	**Unit 1: Weather Dynamics**
OUTCOME / INDICATOR		**Climate Change**
INDICATOR	SC.SCO.1.39.0.	Explain how scientific knowledge evolves as new evidence comes to light [GCO 1]
COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.SC.SCO.1.**	**Unit 1: Weather Dynamics**
OUTCOME / INDICATOR		**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]
COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.SC.SCO.4.**	**Unit 4: Sustainability of Ecosystems**
OUTCOME / INDICATOR		**Cycles and Sustainability**
INDICATOR	SC.SCO.4.68.0.	Illustrate and explain the cycling of matter through biotic and abiotic components of an ecosystem by tracking carbon, nitrogen, and oxygen [GCO 3]
COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.SCO.**	**Specific Curriculum Outcomes**

GCO / SCO	**HS.SC.SCO.4.**	**Unit 4: Sustainability of Ecosystems**
OUTCOME / INDICATOR		**Factors That Affect the Sustainability of Ecosystems**
INDICATOR	SC.SCO.4.71.0.	Analyze the impact of external factors on an ecosystem [GCO 3]
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]
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]
INDICATOR	SC.SCO.4.27.0.	Identify multiple perspectives that influence a science-related decision or issue [GCO 2]
INDICATOR	SC.SCO.4.51.0.	Defend a decision or judgment and demonstrate that relevant arguments can arise from different perspectives [GCO 1]

COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.SC.SCO.4.**	**Unit 4: Sustainability of Ecosystems**
OUTCOME / INDICATOR		**Biodiversity and Sustainability**
INDICATOR	SC.SCO.4.73.0.	Explain how the biodiversity of an ecosystem contributes to its sustainability [GCO 3]
INDICATOR	SC.SCO.4.74.0.	Explain why different ecosystems respond differently to short-term stresses and long-term changes [GCO 3]

COURSE / STRAND	**NL.HS.SC.**	**Science 1206**
STRAND / GCO	**NL.HS.SC.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.SC.SCO.4.**	**Unit 4: Sustainability of Ecosystems**
OUTCOME / INDICATOR		**Sustainable Development**
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]

Grade **10** - Adopted: **2004**

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

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	SC2200.1.1.2.	Compare traditional attitudes and practices to the environment to those embodied in a philosophy of sustainability.
OUTCOME / INDICATOR	SC2200.1.1.6.	Define sustainability.
OUTCOME / INDICATOR	SC2200.1.1.7.	Evaluate relationships that affect the biodiversity and sustainability of life within the biosphere. (NLS-1)
OUTCOME / INDICATOR	SC2200.1.1.8.	Analyze from a variety of perspectives the risks to society of a biodiversity loss. (118-2)
OUTCOME / INDICATOR	SC2200.1.1.10.	Define ecology, ecosystem, habitat, population, community, biodiversity.
OUTCOME / INDICATOR	SC2200.1.1.14.	Describe the classification system for at-risk species.
COURSE / STRAND	**NL.HS.SC2200.**	**Science 2200**
STRAND / GCO	**SC2200.1.**	**Unit 1: Ecosystems**
GCO / SCO	**SC2200.1.1.**	**Diversity in Ecosystems: Students will be expected to:**
OUTCOME / INDICATOR	**SC2200.1.1.15.**	**Describe the main causes and effects of extinction:**
INDICATOR	SC2200.1.1.15.1.	Causes: (i) loss of habitat; (ii) pollution of air and water; (iii) natural environmental change; (iv) climate change; (v) competition for food (i.e., space)
INDICATOR	SC2200.1.1.15.2.	Effects: (i) loss of biodiversity; (ii) food chain collapse
COURSE / STRAND	**NL.HS.SC2200.**	**Science 2200**
STRAND / GCO	**SC2200.1.**	**Unit 1: Ecosystems**
GCO / SCO	**SC2200.1.1.**	**Diversity in Ecosystems: Students will be expected to:**
OUTCOME / INDICATOR	SC2200.1.1.16.	Compile and organize data, using appropriate formats and data treatments to facilitate interpretation of the data. (213-5)
OUTCOME / INDICATOR	SC2200.1.1.17.	Using library and electronic research tools, collect information on a given topic, develop a position or course of action based on the findings, and present, and defend the position. (213-6, 215-5)
OUTCOME / INDICATOR	SC2200.1.1.18.	Work cooperatively with team members to develop and carry out a plan, and troubleshoot problems as they arise. (215-6)

COURSE / STRAND	**NL.HS.SC 2200.**	**Science 2200**
STRAND / GCO	**SC2200. 1.**	**Unit 1: Ecosystems**
GCO / SCO	**SC2200. 1.2.**	**Change and Stability in Ecosystems: Students will be expected to:**
OUTCOME / INDICATOR	SC2200. 1.2.1.	Understand that biodiversity loss due to human activity adversely affects ecosystems. (NLS-2)
OUTCOME / INDICATOR	SC2200. 1.2.2.	Analyze social issues related to rates of global extinctions. (118-9)
OUTCOME / INDICATOR	SC2200. 1.2.10.	Explain how humans have changed the flow of energy in ecosystems.
OUTCOME / INDICATOR	SC2200. 1.2.15.	Explain how biodiversity of an ecosystem contributes to its sustainability. (318-6)
OUTCOME / INDICATOR	SC2200. 1.2.17.	Describe global warming and its impact on our local environment. (215-1)
OUTCOME / INDICATOR	SC2200. 1.2.18.	Describe and predict the nature and effects of changes to terrestrial systems. (331-6)
OUTCOME / INDICATOR	SC2200. 1.2.19.	Pollution (e.g., excess CO2)
OUTCOME / INDICATOR	SC2200. 1.2.20.	Weather change.
OUTCOME / INDICATOR	SC2200. 1.2.21.	Analyze the impact of external factors on an ecosystem by describing how humans have altered the carbon cycle and nitrogen cycle in ecosystems. (318-4)
OUTCOME / INDICATOR	SC2200. 1.2.22.	Compile and organize data, using appropriate formats and data treatments to facilitate interpretation of the data. (213-5)
OUTCOME / INDICATOR	SC2200. 1.2.26.	Illustrate the cycling of matter through biotic and abiotic components of an ecosystem by tracking carbon, nitrogen and oxygen. (318-1)
OUTCOME / INDICATOR	SC2200. 1.2.28.	Differentiate between organic and inorganic materials.
OUTCOME / INDICATOR	SC2200. 1.2.30.	Explain the carbon cycle by describing the processes required to cycle from carbon storage to the atmosphere.
OUTCOME / INDICATOR	SC2200. 1.2.34.	Describe the significance of global warming.
OUTCOME / INDICATOR	SC2200. 1.2.36.	Examine the change of matter in ecosystems using the concept of the cycling of matter. (318-1)

OUTCOME / INDICATOR	SC2200.1.2.39.	Explain how humans have changed the flow of energy in ecosystems. (118-2)
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	SC2200.1.2.42.	Describe how humans have altered the carbon cycle and nitrogen cycle in ecosystems.
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)

COURSE / STRAND	**NL.HS.SC2200.**	**Science 2200**
STRAND / GCO	**SC2200.1.**	**Unit 1: Ecosystems**
GCO / SCO	**SC2200.1.3.**	**Sustaining Ecosystems: Students will be expected to:**
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	SC2200.1.3.19.	Explain why the ecosystem may respond differently to short-term stress and long-term change. (318-4)

COURSE / STRAND	**NL.HS.SC2200.**	**Science 2200**
STRAND / GCO	**SC2200.1.**	**Unit 1: Ecosystems**
GCO / SCO	**SC2200.1.3.**	**Sustaining Ecosystems: Students will be expected to:**
OUTCOME / INDICATOR	**SC2200.1.3.20.**	**Describe the potential impact that a large scale clear-cut logging project could have on various native species. Include:**
INDICATOR	SC2200.1.3.20.i.	Temperature increase
INDICATOR	SC2200.1.3.20.ii.	Water loss

INDICATOR	SC2200.1.3.20.iii.	Food web disruption
INDICATOR	SC2200.1.3.20.iv.	Habitat loss
INDICATOR	SC2200.1.3.20.v.	Nesting site loss
COURSE / STRAND	**NL.HS.SC2200.**	**Science 2200**
STRAND / GCO	**SC2200.1.**	**Unit 1: Ecosystems**
GCO / SCO	**SC2200.1.3.**	**Sustaining Ecosystems: Students will be expected to:**
OUTCOME / INDICATOR	SC2200.1.3.21.	Understand that sustainable development is a shift in the way people view resource development. (114-1)
OUTCOME / INDICATOR	SC2200.1.3.22.	Compare the risks and benefits to the environment of applying new logging technology like clear-cutting. (118-1)
OUTCOME / INDICATOR	SC2200.1.3.23.	Describe the potential impact that that a large clear-cut logging operation could have on native animal species. (318-4)
OUTCOME / INDICATOR	SC2200.1.3.24.	Propose and defend a course of action on a river watershed with respect to resource harvesting or conservation. (118-9, 118-5, 215-4)
OUTCOME / INDICATOR	SC2200.1.3.25.	Communicate questions, ideas and intentions, and receive, interpret, understand, support and respond to the ideas of others in preparing a report about ecosystem change. (215-1)
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)
OUTCOME / INDICATOR	SC2200.1.3.42.	Propose and defend a course of action on a multi-perspective social issue. (118-9, 118-5, 215-4)
COURSE / STRAND	**NL.HS.SC2200.**	**Science 2200**
STRAND / GCO	**SC2200.2.**	**Unit 2: Earth and Space Science: Weather Dynamics**
GCO / SCO	**SC2200.2.2.**	**Global Weather: Students will be expected to:**
OUTCOME / INDICATOR	SC2200.2.2.23.	Identify the distribution of common atmospheric gases (oxygen, nitrogen, water vapour, carbon dioxide).
COURSE / STRAND	**NL.HS.SC2200.**	**Science 2200**
STRAND / GCO	**SC2200.2.**	**Unit 2: Earth and Space Science: Weather Dynamics**
GCO / SCO	**SC2200.2.3.**	**Extreme Weather Events: Students will be expected to:**

OUTCOME / INDICATOR	SC2200.2.3.9.	Describe how human activities can impact global weather patterns.
OUTCOME / INDICATOR	SC2200.2.3.10.	Describe the causes and impact of the greenhouse effect.

Grade **10** - Adopted: **2018**

COURSE / STRAND	**NL.HS.PH.**	**Physics 2204**
STRAND / GCO	**NL.HS.PH.GCO.**	**General Curriculum Outcomes**
GCO / SCO	**HS.PH.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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes – By the end of Grade 12, students will be expected to**
INDICATOR	PH.GCO.4.11.	Have a sense of personal and shared responsibility for maintaining a sustainable environment
INDICATOR	PH.GCO.4.13.	Want to take action for maintaining a sustainable environment

COURSE / STRAND	**NL.HS.PH.**	**Physics 2204**
STRAND / GCO	**NL.HS.PH.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.PH.SCO.i.**	**Unit i: Integrated Skills**
OUTCOME / INDICATOR		**Initiating and Planning**
INDICATOR	PH.SCO.i.5.0.	Implement appropriate sampling procedures [GCO 2]

COURSE / STRAND	**NL.HS.PH.**	**Physics 2204**
STRAND / GCO	**NL.HS.PH.SCO.**	**Specific Curriculum Outcomes**
GCO / SCO	**HS.PH.SCO.i.**	**Unit i: Integrated Skills**
OUTCOME / INDICATOR		**Communication and Teamwork**
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]

Grade **10** - Adopted: **2019**

COURSE / STRAND		**Physics 3204**
STRAND / GCO		**General Curriculum Outcomes**
GCO / SCO		**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.**

OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to**
INDICATOR		have a sense of personal and shared responsibility for maintaining a sustainable environment
INDICATOR		want to take action for maintaining a sustainable environment

COURSE / STRAND		**Physics 3204**
STRAND / GCO		**General Curriculum Outcomes**
GCO / SCO		**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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to**
INDICATOR		have a sense of personal and shared responsibility for maintaining a sustainable environment
INDICATOR		want to take action for maintaining a sustainable environment

COURSE / STRAND		**Physics 3204**
STRAND / GCO		**General Curriculum Outcomes**
GCO / SCO		**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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to**
INDICATOR		have a sense of personal and shared responsibility for maintaining a sustainable environment
INDICATOR		want to take action for maintaining a sustainable environment

Grade **10** - Adopted: **2020**

COURSE / STRAND		**Biology 2201**
STRAND / GCO		**Curriculum Outcomes Framework**
GCO / SCO	**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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to**
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.

