Main Criteria: Forward Education

Secondary Criteria: Nebraska Content Area Standards, Nevada Academic Content Standards, New Hampshire College and Career Ready Standards, New Jersey Student Learning Standards, New Mexico Content Standards, New York State Learning Standards and Core Curriculum, North Carolina Standard Course of Study, North Dakota Content Standards, Ohio Learning Standards, Oklahoma Academic Standards, Oregon Academic Content Standards

Subjects: Mathematics, Science, Technology Education

Grades