COURSE / STRAND		**Biology 2201**
STRAND / GCO		**Curriculum Outcomes Framework**
GCO / SCO	**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.**

OUTCOME / INDICATOR		**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
COURSE / STRAND		**Biology 2201**
STRAND / GCO		**Curriculum Outcomes Framework**
GCO / SCO	**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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to**
INDICATOR		evaluate relationships that affect the biodiversity and sustainability of life within the biosphere.
COURSE / STRAND		**Biology 2201**
STRAND / GCO		**Curriculum Outcomes Framework**
GCO / SCO	**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.**
OUTCOME / INDICATOR		**Key Stage Curriculum Outcomes - By the end of Grade 12, students will be expected to**
INDICATOR		appreciate that the applications of science and technology can raise ethical dilemmas;
INDICATOR		confidently evaluate evidence and consider alternative perspectives, ideas, and explanations;
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;
INDICATOR		be aware of the direct and indirect consequences of their actions.

Northern Territory Curriculum

Science

Grade **9** - Adopted: **2016**

STRAND / DOMAIN	**ACSSU.9.**	**Science Understanding**
OUTCOME / INDICATOR	**ACSSU.9.1.**	**Biological sciences**
INDICATOR	**ACSSU.9.1.2.**	**Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176)**
INDICATOR	ACSSU.9.1.2.2.	Examining factors that affect population sizes such as seasonal changes, destruction of habitats, introduced species
STRAND / DOMAIN	**ACSHE.9.**	**Science as a Human Endeavour**

OUTCOME / INDICATOR	**ACSHE. 9.2.**	**Use and influence of science**
INDICATOR	**ACSHE. 9.2.1.**	**People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities (ACSHE160)**
INDICATOR	ACSHE.9 .2.1.6.	Considering the impact of technological advances developed in Australia, such as the cochlear implant and bionic eye
INDICATOR	ACSHE.9 .2.1.7.	Considering the impacts of human activity on an ecosystem from a range of different perspectives

STRAND / DOMAIN	**ACSIS.9.**	**Science Inquiry Skills**
OUTCOME / INDICATOR	**ACSIS.9. 2.**	**Planning and conducting**
INDICATOR	**ACSIS.9 .2.2.**	**Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS166)**
INDICATOR	ACSIS.9. 2.2.2.	Applying specific skills for the use of scientific instruments

STRAND / DOMAIN	**ACSIS.9.**	**Science Inquiry Skills**
OUTCOME / INDICATOR	**ACSIS.9. 5.**	**Communicating**
INDICATOR	**ACSIS.9 .5.1.**	**Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS174)**
INDICATOR	ACSIS.9. 5.1.2.	Using secondary sources as well as students' own findings to help explain a scientific concept

Northern Territory Curriculum

Science

Grade **10** - Adopted: **2016**

STRAND / DOMAIN	**ACSSU.1 0.**	**Science Understanding**
OUTCOME / INDICATOR	**ACSSU. 10.3.**	**Earth and space sciences**
INDICATOR	**ACSSU. 10.3.2.**	**Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere (ACSSU189)**
INDICATOR	ACSSU.1 0.3.2.2.	Modelling a cycle, such as the water, carbon, nitrogen or phosphorus cycle within the biosphere
INDICATOR	ACSSU.1 0.3.2.3.	Explaining the causes and effects of the greenhouse effect
INDICATOR	ACSSU.1 0.3.2.5.	Considering the long-term effects of loss of biodiversity

STRAND / DOMAIN	**ACSHE.1 0.**	**Science as a Human Endeavour**

OUTCOME / INDICATOR	**ACSHE. 10.1.**	**Nature and development of science**
INDICATOR	**ACSHE. 10.1.1.**	**Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community (ACSHE191)**
INDICATOR	ACSHE.10.1.1.5.	Considering the role of science in identifying and explaining the causes of climate change
STRAND / DOMAIN	**ACSHE.10.**	**Science as a Human Endeavour**
OUTCOME / INDICATOR	**ACSHE. 10.1.**	**Nature and development of science**
INDICATOR	**ACSHE. 10.1.2.**	**Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries (ACSHE192)**
INDICATOR	ACSHE.10.1.2.1.	Recognising that the development of fast computers has made possible the analysis of DNA sequencing, radio astronomy signals and other data
INDICATOR	ACSHE.10.1.2.4.	Considering how information technology can be applied to different areas of science such as bioinformatics and the Square Kilometre Array
STRAND / DOMAIN	**ACSHE.10.**	**Science as a Human Endeavour**
OUTCOME / INDICATOR	**ACSHE. 10.2.**	**Use and influence of science**
INDICATOR	**ACSHE. 10.2.1.**	**People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities (ACSHE194)**
INDICATOR	ACSHE.10.2.1.5.	Considering how the computing requirements in many areas of modern science depend on people working in the area of information technology
INDICATOR	ACSHE.10.2.1.6.	Considering the scientific knowledge used in discussions relating to climate change
INDICATOR	ACSHE.10.2.1.8.	Evaluating claims relating to environmental footprints
STRAND / DOMAIN	**ACSHE.10.**	**Science as a Human Endeavour**
OUTCOME / INDICATOR	**ACSHE. 10.2.**	**Use and influence of science**
INDICATOR	**ACSHE. 10.2.2.**	**Values and needs of contemporary society can influence the focus of scientific research (ACSHE230)**
INDICATOR	ACSHE.10.2.2.1.	Investigating technologies associated with the reduction of carbon pollution, such as carbon capture
STRAND / DOMAIN	**ACSIS.10.**	**Science Inquiry Skills**
OUTCOME / INDICATOR	**ACSIS.10.2.**	**Planning and conducting**
INDICATOR	**ACSIS.10.2.2.**	**Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS200)**

INDICATOR	ACSIS.10.2.2.2.	Applying specific skills for the use of scientific instruments

Grade **10** - Adopted: **2017**

STRAND / DOMAIN	**NTCET.SC.**	**Science – Year 10 (2017)**
OUTCOME / INDICATOR	**SHE.**	**Science as a Human Endeavour Year 9-10**
INDICATOR		**Nature and development of science**
INDICATOR	SHE.2.	Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries (ACSHE192)

STRAND / DOMAIN	**NTCET.SC.**	**Science – Year 10 (2017)**
OUTCOME / INDICATOR	**SHE.**	**Science as a Human Endeavour Year 9-10**
INDICATOR		**Use and influence of science**
INDICATOR	SHE.4.	Values and needs of contemporary society can influence the focus of scientific research (ACSHE230)

STRAND / DOMAIN	**NTCET.SC.**	**Science – Year 10 (2017)**
OUTCOME / INDICATOR	**SIS.**	**Science Inquiry Skills Year 9-10**
INDICATOR		**Planning and conducting**
INDICATOR	SIS.3.	Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS200)

STRAND / DOMAIN	**NTCET.SC.**	**Science – Year 10 (2017)**
OUTCOME / INDICATOR	**SIS.**	**Science Inquiry Skills Year 9-10**
INDICATOR		**Communicating**
INDICATOR	SIS.8.	Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS208)

Northern Territory Curriculum

Technology Education

Grade **9** - Adopted: **2016 (ACARA)**

STRAND / DOMAIN		**Design and Technologies**
OUTCOME / INDICATOR	**ACTDEK.9-10.**	**Design and Technologies Knowledge and Understanding**
INDICATOR	**ACTDEK.9-10.3.**	**By the end of Year 10 students will have had the opportunity to design and produce designed solutions for one or more of the technologies contexts below.**
INDICATOR	**ACTDEK.9-10.3.5.**	**Investigate and make judgments, within a range of technologies specialisations, on how technologies can be combined to create designed solutions (ACTDEK047)**

INDICATOR	ACTDEK.9-10.3.5.1.	Examining factors influencing the design of a product that has an explicit environmental emphasis, for example the low-flush toilet
INDICATOR	ACTDEK.9-10.3.5.2.	Critiquing product manufacturing processes in relation to society, ethics, and sustainability factors, for example a mechanised entertainment system; an interactive multimedia product to teach a concept to a student in a country in Asia
INDICATOR	ACTDEK.9-10.3.5.3.	Critiquing the social nature of services, for example a signage system to manage students and community members during a school function (signs may include words, pictures and/or braille); organisational system for an aged-care facility
INDICATOR	ACTDEK.9-10.3.5.4.	Critiquing environments in relation to preferred futures in relation to society, ethics and sustainability practices, for example the refurbishment of a local playground; the re-design of a local wetland

STRAND / DOMAIN		**Design and Technologies**
OUTCOME / INDICATOR	**ACTDEP.9-10.**	**Design and Technologies Processes and Production Skills**
INDICATOR	**ACTDEP.9-10.4.**	**Evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability (ACTDEP051)**
INDICATOR	ACTDEP.9-10.4.1.	Establishing specific criteria for success for evaluating designed solutions
INDICATOR	ACTDEP.9-10.4.2.	Evaluating and justifying the use and best combination of traditional, contemporary and emerging technologies during project development, including consideration of sustainability, for example farming methods in South-East Asia
INDICATOR	ACTDEP.9-10.4.3.	Evaluating choices made at various stages of a design process and modifying plans when needed with consideration of criteria for success
INDICATOR	ACTDEP.9-10.4.4.	Evaluating projects for their long-term application, functionality and impact
INDICATOR	ACTDEP.9-10.4.5.	Reflecting on learning, evaluating processes and transferring new knowledge and skills to future design projects

STRAND / DOMAIN		**Digital Technologies**
OUTCOME / INDICATOR	**ACTDIP.9-10.**	**Digital Technologies Processes and Production Skills**
INDICATOR	**ACTDIP.9-10.3.**	**Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (ACTDIP038)**
INDICATOR	ACTDIP.9-10.3.1.	developing a preliminary specification for an opportunity or a need that typically contains a problem statement, a set of solution needs expressed as functional and non-functional requirements, any assumptions or constraints to be considered and the scope or boundaries of the solution

STRAND / DOMAIN		**Digital Technologies**
OUTCOME / INDICATOR	**ACTDIP.9-10.**	**Digital Technologies Processes and Production Skills**

INDICATOR	**ACTDIP.9-10.4.**	**Design the user experience of a digital system by evaluating alternative designs against criteria including functionality, accessibility, usability, and aesthetics (ACTDIP039)**
INDICATOR	ACTDIP.9-10.4.5.	applying the principles and elements of design to a client's requirements and evaluating the success of a solution through an iterative feedback process, for example using customer feedback to refine a user interface to more effectively provide access to important features
STRAND / DOMAIN		**Digital Technologies**
OUTCOME / INDICATOR	**ACTDIP.9-10.**	**Digital Technologies Processes and Production Skills**
INDICATOR	**ACTDIP.9-10.5.**	**Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases (ACTDIP040)**
INDICATOR	ACTDIP.9-10.5.1.	designing algorithms to solve real-world problems and describing algorithms using flow charts and structured English, for example START, END, IF and UNTIL

Nova Scotia Curriculum

Mathematics

Grade **10** - Adopted: **2015**

GENERAL LEARNING OUTCOME	**NS.M10.**	**Mathematics 10**
CURRICULUM OUTCOME	**M10.SCO.**	**Specific Curriculum Outcomes**
GRADE LEVEL EXPECTATION	**M10.SCO.RF.**	**Relations and Functions (RF)**
EXPECTATION	**M10.SCO.RF04.**	**Students will be expected to describe and represent linear relations, using words, ordered pairs, tables of values, graphs, and equations. [C, CN, R, V]**
INDICATOR	M10.SCO.RF04.07.	Match corresponding representations of linear relations.

GENERAL LEARNING OUTCOME	**NS.PIB.**	**Mathematics 10 Pre-IB**
CURRICULUM OUTCOME	**PIB.SCO.**	**Specific Curriculum Outcomes**
GRADE LEVEL EXPECTATION	**PIB.SCO.RF.**	**Relations and Functions (RF)**
EXPECTATION	**PIB.SCO.RF04.**	**Students will be expected to describe and represent linear relations, using words, ordered pairs, tables of values, graphs, and equations. [C, CN, R, V]**
INDICATOR	PIB.SCO.RF04.07.	Match corresponding representations of linear relations.

GENERAL LEARNING OUTCOME	**NS.PIB.**	**Mathematics 10 Pre-IB**
CURRICULUM OUTCOME	**PIB.ACO.**	**Additional Curriculum Outcomes**
GRADE LEVEL EXPECTATION	PIB.ACO.8.	Summarize and analyze single variable discrete/grouped/cumulative data with a variety of statistics including mean, median, mode, range, and standard deviation; create and interpret graphical representations including column graphs, histograms, and box-and-whisker plots and relate these to normally distributed continuous data

Nova Scotia Curriculum

Science

Grade **9** - Adopted: **2015**

GENERAL LEARNING OUTCOME	**NS.9.GCO.**	**General Curriculum Outcomes**
CURRICULUM OUTCOME	**9.GCO.1.**	**STSE**
GRADE LEVEL EXPECTATION	9.GCO.1.1.	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.

GENERAL LEARNING OUTCOME	**NS.9.GCO.**	**General Curriculum Outcomes**
CURRICULUM OUTCOME	**9.GCO.2.**	**SKILLS**
GRADE LEVEL EXPECTATION	9.GCO.2.2.	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.

GENERAL LEARNING OUTCOME	**NS.9.GCO.**	**General Curriculum Outcomes**
CURRICULUM OUTCOME	**9.GCO.4.**	**ATTITUDES**
GRADE LEVEL EXPECTATION	9.GCO.4.4.	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.

Nova Scotia Curriculum

Science

Grade **10** - Adopted: **2015**

GENERAL LEARNING OUTCOME	**NS.S10.GCE.**	**General Curriculum Outcomes**
CURRICULUM OUTCOME	**S10.GCO.1.**	**STSE**
GRADE LEVEL EXPECTATION	S10.GCO.1.1.	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.

GENERAL LEARNING OUTCOME	**NS.S10.GCE.**	**General Curriculum Outcomes**
CURRICULUM OUTCOME	**S10.GCO.2.**	**Skills**
GRADE LEVEL EXPECTATION	S10.GCO.2.2.	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.

GENERAL LEARNING OUTCOME	**NS.S10.GCE.**	**General Curriculum Outcomes**
CURRICULUM OUTCOME	**S10.GCO.4.**	**Attitudes**

GRADE LEVEL EXPECTATION	S10.GCO.4.4.	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.

GENERAL LEARNING OUTCOME	NS.S10.SCO.	Specific Curriculum Outcomes
CURRICULUM OUTCOME	S10.SCO.ESS.	Earth and Space Science: Weather Dynamics (25%)
GRADE LEVEL EXPECTATION	S10.SCO.ESS.3.	WEATHER DYNAMICS: HEAT AND ENERGY
EXPECTATION	S10.SCO.ESS.3.1.	Use weather data to describe and explain heat transfers in the hydrosphere and atmosphere, showing how these affect air and water currents (331-2)

GENERAL LEARNING OUTCOME	NS.S10.SCO.	Specific Curriculum Outcomes
CURRICULUM OUTCOME	S10.SCO.LS.	Life Science: Sustainability of Ecosystems (25%)
GRADE LEVEL EXPECTATION	S10.SCO.LS.1.	SUSTAINABILITY
EXPECTATION	S10.SCO.LS.1.1.	Question and analyze how a paradigm shift in sustainability can change society's views (114-1)

GENERAL LEARNING OUTCOME	NS.S10.SCO.	Specific Curriculum Outcomes
CURRICULUM OUTCOME	S10.SCO.LS.	Life Science: Sustainability of Ecosystems (25%)
GRADE LEVEL EXPECTATION	S10.SCO.LS.2.	SUSTAINABILITY OF AN ECOSYSTEM
EXPECTATION	S10.SCO.LS.2.3.	Predict and analyze the impact of external factors on the sustainability of an ecosystem, using a variety of formats (212-4, 214-3, 331-6)
EXPECTATION	S10.SCO.LS.2.4.	Diagnose and report the ecosystem's response to short-term stress and long-term change (213-7, 215-1, 318-4)

GENERAL LEARNING OUTCOME	NS.S10.SCO.	Specific Curriculum Outcomes
CURRICULUM OUTCOME	S10.SCO.LS.	Life Science: Sustainability of Ecosystems (25%)
GRADE LEVEL EXPECTATION	S10.SCO.LS.3.	STSE AND SUSTAINABLE DEVELOPMENT
EXPECTATION	S10.SCO.LS.3.2.	Identify, investigate, and defend a course of action on a multi-perspective social issue (118-9, 215-4, 118-5)

Prince Edward Island Curriculum

Mathematics

Grade **10** - Adopted: **2010**

STRAND / COURSE	PE.MAT421A.	Mathematics

GENERAL LEARNING OUTCOME	**MAT421 A.RF.**	**Relations and Functions (RF): Develop algebraic and graphical reasoning through the study of relations.**
CURRICULUM OUTCOME	**MAT421 A.RF3.**	**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]**
GRADE LEVEL EXPECTATION		**Students who have achieved this outcome should be able to:**
EXPECTATION	MAT421A .RF3.E.	Explain, using examples, slope as a rate of change.

STRAND / COURSE	**PE.MAT421A.**	**Mathematics**
GENERAL LEARNING OUTCOME	**MAT421 A.RF.**	**Relations and Functions (RF): Develop algebraic and graphical reasoning through the study of relations.**
CURRICULUM OUTCOME	**MAT421 A.RF4.**	**Describe and represent linear relations, using: words; ordered pairs; tables of values; graphs; equations. [C, CN, R, V]**
GRADE LEVEL EXPECTATION		**Students who have achieved this outcome should be able to:**
EXPECTATION	MAT421A .RF4.G.	Match corresponding representations of linear relations.

STRAND / COURSE	**PE.MAT421A.**	**Mathematics**
GENERAL LEARNING OUTCOME	**MAT421 A.RF.**	**Relations and Functions (RF): Develop algebraic and graphical reasoning through the study of relations.**
CURRICULUM OUTCOME	**MAT421 A.RF6.**	**Relate linear relations expressed in: slope-intercept form [y = mx + b]; general form [Ax + By + C = 0]; slope-point form [y – y1 = m(x – x1)]; to their graphs. [CN, R, T, V]**
GRADE LEVEL EXPECTATION		**Students who have achieved this outcome should be able to:**
EXPECTATION	MAT421A .RF6.A.	Express a linear relation in different forms, and compare the graphs.

STRAND / COURSE	**PE.MAT431A.**	**Mathematics**
GENERAL LEARNING OUTCOME	**MAT431 A.G.**	**Geometry (G): Develop spatial sense.**
CURRICULUM OUTCOME	**MAT431 A.G1.**	**Analyse puzzles and games that involve spatial reasoning, using problem-solving strategies. [C, CN, PS, R]**
GRADE LEVEL EXPECTATION		**Students who have achieved this outcome should be able to:**
EXPECTATION	MAT431A .G1.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 alternative approaches.
EXPECTATION	MAT431A .G1.C.	Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

STRAND / COURSE	PE.421A.	Science 421A
GENERAL LEARNING OUTCOME	421A.1.	Unit 1 Life Science: Sustainability of Ecosystems
CURRICULUM OUTCOME		Students will be expected to
GRADE LEVEL EXPECTATION	421A.1.1.	Identify examples where scientific understanding about an ecosystem was enhanced or revised as a result of human invention or related technologies (116-1).
GRADE LEVEL EXPECTATION	421A.1.2.	Analyse the impact of external factors on an ecosystem (331-6).
GRADE LEVEL EXPECTATION	421A.1.3.	Explain how biodiversity of an ecosystem contributes to its sustainability (318-6).
GRADE LEVEL EXPECTATION	421A.1.8.	Analyse and interpret information in a variety of formats (214-3A).
GRADE LEVEL EXPECTATION	421A.1.9.	Illustrate the cycling of matter through biotic and abiotic components of an ecosystem by tracking carbon, nitrogen, and oxygen (318-1).
GRADE LEVEL EXPECTATION	421A.1.10.	Propose a course of action on social issues related to science and technology taking into account human and environmental needs (118-9).
GRADE LEVEL EXPECTATION	421A.1.14.	Explain how a paradigm can change scientific world views in understanding sustainability (114-1).
GRADE LEVEL EXPECTATION	421A.1.15.	Select and integrate information from various print and electronic sources (213-7).
GRADE LEVEL EXPECTATION	421A.1.20.	Explain why different ecosystems respond differently to short-term stresses and long-term changes (318-4).

STRAND / COURSE	PE.421A.	Science 421A
GENERAL LEARNING OUTCOME	421A.2.	Unit 2 Physical Science: Motion 19 hours
CURRICULUM OUTCOME		Students will be expected to
GRADE LEVEL EXPECTATION	421A.2.19.	Distinguish between scientific questions and technological problems (115-1).

STRAND / COURSE	PE.431A.	Science 431A
GENERAL LEARNING OUTCOME	431A.1.	Unit 1 Ecosystems
CURRICULUM OUTCOME		By the end of Grade 10 students will be expected to:

GRADE LEVEL EXPECTATION	431A.1.2.	Propose a course of action on social issues related to science and technology taking into account human and environmental needs (118-9).
GRADE LEVEL EXPECTATION	431A.1.3.	Analyze the impact of external factors on the ecosystem (331-6).
GRADE LEVEL EXPECTATION	431A.1.15.	Select, compile, and display evidence and information from various sources, in different formats, to support a given view in a presentation about ecosystem change (214-3, 213-7).
GRADE LEVEL EXPECTATION	431A.1.16.	Illustrate the cycling of matter through biotic and abiotic components of an ecosystem by tracking carbon, nitrogen, and oxygen (318-1).
GRADE LEVEL EXPECTATION	431A.1.18.	Analyze the impact of external factors on an ecosystem (331-6).
GRADE LEVEL EXPECTATION	431A.1.19.	Explain how the biodiversity of an ecosystem contributes to its sustainability (318-6).
GRADE LEVEL EXPECTATION	431A.1.21.	Explain why different ecosystems respond differently to short-term stresses and longterm changes (318-4).
GRADE LEVEL EXPECTATION	431A.1.22.	Identify multiple perspectives that influence a science-related decision or issue (215-4).
GRADE LEVEL EXPECTATION	431A.1.23.	Analyze the impact of external factors on an ecosystem (331-6).
GRADE LEVEL EXPECTATION	431A.1.27.	Identify multiply perspectives that influence a science-related decision or issue (215-4).
GRADE LEVEL EXPECTATION	431A.1.28.	Explain how a paradigm shift can change scientific world views (114-1).
GRADE LEVEL EXPECTATION	431A.1.30.	Compare the risks and benefits to society and the environment of applying scientific knowledge or introducing a new technology (118-1).

Grade **10** - Adopted: **2010**

STRAND / COURSE	**PE.431A.**	**Applied Science 701A**
GENERAL LEARNING OUTCOME	**431A.3.**	**Student Reflection, Skills Logbook, Engineering Notebook**
CURRICULUM OUTCOME		**Students will be expected to**
GRADE LEVEL EXPECTATION	431A.3.1.	Evaluate individual and group processes used in planning, problem solving, decision making, and completing a task (215-7).

STRAND / COURSE	**PE.431A.**	**Applied Science 701A**
GENERAL LEARNING OUTCOME	**431A.14.**	**Final Project**

CURRICULUM OUTCOME		Students will be expected to
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).

Programme de formation de l'école québécoise - Progression des apprentissages

Mathematics

Grade **9** - Adopted: **2009**

STRAND	QC.4.	Arithmétique: Comprendre et analyser les situations proportionnelles
STANDARD	4.3.	Interprète ratios et les taux de
STANDARD	4.4.	Décrire l'effet de la modification d'un terme dans un rapport ou un taux

STRAND	QC.4.	Arithmétique: Comprendre et analyser les situations proportionnelles
STANDARD	4.5.	Compare
SUBSTRAND	4.5.a.	Ratios et taux qualitativement (taux équivalents et les ratios, taux unitaire)

STRAND	QC.4.	Arithmétique: Comprendre et analyser les situations proportionnelles
STANDARD	4.7.	Reconnaît une situation de proportionnalité en utilisant le contexte, une table de valeurs ou d'un graphique

STRAND	QC.5.	Algèbre: Comprendre et manipuler des expressions algébriques
STANDARD	5.C.	Analyse des situations en utilisant des équations ou d'inégalités
SUBSTRAND	5.C.5.	Représente
COMPETENCY	5.C.5.b.	Une inégalité en utilisant un autre registre (type) de la représentation, si nécessaire

STRAND	QC.6.	Algèbre: Comprendre les relations de dépendance
STANDARD	6.A.	Relations, les fonctions et inverses
SUBSTRAND	6.A.3.	Représente une situation généralement à l'aide d'un graphique

STRAND	QC.8.	Statistiques: Analyse et prise de décisions sur un ou deux variables distributions, en utilisant des outils statistiques
STANDARD	8.A.	Une variable distributions
SUBSTRAND	8.A.8.	Comprendre et calcule la moyenne arithmétique
SUBSTRAND	8.A.9.	Décrit le concept de moyenne arithmétique (point de nivellement ou de l'équilibre)

SUBSTRAND	8.A.10.	Calcule et interprète une moyenne arithmétique

STRAND	**QC.8.**	**Statistiques: Analyse et prise de décisions sur un ou deux variables distributions, en utilisant des outils statistiques**
STANDARD	**8.A.**	**Une variable distributions**
SUBSTRAND	**8.A.11.**	**Détermine et interprète**

COMPETENCY	8.A.11.a.	Mesures de tendance centrale: mode, la médiane, la moyenne pondérée

Programme de formation de l'école québécoise - Progression des apprentissages

Mathematics

Grade **10** - Adopted: **2009**

STRAND	**QC.4.**	**Arithmétique: Comprendre et analyser les situations proportionnelles**
STANDARD	4.2.	Reconnaît les ratios et les taux de
STANDARD	4.3.	Interprète ratios et les taux de
STANDARD	4.4.	Décrire l'effet de la modification d'un terme dans un rapport ou un taux
STANDARD	4.6.	Traduit une situation en utilisant un ratio ou taux de

STRAND	**QC.5.**	**Algèbre: Comprendre et manipuler des expressions algébriques**
STANDARD	**5.C.**	**Analyse des situations en utilisant des équations ou d'inégalités**
SUBSTRAND	**5.C.5.**	**Représente**

COMPETENCY	5.C.5.a.	Une équation utilisant un autre registre (type) de la représentation, le cas échéant

STRAND	**QC.6.**	**Algèbre: Comprendre les relations de dépendance**
STANDARD	**6.A.**	**Relations, les fonctions et inverses**
SUBSTRAND	6.A.2.	Analyser les situations en utilisant différents registres (types) de la représentation

STRAND	**QC.8.**	**Statistiques: Analyse et prise de décisions sur un ou deux variables distributions, en utilisant des outils statistiques**
STANDARD	**8.A.**	**Une variable distributions**
SUBSTRAND	8.A.8.	Comprendre et calcule la moyenne arithmétique
SUBSTRAND	8.A.9.	Décrit le concept de moyenne arithmétique (point de nivellement ou de l'équilibre)
SUBSTRAND	8.A.10.	Calcule et interprète une moyenne arithmétique

STRAND	**QC.8.**	**Statistiques: Analyse et prise de décisions sur un ou deux variables distributions, en utilisant des outils statistiques**
STANDARD	**8.A.**	**Une variable distributions**
SUBSTRAND	**8.A.11.**	**Détermine et interprète**

COMPETENCY	8.A.11.a.	Mesures de tendance centrale: mode, la médiane, la moyenne pondérée

Programme de formation de l'école québécoise - Progression des apprentissages

Science

Grade **9** - Adopted: **2009**

STRAND	**QC.3.**	**Parcours de formation générale: La Terre et l'espace**
STANDARD	**3.A.**	**Caractéristiques de la Terre**
SUBSTRAND	**3.A.2.**	**Lithosphère**
COMPETENCY	**3.A.2.a.**	**Les caractéristiques générales de la lithosphère**
OBJECTIVE	3.A.2.a.ii.	Décrit les principales relations entre la lithosphère et l'activité humaine (par exemple la survie, l'agriculture, l'exploitation minière, l'aménagement du territoire)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.1.**	**Forces et mouvements**
COMPETENCY	**4.B.1.a.**	**Types de mouvement**
OBJECTIVE	4.B.1.a.i.	Identifie les parties qui se déplacent d'une manière spécifique dans un objet technique (rectiligne translation, rotation, hélicoïdal)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.2.**	**Les systèmes technologiques**
COMPETENCY	**4.B.2.a.**	**Système**
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

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.2.**	**Les systèmes technologiques**
COMPETENCY	**4.B.2.b.**	**Composantes d'un système**
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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**

SUBSTRAND	**4.B.2.**	**Les systèmes technologiques**
COMPETENCY	**4.B.2.c.**	**Transformations de l'énergie**
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

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.a.**	**De base des fonctions mécaniques (liaisons, de contrôle de guidage)**
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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.b.**	**Typiques des liaisons mécaniques**
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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.e.**	**Les fonctions typiques**
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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.h.**	**Des systèmes de transmission de mouvement**
OBJECTIVE	4.B.3.h.i.	Identifie les systèmes de transmission de mouvement dans des objets techniques

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**

COMPETENCY	**4.B.3.i.**	**Fonction, composantes et utilisation des systèmes de transmission de mouvement**
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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.k.**	**Systèmes de transformation de mouvement**
OBJECTIVE	4.B.3.k.i.	Identifie les systèmes de transformation de mouvement dans des objets techniques

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.l.**	**Fonction, composantes et utilisation des systèmes de transformation de mouvement**
OBJECTIVE	4.B.3.l.i.	Noms de transformation des systèmes de mouvement dans les objets techniques (par exemple système de roue à denture hélicoï dale, 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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.D.**	**Matériels**
SUBSTRAND	**4.D.1.**	**Les ressources matérielles**
COMPETENCY	**4.D.1.b.**	**Matériels**
OBJECTIVE	4.D.1.b.ii.	Détermine les origines des matériaux présents dans un objet technique (animale, végétale, minérale, bois)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.D.**	**Matériels**
SUBSTRAND	**4.D.1.**	**Les ressources matérielles**
COMPETENCY	**4.D.1.c.**	**Équipement**
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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**

STANDARD	**4.E.**	**Fabrication**
SUBSTRAND	**4.E.a.**	**Caractéristiques**
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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.E.**	**Fabrication**
SUBSTRAND	**4.E.b.**	**Feuille de processus de fabrication**
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

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.a.**	**En toute sécurité en utilisant des machines et tools4**
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)

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.b.**	**Mesure et portant sur**
OBJECTIVE	5.A.2.b.iii.	Adopte la position appropriée pour la lecture d'un instrument
OBJECTIVE	5.A.2.b.iv.	Marque les matériaux à être façonné à l'aide d'un crayon ou d'un poinçon

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.c.**	**Usinage et formant**
OBJECTIVE	5.A.2.c.i.	Choisit les matériaux appropriés, des outils, des techniques et des processus
OBJECTIVE	5.A.2.c.iii.	Immobilise la partie à former
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

OBJECTIVE	5.A.2.c.v.	Forme la partie en conformité avec les étapes dans les procédés d'usinage suivantes: extraction, épissage, brasage

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.d.**	**Finition**
OBJECTIVE	5.A.2.d.i.	Sables les côtés ou ébavurer les bords de chaque pièce après formage
OBJECTIVE	5.A.2.d.ii.	Utilise la finition appropriée (teinture, peinture)
OBJECTIVE	5.A.2.d.iii.	Rectifier, les encaustiques, des marteaux ou des pièces métalliques ciseaux

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.e.**	**Assemblage**
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

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.f.**	**Montage et démontage**
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

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.g.**	**Effectuer des tâches de vérification et de contrôle**
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

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.h.**	**Faire une partie**
OBJECTIVE	5.A.2.h.i.	Donne une pièce en utilisant les techniques appropriées

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.B.**	**Science**
SUBSTRAND	**5.B.d.**	**Utilisation d'instruments de mesure**
COMPETENCY	5.B.d.i.	Adopte la position appropriée pour la lecture d'un instrument
COMPETENCY	5.B.d.vi.	Utilise les instruments de mesure appropriée (par exemple un ampèremètre, fiole jaugée)

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.B.**	**Science**
SUBSTRAND	**5.B.e.**	**Utilisation d'instruments d'observation**
COMPETENCY	5.B.e.i.	Utilise des instruments d'observation appropriée (loupe, loupe binoculaire, jumelles, microscope)

STRAND	**QC.6.**	**Parcours de formation générale: Stratégies**
STANDARD	**6.A.**	**Stratégies d'exploration**
SUBSTRAND	6.A.1.	L'étude d'un problème ou un phénomène de différents points de vue (social, environnemental, historique, économique)
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)
SUBSTRAND	6.A.19.	Considérant divers points de vue sur des questions scientifiques ou technologiques

STRAND	**QC.6.**	**Parcours de formation générale: Stratégies**
STANDARD	**6.B.**	**Stratégies d'instrumentation**

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
STRAND	**QC.6.**	**Parcours de formation générale: Stratégies**
STANDARD	**6.C.**	**Des stratégies analytiques**
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
STRAND	**QC.6.**	**Parcours de formation générale: Stratégies**
STANDARD	**6.D.**	**Les stratégies de communication**
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)
STRAND	**QC.12.**	**Chimie - secondaire V Programme facultatif: Stratégies**
STANDARD	**12.B.**	**Stratégies d'instrumentation**
SUBSTRAND	12.B.3.	Recourir au design technique pour illustrer une solution (par exemple des diagrammes, des croquis, des dessins techniques)
STRAND	**QC.18.**	**Physique - Secondaire V Programme facultatif: Stratégies**
STANDARD	**18.B.**	**Stratégies d'instrumentation**
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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STRAND	**QC.2.**	**Parcours de formation générale: Le Monde vivant**

STANDARD	**2.A.**	**La diversité des formes de vie**
SUBSTRAND	**2.A.1.**	**Écologie**
COMPETENCY	**2.A.1.f.**	**Dynamique des communautés**
OBJECTIVE	2.A.1.f.i.	Biodiversité: Définit la biodiversité d'une communauté que l'abondance relative des espèces qui la composent; Explique les facteurs qui affectent la biodiversité d'une communauté donnée
OBJECTIVE	2.A.1.f.ii.	Perturbations: définit une perturbation dans la communauté; Explique les effets de certains facteurs qui perturbent l'équilibre écologique (par exemple l'activité humaine, les catastrophes naturelles)

STRAND	**QC.2.**	**Parcours de formation générale: Le Monde vivant**
STANDARD	**2.A.**	**La diversité des formes de vie**
SUBSTRAND	**2.A.1.**	**Écologie**
COMPETENCY	**2.A.1.g.**	**Dynamique des écosystèmes**
OBJECTIVE	2.A.1.g.iii.	Matériel et flux d'énergie: Décrit matériel et le flux d'énergie dans un écosystème

STRAND	**QC.3.**	**Parcours de formation générale: La Terre et l'espace**
STANDARD	**3.A.**	**Caractéristiques de la Terre**
SUBSTRAND	**3.A.2.**	**Lithosphère**
COMPETENCY	**3.A.2.a.**	**Les caractéristiques générales de la lithosphère**
OBJECTIVE	3.A.2.a.ii.	Décrit les principales relations entre la lithosphère et l'activité humaine (par exemple la survie, l'agriculture, l'exploitation minière, l'aménagement du territoire)

STRAND	**QC.3.**	**Parcours de formation générale: La Terre et l'espace**
STANDARD	**3.A.**	**Caractéristiques de la Terre**
SUBSTRAND	**3.A.2.**	**Lithosphère**
COMPETENCY	**3.A.2.l.**	**Le pergélisol**
OBJECTIVE	3.A.2.l.ii.	Explique en partie les conséquences d'une élévation de la température dans le pergélisol (glissements de terrain, par exemple, les émissions de méthane)

STRAND	**QC.3.**	**Parcours de formation générale: La Terre et l'espace**
STANDARD	**3.A.**	**Caractéristiques de la Terre**
SUBSTRAND	**3.A.2.**	**Lithosphère**
COMPETENCY	**3.A.2.p.**	**Les cycles biogéochimiques**
OBJECTIVE	3.A.2.p.i.	Le cycle du carbone: Décrit les transformations liées à la circulation du carbone (par exemple la photosynthèse, la décomposition des végétaux, la dissolution dans l'eau, la combustion de combustibles fossiles)

STRAND	**QC.3.**	**Parcours de formation générale: La Terre et l'espace**
STANDARD	**3.A.**	**Caractéristiques de la Terre**
SUBSTRAND	**3.A.4.**	**Atmosphère**
COMPETENCY	**3.A.4.b.**	**Effet de serre**

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)
STRAND	**QC.3.**	**Parcours de formation générale: La Terre et l'espace**
STANDARD	**3.B.**	**Phénomènes géologiques et géophysiques**
SUBSTRAND	**3.B.i.**	**Les ressources énergétiques renouvelables et non renouvelables**
COMPETENCY	3.B.i.iii.	Décrit le principal impact de l'utilisation des ressources énergétiques dans la lithosphère, l'hydrosphère et l'atmosphère
STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.1.**	**Forces et mouvements**
COMPETENCY	**4.B.1.a.**	**Types de mouvement**
OBJECTIVE	4.B.1.a.i.	Identifie les parties qui se déplacent d'une manière spécifique dans un objet technique (rectiligne translation, rotation, hélicoïdal)
STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.2.**	**Les systèmes technologiques**
COMPETENCY	**4.B.2.a.**	**Système**
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
STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.2.**	**Les systèmes technologiques**
COMPETENCY	**4.B.2.b.**	**Composantes d'un système**
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)
STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**

SUBSTRAND	**4.B.2.**	**Les systèmes technologiques**
COMPETENCY	**4.B.2.c.**	**Transformations de l'énergie**
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

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.a.**	**De base des fonctions mécaniques (liaisons, de contrôle de guidage)**
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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.b.**	**Typiques des liaisons mécaniques**
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)

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.c.**	**Lier des pièces mécaniques**
OBJECTIVE	4.B.3.c.i.	Décrit les caractéristiques des liens dans un objet technique (xible directe ou indirecte, rigide ou fle, 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 juges le choix des solutions d'assemblage dans un objet technique

STRAND	**QC.4.**	**Parcours de formation générale: Le monde technologique**
STANDARD	**4.B.**	**Génie mécanique**
SUBSTRAND	**4.B.3.**	**Ingénierie**
COMPETENCY	**4.B.3.e.**	**Les fonctions typiques**
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)

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.B.	Génie mécanique
SUBSTRAND	4.B.3.	Ingénierie
COMPETENCY	4.B.3.f.	Contrôles directeurs
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)

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.B.	Génie mécanique
SUBSTRAND	4.B.3.	Ingénierie
COMPETENCY	4.B.3.h.	Des systèmes de transmission de mouvement
OBJECTIVE	4.B.3.h.i.	Identifie les systèmes de transmission de mouvement dans des objets techniques

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.B.	Génie mécanique
SUBSTRAND	4.B.3.	Ingénierie
COMPETENCY	4.B.3.i.	Fonction, composantes et utilisation des systèmes de transmission de mouvement
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)

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.B.	Génie mécanique
SUBSTRAND	4.B.3.	Ingénierie
COMPETENCY	4.B.3.j.	Construction et caractéristiques des systèmes de transmission de mouvement
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)

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.B.	Génie mécanique
SUBSTRAND	4.B.3.	Ingénierie
COMPETENCY	4.B.3.k.	Systèmes de transformation de mouvement
OBJECTIVE	4.B.3.k.i.	Identifie les systèmes de transformation de mouvement dans des objets techniques

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.B.	Génie mécanique
SUBSTRAND	4.B.3.	Ingénierie
COMPETENCY	4.B.3.l.	Fonction, composantes et utilisation des systèmes de transformation de mouvement
OBJECTIVE	4.B.3.l.i.	Noms de transformation des systèmes de mouvement dans les objets techniques (par exemple système de roue à denture hélicoï dale, 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)

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.B.	Génie mécanique
SUBSTRAND	4.B.3.	Ingénierie
COMPETENCY	4.B.3.m.	Construction et caractéristiques des systèmes de transformation de mouvement
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)

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.D.	Matériels
SUBSTRAND	4.D.1.	Les ressources matérielles
COMPETENCY	4.D.1.b.	Matériels
OBJECTIVE	4.D.1.b.ii.	Détermine les origines des matériaux présents dans un objet technique (animale, végétale, minérale, bois)

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.D.	Matériels
SUBSTRAND	4.D.1.	Les ressources matérielles
COMPETENCY	4.D.1.c.	Équipement
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)

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.E.	Fabrication
SUBSTRAND	4.E.a.	Caractéristiques
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)

STRAND	QC.4.	Parcours de formation générale: Le monde technologique
STANDARD	4.E.	Fabrication

SUBSTRAND	**4.E.b.**	**Feuille de processus de fabrication**
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

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.a.**	**En toute sécurité en utilisant des machines et tools4**
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)

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.b.**	**Mesure et portant sur**
OBJECTIVE	5.A.2.b.iii.	Adopte la position appropriée pour la lecture d'un instrument
OBJECTIVE	5.A.2.b.iv.	Marque les matériaux à être façonné à l'aide d'un crayon ou d'un poinçon

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.c.**	**Usinage et formant**
OBJECTIVE	5.A.2.c.i.	Choisit les matériaux appropriés, des outils, des techniques et des processus
OBJECTIVE	5.A.2.c.iii.	Immobilise la partie à former
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
OBJECTIVE	5.A.2.c.v.	Forme la partie en conformité avec les étapes dans les procédés d'usinage suivantes: extraction, épissage, brasage

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.d.**	**Finition**

OBJECTIVE	5.A.2.d.i.	Sables les côtés ou ébavurer les bords de chaque pièce après formage
OBJECTIVE	5.A.2.d.ii.	Utilise la finition appropriée (teinture, peinture)
OBJECTIVE	5.A.2.d.iii.	Rectifier, les encaustiques, des marteaux ou des pièces métalliques ciseaux

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.e.**	**Assemblage**
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

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.f.**	**Montage et démontage**
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.viii.	Connecte les composants en utilisant les fils, connecteurs ou les soudures

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.g.**	**Effectuer des tâches de vérification et de contrôle**
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

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**

STANDARD	**5.A.**	**Technologie**
SUBSTRAND	**5.A.2.**	**Fabrication**
COMPETENCY	**5.A.2.h.**	**Faire une partie**
OBJECTIVE	5.A.2.h.i.	Donne une pièce en utilisant les techniques appropriées

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.B.**	**Science**
SUBSTRAND	**5.B.d.**	**Utilisation d'instruments de mesure**
COMPETENCY	5.B.d.i.	Adopte la position appropriée pour la lecture d'un instrument
COMPETENCY	5.B.d.vi.	Utilise les instruments de mesure appropriée (par exemple un ampèremètre, fiole jaugée)

STRAND	**QC.5.**	**Parcours de formation générale: Techniques**
STANDARD	**5.B.**	**Science**
SUBSTRAND	**5.B.e.**	**Utilisation d'instruments d'observation**
COMPETENCY	5.B.e.i.	Utilise des instruments d'observation appropriée (loupe, loupe binoculaire, jumelles, microscope)

STRAND	**QC.6.**	**Parcours de formation générale: Stratégies**
STANDARD	**6.A.**	**Stratégies d'exploration**
SUBSTRAND	6.A.1.	L'étude d'un problème ou un phénomène de différents points de vue (social, environnemental, historique, économique)
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)
SUBSTRAND	6.A.19.	Considérant divers points de vue sur des questions scientifiques ou technologiques

STRAND	**QC.6.**	**Parcours de formation générale: Stratégies**
STANDARD	**6.B.**	**Stratégies d'instrumentation**
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
STRAND	**QC.6.**	**Parcours de formation générale: Stratégies**
STANDARD	**6.C.**	**Des stratégies analytiques**
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
STRAND	**QC.6.**	**Parcours de formation générale: Stratégies**
STANDARD	**6.D.**	**Les stratégies de communication**
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)
STRAND	**QC.12.**	**Chimie - secondaire V Programme facultatif: Stratégies**
STANDARD	**12.B.**	**Stratégies d'instrumentation**
SUBSTRAND	12.B.3.	Recourir au design technique pour illustrer une solution (par exemple des diagrammes, des croquis, des dessins techniques)
STRAND	**QC.18.**	**Physique - Secondaire V Programme facultatif: Stratégies**
STANDARD	**18.B.**	**Stratégies d'instrumentation**
SUBSTRAND	18.B.3.	Recourir au design technique pour illustrer une solution (par exemple des diagrammes, des croquis, des dessins techniques)

Québec Education Program Progression of Learning

Mathematics

Grade **9** - Adopted: **2009/Updated 2016**

STRAND	**QC.4.**	**Arithmetic: Understanding and analyzing proportional situations**
STANDARD	4.2.	Recognizes ratios and rates

STANDARD	4.3.	Interprets ratios and rates
STANDARD	4.4.	Describes the effect of changing a term in a ratio or rate
STANDARD	4.6.	Translates a situation using a ratio or rate

STRAND	**QC.5.**	**Algebra: Understanding and manipulating algebraic expressions**
STANDARD	**5.C.**	**Analyzing situations using equations or inequalities**
SUBSTRAND	**5.C.5.**	**Represents**
COMPETENCY	5.C.5.a.	An equation using another register (type) of representation, if necessary

STRAND	**QC.6.**	**Algebra: Understanding dependency relationships**
STANDARD	**6.A.**	**Relations, functions and inverses**
SUBSTRAND	6.A.2.	Analyzes situations using different registers (types) of representation

STRAND	**QC.8.**	**Statistics: Analyzing and making decisions about one- or two-variable distributions, using statistical tools**
STANDARD	**8.A.**	**One-variable distributions**
SUBSTRAND	8.A.8.	Understands and calculates the arithmetic mean
SUBSTRAND	8.A.9.	Describes the concept of arithmetic mean (levelling or balance point)
SUBSTRAND	8.A.10.	Calculates and interprets an arithmetic mean

STRAND	**QC.8.**	**Statistics: Analyzing and making decisions about one- or two-variable distributions, using statistical tools**
STANDARD	**8.A.**	**One-variable distributions**
SUBSTRAND	**8.A.11.**	**Determines and interprets**
COMPETENCY	8.A.11.a.	Measures of central tendency: mode, median, weighted mean

Québec Education Program Progression of Learning

Mathematics

Grade **10** - Adopted: **2009/Updated 2016**

STRAND	**QC.4.**	**Arithmetic: Understanding and analyzing proportional situations**
STANDARD	4.2.	Recognizes ratios and rates
STANDARD	4.3.	Interprets ratios and rates
STANDARD	4.4.	Describes the effect of changing a term in a ratio or rate
STANDARD	4.6.	Translates a situation using a ratio or rate

STRAND	**QC.5.**	**Algebra: Understanding and manipulating algebraic expressions**
STANDARD	**5.C.**	**Analyzing situations using equations or inequalities**
SUBSTRAND	**5.C.5.**	**Represents**
COMPETENCY	5.C.5.a.	An equation using another register (type) of representation, if necessary

STRAND	**QC.6.**	**Algebra: Understanding dependency relationships**
STANDARD	**6.A.**	**Relations, functions and inverses**
SUBSTRAND	6.A.2.	Analyzes situations using different registers (types) of representation

STRAND	**QC.8.**	**Statistics: Analyzing and making decisions about one- or two-variable distributions, using statistical tools**
STANDARD	**8.A.**	**One-variable distributions**
SUBSTRAND	8.A.8.	Understands and calculates the arithmetic mean
SUBSTRAND	8.A.9.	Describes the concept of arithmetic mean (levelling or balance point)
SUBSTRAND	8.A.10.	Calculates and interprets an arithmetic mean

STRAND	**QC.8.**	**Statistics: Analyzing and making decisions about one- or two-variable distributions, using statistical tools**
STANDARD	**8.A.**	**One-variable distributions**
SUBSTRAND	**8.A.11.**	**Determines and interprets**
COMPETENCY	8.A.11.a.	Measures of central tendency: mode, median, weighted mean

Québec Education Program Progression of Learning

Science

Grade **9** - Adopted: **2009**

STRAND	**QC.3.**	**General Education Path: The Earth and Space**
STANDARD	**3.A.**	**Characteristics of the Earth**
SUBSTRAND	**3.A.2.**	**Lithosphere**
COMPETENCY	**3.A.2.a.**	**General characteristics of the lithosphere**
OBJECTIVE	3.A.2.a.ii.	Describes the main relationships between the lithosphere and human activity (e.g. survival, agriculture, mining, land-use planning)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.1.**	**Forces and motion**
COMPETENCY	**4.B.1.a.**	**Types of motion**
OBJECTIVE	4.B.1.a.i.	Identifies parts that move in a specific way in a technical object (rectilinear translation, rotation, helical)

STRAND	QC.4.	General Education Path: The Technological World
STANDARD	4.B.	Mechanical engineering
SUBSTRAND	4.B.2.	Technological systems
COMPETENCY	4.B.2.a.	System
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

STRAND	QC.4.	General Education Path: The Technological World
STANDARD	4.B.	Mechanical engineering
SUBSTRAND	4.B.2.	Technological systems
COMPETENCY	4.B.2.b.	Components of a system
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)

STRAND	QC.4.	General Education Path: The Technological World
STANDARD	4.B.	Mechanical engineering
SUBSTRAND	4.B.2.	Technological systems
COMPETENCY	4.B.2.c.	Energy transformations
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

STRAND	QC.4.	General Education Path: The Technological World
STANDARD	4.B.	Mechanical engineering
SUBSTRAND	4.B.3.	Engineering
COMPETENCY	4.B.3.a.	Basic mechanical functions (links, guiding control)
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)

STRAND	QC.4.	General Education Path: The Technological World
STANDARD	4.B.	Mechanical engineering
SUBSTRAND	4.B.3.	Engineering

COMPETENCY	**4.B.3.b.**	**Typical mechanical links**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.e.**	**Typical functions**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.h.**	**Motion transmission systems**
OBJECTIVE	4.B.3.h.i.	Identifies motion transmission systems in technical objects

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.i.**	**Function, components and use of motion transmission systems**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.k.**	**Motion transformation systems**
OBJECTIVE	4.B.3.k.i.	Identifies motion transformation systems in technical objects

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**

COMPETENCY	**4.B.3.l.**	**Function, components and use of motion transformation systems**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.D.**	**Materials**
SUBSTRAND	**4.D.1.**	**Material resources**
COMPETENCY	**4.D.1.b.**	**Materials**
OBJECTIVE	4.D.1.b.ii.	Determines the origins of the materials present in a technical object (animal, plant, mineral, wood)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.D.**	**Materials**
SUBSTRAND	**4.D.1.**	**Material resources**
COMPETENCY	**4.D.1.c.**	**Equipment**
OBJECTIVE	4.D.1.c.i.	Defines tools and equipment as the elements needed to manufacture an object (machining, control, assembly)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.E.**	**Manufacturing**
SUBSTRAND	**4.E.a.**	**Specifications**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.E.**	**Manufacturing**
SUBSTRAND	**4.E.b.**	**Manufacturing process sheet**
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

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.a.**	**Safely using machines and tools**
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)

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.b.**	**Measuring and laying out**
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

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.c.**	**Machining and forming**
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

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.d.**	**Finishing**
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

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.e.**	**Assembling**
OBJECTIVE	5.A.2.e.ii.	Immobilizes parts during gluing
OBJECTIVE	5.A.2.e.iii.	Drills to the diameter of the screws, nails or rivets used

OBJECTIVE	5.A.2.e.iv.	Countersinks the openings for countersunk screws

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.f.**	**Assembling and disassembling**
OBJECTIVE	5.A.2.f.i.	Identifies and gathers the parts and hardware
OBJECTIVE	5.A.2.f.ii.	Chooses the appropriate tools
OBJECTIVE	5.A.2.f.iii.	For disassembly, numbers and records the location of the parts

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.g.**	**Performing verification and control tasks**
OBJECTIVE	5.A.2.g.i.	Evaluates the dimensions of a part during and after construction using a ruler
OBJECTIVE	5.A.2.g.iii.	Uses a template to verify the conformity of a part

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.h.**	**Making a part**
OBJECTIVE	5.A.2.h.i.	Makes a part using the appropriate techniques

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.B.**	**Science**
SUBSTRAND	**5.B.d.**	**Using measuring instruments**
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)

STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.B.**	**Science**
SUBSTRAND	**5.B.e.**	**Using observational instruments**
COMPETENCY	5.B.e.i.	Uses observational instruments appropriately (e.g. magnifying glass, stereomicroscope, binoculars, microscope)

STRAND	**QC.6.**	**General Education Path: Strategies**

STANDARD	**6.A.**	**Exploration strategies**
SUBSTRAND	6.A.1.	Studying a problem or a phenomenon from different points of view (e.g. social, environmental, historical, economic)
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)
SUBSTRAND	6.A.19.	Considering various points of view on scientific or technological issues
STRAND	**QC.6.**	**General Education Path: Strategies**
STANDARD	**6.B.**	**Instrumentation strategies**
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
STRAND	**QC.6.**	**General Education Path: Strategies**
STANDARD	**6.C.**	**Analytical strategies**
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
STRAND	**QC.6.**	**General Education Path: Strategies**
STANDARD	**6.D.**	**Communication strategies**
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)
STRAND	**QC.12.**	**Chemistry - Secondary V Optional Program: Strategies**
STANDARD	**12.B.**	**Instrumentation strategies**
SUBSTRAND	12.B.3.	Using technical design to illustrate a solution (e.g. diagrams, sketches, technical drawings)
STRAND	**QC.18.**	**Physics - Secondary V Optional Program: Strategies**
STANDARD	**18.B.**	**Instrumentation strategies**
SUBSTRAND	18.B.3.	Using technical design to illustrate a solution (e.g. diagrams, sketches, technical drawings)

Québec Education Program Progression of Learning

Science

Grade **10** - Adopted: **2009**

STRAND	**QC.2.**	**General Education Path: The Living World**
STANDARD	**2.A.**	**Diversity of life forms**
SUBSTRAND	**2.A.1.**	**Ecology**
COMPETENCY	**2.A.1.f.**	**Dynamics of communities**
OBJECTIVE	2.A.1.f.i.	Biodiversity: Defines the biodiversity of a community as the relative abundance of species it comprises; Explains factors that affect the biodiversity of a given community
OBJECTIVE	2.A.1.f.ii.	Disturbances: Defines a disturbance in a community; Explains the effects of certain factors that disturb the ecological balance (e.g. human activity, natural disasters)
STRAND	**QC.2.**	**General Education Path: The Living World**
STANDARD	**2.A.**	**Diversity of life forms**
SUBSTRAND	**2.A.1.**	**Ecology**
COMPETENCY	**2.A.1.g.**	**Dynamics of ecosystems**
OBJECTIVE	2.A.1.g.iii.	Material and energy flow: Describes material and energy flow in an ecosystem
STRAND	**QC.3.**	**General Education Path: The Earth and Space**
STANDARD	**3.A.**	**Characteristics of the Earth**
SUBSTRAND	**3.A.2.**	**Lithosphere**
COMPETENCY	**3.A.2.a.**	**General characteristics of the lithosphere**
OBJECTIVE	3.A.2.a.ii.	Describes the main relationships between the lithosphere and human activity (e.g. survival, agriculture, mining, land-use planning)
STRAND	**QC.3.**	**General Education Path: The Earth and Space**
STANDARD	**3.A.**	**Characteristics of the Earth**
SUBSTRAND	**3.A.2.**	**Lithosphere**
COMPETENCY	**3.A.2.l.**	**Permafrost**

OBJECTIVE	3.A.2.l.ii.	Explains some of the consequences of a rise in temperature in the permafrost (e.g. landslides, methane emissions)

STRAND	**QC.3.**	**General Education Path: The Earth and Space**
STANDARD	**3.A.**	**Characteristics of the Earth**
SUBSTRAND	**3.A.2.**	**Lithosphere**
COMPETENCY	**3.A.2.p.**	**Biogeochemical cycles**
OBJECTIVE	3.A.2.p.i.	Carbon cycle: Describes transformations related to the circulation of carbon (e.g. photosynthesis, plant decomposition, dissolution in water, combustion of fossil fuels)

STRAND	**QC.3.**	**General Education Path: The Earth and Space**
STANDARD	**3.A.**	**Characteristics of the Earth**
SUBSTRAND	**3.A.4.**	**Atmosphere**
COMPETENCY	**3.A.4.b.**	**Greenhouse effect**
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)

STRAND	**QC.3.**	**General Education Path: The Earth and Space**
STANDARD	**3.B.**	**Geological and geophysical phenomena**
SUBSTRAND	**3.B.i.**	**Renewable and nonrenewable energy resources**
COMPETENCY	3.B.i.iii.	Describes the main impact of the use of energy resources in the lithosphere, hydrosphere and atmosphere

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.1.**	**Forces and motion**
COMPETENCY	**4.B.1.a.**	**Types of motion**
OBJECTIVE	4.B.1.a.i.	Identifies parts that move in a specific way in a technical object (rectilinear translation, rotation, helical)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.2.**	**Technological systems**
COMPETENCY	**4.B.2.a.**	**System**
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

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.2.**	**Technological systems**
COMPETENCY	**4.B.2.b.**	**Components of a system**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.2.**	**Technological systems**
COMPETENCY	**4.B.2.c.**	**Energy transformations**
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

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.a.**	**Basic mechanical functions (links, guiding control)**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.b.**	**Typical mechanical links**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.c.**	**Linking of mechanical parts**

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
OBJECTIVE	4.B.3.c.iii.	Judges the choice of assembly solutions in a technical object

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.e.**	**Typical functions**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.f.**	**Guiding controls**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.h.**	**Motion transmission systems**
OBJECTIVE	4.B.3.h.i.	Identifies motion transmission systems in technical objects

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.i.**	**Function, components and use of motion transmission systems**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**

STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.j.**	**Construction and characteristics of motion transmission systems**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.k.**	**Motion transformation systems**
OBJECTIVE	4.B.3.k.i.	Identifies motion transformation systems in technical objects

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.l.**	**Function, components and use of motion transformation systems**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.B.**	**Mechanical engineering**
SUBSTRAND	**4.B.3.**	**Engineering**
COMPETENCY	**4.B.3.m.**	**Construction and characteristics of motion transformation systems**
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)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.D.**	**Materials**
SUBSTRAND	**4.D.1.**	**Material resources**
COMPETENCY	**4.D.1.b.**	**Materials**
OBJECTIVE	4.D.1.b.ii.	Determines the origins of the materials present in a technical object (animal, plant, mineral, wood)

STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.D.**	**Materials**
SUBSTRAND	**4.D.1.**	**Material resources**
COMPETENCY	**4.D.1.c.**	**Equipment**

OBJECTIVE	4.D.1.c.i.	Defines tools and equipment as the elements needed to manufacture an object (machining, control, assembly)
STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.E.**	**Manufacturing**
SUBSTRAND	**4.E.a.**	**Specifications**
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)
STRAND	**QC.4.**	**General Education Path: The Technological World**
STANDARD	**4.E.**	**Manufacturing**
SUBSTRAND	**4.E.b.**	**Manufacturing process sheet**
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
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.a.**	**Safely using machines and tools**
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)
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.b.**	**Measuring and laying out**
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
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.c.**	**Machining and forming**
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
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.d.**	**Finishing**
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
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.e.**	**Assembling**
OBJECTIVE	5.A.2.e.ii.	Immobilizes parts during gluing
OBJECTIVE	5.A.2.e.iii.	Drills to the diameter of the screws, nails or rivets used
OBJECTIVE	5.A.2.e.iv.	Countersinks the openings for countersunk screws
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.f.**	**Assembling and disassembling**
OBJECTIVE	5.A.2.f.i.	Identifies and gathers the parts and hardware
OBJECTIVE	5.A.2.f.ii.	Chooses the appropriate tools
OBJECTIVE	5.A.2.f.iii.	For disassembly, numbers and records the location of the parts
OBJECTIVE	5.A.2.f.iv.	In the case of electrical circuits, identifies and gathers the electrical components
OBJECTIVE	5.A.2.f.viii.	Connects the components using wire, connectors or solders
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**

COMPETENCY	**5.A.2.g.**	**Performing verification and control tasks**
OBJECTIVE	5.A.2.g.i.	Evaluates the dimensions of a part during and after construction using a ruler
OBJECTIVE	5.A.2.g.iii.	Uses a template to verify the conformity of a part
OBJECTIVE	5.A.2.g.iv.	Evaluates the dimensions of a part during and after construction using vernier calipers
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.A.**	**Technology**
SUBSTRAND	**5.A.2.**	**Manufacturing**
COMPETENCY	**5.A.2.h.**	**Making a part**
OBJECTIVE	5.A.2.h.i.	Makes a part using the appropriate techniques
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.B.**	**Science**
SUBSTRAND	**5.B.d.**	**Using measuring instruments**
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)
STRAND	**QC.5.**	**General Education Path: Techniques**
STANDARD	**5.B.**	**Science**
SUBSTRAND	**5.B.e.**	**Using observational instruments**
COMPETENCY	5.B.e.i.	Uses observational instruments appropriately (e.g. magnifying glass, stereomicroscope, binoculars, microscope)
STRAND	**QC.6.**	**General Education Path: Strategies**
STANDARD	**6.A.**	**Exploration strategies**
SUBSTRAND	6.A.1.	Studying a problem or a phenomenon from different points of view (e.g. social, environmental, historical, economic)
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)
SUBSTRAND	6.A.19.	Considering various points of view on scientific or technological issues

STRAND	**QC.6.**	**General Education Path: Strategies**
STANDARD	**6.B.**	**Instrumentation strategies**
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
STRAND	**QC.6.**	**General Education Path: Strategies**
STANDARD	**6.C.**	**Analytical strategies**
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
STRAND	**QC.6.**	**General Education Path: Strategies**
STANDARD	**6.D.**	**Communication strategies**
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)
STRAND	**QC.12.**	**Chemistry - Secondary V Optional Program: Strategies**
STANDARD	**12.B.**	**Instrumentation strategies**
SUBSTRAND	12.B.3.	Using technical design to illustrate a solution (e.g. diagrams, sketches, technical drawings)
STRAND	**QC.18.**	**Physics - Secondary V Optional Program: Strategies**
STANDARD	**18.B.**	**Instrumentation strategies**
SUBSTRAND	18.B.3.	Using technical design to illustrate a solution (e.g. diagrams, sketches, technical drawings)

OUTCOME / COURSE	**SK.FP10.**	**Foundations of Mathematics and Pre-calculus 10**
FOCUS	**FP10.8.**	**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]**
OUTCOME	FP10.8.e.	Match corresponding types of representations of linear relations (e.g., situations, graphs, tables of values, equations, and sets of ordered pairs).

OUTCOME / COURSE	**SK.WA10.**	**Workplace and Apprenticeship Mathematics 10**
FOCUS	**WA10.2.**	**Analyze puzzles and games that involve spatial reasoning using problem solving strategies. [C, CN, PS, R]**
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 **10** - Adopted: **2010**

OUTCOME / COURSE	**SK.FM20.**	**Foundations of Mathematics 20**
FOCUS	**FM20.2.**	**Demonstrate understanding of inductive and deductive reasoning including: analyzing conjectures; analyzing spatial puzzles and games; providing conjectures; solving problems. [C, CN, PS, R, V]**
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.

OUTCOME / COURSE	**SK.FM20.**	**Foundations of Mathematics 20**
FOCUS	**FM20.2.**	**Demonstrate understanding of inductive and deductive reasoning including: analyzing conjectures; analyzing spatial puzzles and games; providing conjectures; solving problems. [C, CN, PS, R, V]**
OUTCOME	**FM20.2.j.**	**Determine, explain, and verify strategies for solving puzzles or winning games, such as:**
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.

OUTCOME / COURSE	**SK.WA20.**	**Workplace and Apprenticeship Mathematics 20**
FOCUS	**WA20.1.**	**Expand and apply understanding of the preservation of equality including solving problems that involve the manipulation and application of formulae for volume and capacity, surface area, slope and rate of change, simple interest, and finance charges. [C, CN, ME, PS, R, T]**
OUTCOME	WA20.1.c.	Describe, using examples, how a given formula is used in a trade or an occupation.
OUTCOME	WA20.1.d.	Create, solve, and verify the reasonableness of solutions to situational questions that involve the use of a formula relevant to self, family, or community.
OUTCOME	WA20.1.e.	Analyze solutions to questions that involve formulae to verify the preservation of equality, correct if necessary, and explain the reasoning.

OUTCOME / COURSE	**SK.WA20.**	**Workplace and Apprenticeship Mathematics 20**
FOCUS	**WA20.1.**	**Expand and apply understanding of the preservation of equality including solving problems that involve the manipulation and application of formulae for volume and capacity, surface area, slope and rate of change, simple interest, and finance charges. [C, CN, ME, PS, R, T]**
OUTCOME	**WA20.1.f.**	**Solve, with or without the use of technology, situational questions that involve the application of a formula that:**
INDICATOR	WA20.1.f.1.	Does not require manipulation.
INDICATOR	WA20.1.f.2.	Does require manipulation.

OUTCOME / COURSE	**SK.WA20.**	**Workplace and Apprenticeship Mathematics 20**
FOCUS	**WA20.2.**	**Demonstrate the ability to analyze puzzles and games that involve numerical reasoning and problem solving strategies. [C, CN, PS, R]**
OUTCOME	**WA20.2.a.**	**Determine, explain, and verify strategies to solve a puzzle or to win a game such as:**
INDICATOR	WA20.2.a.3.	Make a systematic list.
INDICATOR	WA20.2.a.4.	Draw or model.
INDICATOR	WA20.2.a.5.	Eliminate possibilities.
INDICATOR	WA20.2.a.6.	Formulate and simplify a problem that is similar to the original problem.
INDICATOR	WA20.2.a.7.	Work backwards.

INDICATOR	WA20.2.a.8.	Develop alternative approaches.

OUTCOME / COURSE	**SK.WA20.**	**Workplace and Apprenticeship Mathematics 20**
FOCUS	**WA20.9.**	**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]**
OUTCOME	WA20.9.a.	Research and present contexts that involve slope including the mathematics involved (e.g., ramps, roofs, road grade, flow rates within a tube, skateboard parks, ski hills).

OUTCOME / COURSE	**SK.WA20.**	**Workplace and Apprenticeship Mathematics 20**
FOCUS	**WA20.9.**	**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]**
OUTCOME	**WA20.9.e.**	**Justify, using examples and illustrations:**
INDICATOR	WA20.9.e.2.	Slope as rate of change.

OUTCOME / COURSE	**SK.WA20.**	**Workplace and Apprenticeship Mathematics 20**
FOCUS	**WA20.9.**	**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]**
OUTCOME	WA20.9.f.	Analyze slopes of objects, such as ramps or roofs, to determine if the slope is constant and explain the reasoning.

Grade **10** - Adopted: **2012**

OUTCOME / COURSE	**SK.FM30.**	**Foundations of Mathematics 30**
FOCUS	**FM30.2.**	**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]**
OUTCOME	**FM30.2.a.**	**Develop, generalize, verify, explain, and apply strategies to solve a puzzle or win a game such as:**
INDICATOR	FM30.2.a.3.	Make a systematic list.
INDICATOR	FM30.2.a.4.	Draw or model.
INDICATOR	FM30.2.a.5.	Eliminate possibilities.
INDICATOR	FM30.2.a.6.	Simplify the original problem.
INDICATOR	FM30.2.a.7.	Work backwards to develop alternative approaches.

OUTCOME / COURSE	**SK.FM30.**	**Foundations of Mathematics 30**

FOCUS	**FM30.2.**	**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]**
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.

OUTCOME / COURSE	**SK.WA30.**	**Workplace and Apprenticeship Mathematics 30**
FOCUS	**WA30.1.**	**Analyze puzzles and games that involve logical reasoning using problem-solving strategies. [C, CN, PS, R]**
OUTCOME	**WA30.1.a.**	**Determine, explain, and verify strategies to solve a puzzle or to win a game such as:**
INDICATOR	WA30.1.a.3.	Make a systematic list.
INDICATOR	WA30.1.a.4.	Draw or model.
INDICATOR	WA30.1.a.5.	Eliminate possibilities.
INDICATOR	WA30.1.a.6.	Formulate and simplify a problem that is similar to the original problem.
INDICATOR	WA30.1.a.7.	Work backwards.
INDICATOR	WA30.1.a.8.	Develop alternative approaches.

OUTCOME / COURSE	**SK.WA30.**	**Workplace and Apprenticeship Mathematics 30**
FOCUS	**WA30.1.**	**Analyze puzzles and games that involve logical reasoning using problem-solving strategies. [C, CN, PS, R]**
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.

OUTCOME / COURSE	**SK.WA30.**	**Workplace and Apprenticeship Mathematics 30**
FOCUS	**WA30.8.**	**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]**
OUTCOME	WA30.8.j.	Relate slope and rate of change to linear relations.

OUTCOME / COURSE	SK.WA30.	Workplace and Apprenticeship Mathematics 30
FOCUS	**WA30.9.**	**Extend and apply understanding of measures of central tendency to solve problems including: mean, median, mode, weighted mean, trimmed mean. [C, CN, PS, R]**
OUTCOME	WA30.9.b.	Determine the mean, median, and mode for sets of data and explain the reasoning.
OUTCOME	WA30.9.c.	Analyze calculations of measures of central tendency to identify and correct errors if necessary.
OUTCOME	WA30.9.d.	Critique statements such as "It is not possible to have a set of data which displays a mean, a median, and a mode of the same value."
OUTCOME	WA30.9.j.	Create and solve situational questions that involve measures of central tendency.

Saskatchewan Curriculum

Science

Grade **10** - Adopted: **2016**

OUTCOME / COURSE	SK.SCI10.	Science 10
FOCUS	**SCI10-CD.**	**Climate and Ecosystem Dynamics**
OUTCOME	**SCI10-CD1.**	**Assess the implications of human actions on the local and global climate and the sustainability of ecosystems. [CP, DM]**
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.b.	Reflect upon your personal view of humanity's relationship with the environment. (STSE, A)
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., CO2 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)

OUTCOME / COURSE	SK.SCI10.	Science 10
FOCUS	**SCI10-CD.**	**Climate and Ecosystem Dynamics**
OUTCOME	**SCI10-CD2.**	**Investigate factors that influence Earth's climate system, including the role of the natural greenhouse effect. [DM, SI]**
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)
OUTCOME / COURSE	**SK.SCI10.**	**Science 10**
FOCUS	**SCI10-CD.**	**Climate and Ecosystem Dynamics**
OUTCOME	**SCI10-CD3.**	**Examine biodiversity through the analysis of interactions among populations within communities. [DM, SI]**
INDICATOR	SCI10-CD3.a.	Discuss the importance of biodiversity and maintaining biodiversity. (S, K)
INDICATOR	SCI10-CD3.d.	Estimate the abundance of organisms in a local ecosystem using random (e.g., quadrat), systematic (e.g., line transect and belt transect) and/or stratified sampling techniques. (S)
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)
OUTCOME / COURSE	**SK.SCI10.**	**Science 10**
FOCUS	**SCI10-CD.**	**Climate and Ecosystem Dynamics**
OUTCOME	**SCI10-CD4.**	**Investigate the role of feedback mechanisms in biogeochemical cycles and in maintaining stability in ecosystems. [CP, DM, SI]**
INDICATOR	SCI10-CD4.b.	Create a representation of a feedback mechanism that is relevant to a specific biogeochemical (e.g., carbon, nitrogen, phosphorus and water) cycle. (S)
INDICATOR	SCI10-CD4.d.	Describe how human actions can affect the cycling of matter and flow of energy through ecosystems. (K, A, STSE)
INDICATOR	SCI10-CD4.e.	Examine the role of photosynthesis, respiration and sinks in the cycling of carbon through the environment. (K, A)
INDICATOR	SCI10-CD4.f.	Design and carry out an investigation to determine the effect of carbon dioxide levels on photosynthesis and/or to determine the effect of nitrogenous-based fertilizer on plant or algal growth. (S, A)
INDICATOR	SCI10-CD4.h.	Research the short-term and long-term effects of small-scale and large-scale agricultural practices on the cycling of phosphorus, nitrogen and other nutrients in an ecosystem. (K, A, STSE)
INDICATOR	SCI10-CD4.i.	Analyze the interdependence between the water cycle and other biogeochemical cycles. (K, S)
OUTCOME / COURSE	**SK.ES20.**	**Environmental Science 20**
FOCUS	**ES20-SDS.**	**Student-Directed Study**

OUTCOME	**ES20-SDS1.**	**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]**
INDICATOR	ES20-SDS1.e.	Develop an environmental impact assessment of a real or hypothetical development. (S, STSE)
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)
INDICATOR	ES20-SDS1.k.	Analyze an issue or case study where humans have greatly affected their environment, including a cost-benefit analysis and ethical implications. (STSE)
OUTCOME / COURSE	**SK.ES20.**	**Environmental Science 20**
FOCUS	**ES20-ES.**	**The Nature of Environmental Science**
OUTCOME	**ES20-ES1.**	**Examine the methods, mindsets and purposes of environmental science. [CP, DM]**
INDICATOR	ES20-ES1.a.	Reflect upon how one's connection with the environment is influenced by personal experiences and cultural understandings. (K, STSE, A)
INDICATOR	ES20-ES1.b.	Engage in place-based learning to gain a deeper understanding and appreciation of the environment. (S, STSE)
INDICATOR	ES20-ES1.c.	Analyze how different worldviews (e.g. anthropocentric, biocentric and ecocentric) are expressed through various environmental action plans or environmental policies developed by individuals, industry, government and nongovernmental organizations and First Nations, Métis and Inuit groups. (STSE, K)
INDICATOR	ES20-ES1.h.	Examine how principles of sustainability (i.e., environmental, economic and social justice) are integral to environmental science. (STSE)
INDICATOR	ES20-ES1.i.	Investigate how data produced through environmental science can be used in environmental impact assessments, such as those outlined in the Canadian Environmental Assessment Act, 2012, to guide projects or policies. (STSE)
INDICATOR	ES20-ES1.j.	Discuss the importance of systems thinking (e.g., boundaries, initial conditions, inputs and outputs, feedback loops, energy flows and matter transfers) to understanding environmental issues. (K, STSE)
OUTCOME / COURSE	**SK.ES20.**	**Environmental Science 20**
FOCUS	**ES20-AH.**	**Atmosphere and Human Health**
OUTCOME	**ES20-AH2.**	**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]**
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.l.	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)
OUTCOME / COURSE	**SK.ES20.**	**Environmental Science 20**
FOCUS	**ES20-HP.**	**Human Population and Pollution**
OUTCOME	**ES20-HP1.**	**Investigate technologies and processes used for mitigating and managing resource use, waste generation and pollution associated with a growing human population. [CP, DM, SI]**
INDICATOR	ES20-HP1.c.	Research First Nations and Métis beliefs and practices that demonstrate a sustainable perspective on using resources wisely and minimizing waste. (K, STSE, S)
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)
OUTCOME / COURSE	**SK.ES20.**	**Environmental Science 20**
FOCUS	**ES20-TE.**	**Terrestrial Ecosystems**
OUTCOME	**ES20-TE2.**	**Examine the role plants play in an ecosystem, including ways in which humans use plants. [SI, CP, DM]**
INDICATOR	ES20-TE2.b.	Examine the significance (e.g., medicinal, spiritual, nutritional and shelter) of plants, including tobacco, in First Nations and Métis cultures. (K, STSE)
INDICATOR	ES20-TE2.i.	Analyse forestry practices (e.g., selective cutting, clear cutting, shelterwood system and integrated resource management) in terms of productivity, profitability and environmental stewardship. (STSE)
INDICATOR	ES20-TE2.j.	Assess the impact of agriculture or forestry on a natural ecosystem. (S)
OUTCOME / COURSE	**SK.ES20.**	**Environmental Science 20**
FOCUS	**ES20-TE.**	**Terrestrial Ecosystems**
OUTCOME	**ES20-TE3.**	**Recognize the need for intact habitat to support animal populations and biodiversity. [SI, CP, DM]**
INDICATOR	ES20-TE3.a.	Justify the need for habitat protection and restoration in terms of biodiversity (e.g., genetic diversity, species diversity and habitat diversity) and resilience within ecosystems both locally and globally. (K)

INDICATOR	ES20-TE3.b.	Describe examples of First Nations and Métis people's contributions in recognizing the effects of natural and human-caused changes to habitat on historical migration patterns of animals in Saskatchewan. (STSE, A)
INDICATOR	ES20-TE3.c.	Examine how habitat management and protection decisions are influenced by the extent to which Indigenous land rights (e.g., custodians of the land versus individual land ownership) are reflected through the spirit and intent of various treaties. (K, STSE, A)
INDICATOR	ES20-TE3.f.	Correlate the range and habitat of various animals with Saskatchewan's ecozones and ecoregions and identify changes to an animal's range and habitat due to human activities such as agriculture, mining, oil and gas development, forestry, urbanization and recreation. (K)
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)
INDICATOR	ES20-TE3.i.	Assess current or potential impacts of a changing climate on a specific representative animal and its habitat. (S)
OUTCOME / COURSE	**SK.HS20.**	**Health Science 20**
FOCUS	**HS20-SDS.**	**Student-Directed Study**
OUTCOME	**HS20-SDS1.**	**Create and carry out a plan to explore one or more topics of personal interest relevant to Health Science 20. [DM, SI, TPS]**
INDICATOR	HS20-SDS1.d.	Design, construct and evaluate the effectiveness of a device, model or technique that demonstrates the scientific principles underlying a concept related to a Health Science 20 topic. (STSE, S)
INDICATOR	HS20-SDS1.j.	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)
OUTCOME / COURSE	**SK.BI30.**	**Biology 30**
FOCUS	**BI30-SDS.**	**Student-Directed Study**
OUTCOME	**BI30-SDS1.**	**Create and carry out a plan to explore one or more topics of personal interest relevant to Biology 30 in depth. [DM, SI, TPS]**
INDICATOR	BI30-SDS1.d.	Design, construct and evaluate the effectiveness of a device, model or technique that demonstrates the scientific principles underlying concept related to a Biology 30 topic. (STSE, S)
INDICATOR	BI30-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)
OUTCOME / COURSE	**SK.ES30.**	**Earth Science 30**
FOCUS	**ES30-LS.**	**Lithosphere**
OUTCOME	**ES30-LS1.**	**Analyze surface geography as a product of weathering, erosion and mass wasting. [SI, CP]**
INDICATOR	ES30-LS1.j.	Interpret and/or create a map of geological, civic and/or environmental data using a geographic information system (GIS) to correlate surface geography with human land use. (S, STSE)

OUTCOME / COURSE	**SK.ES30.**	**Earth Science 30**
FOCUS	**ES30-AH.**	**Atmosphere and Hydrosphere**
OUTCOME	**ES30-AH1.**	**Correlate major changes in Earth's atmosphere over geologic time with corresponding changes in the biosphere and other components of the geosphere.**
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)
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)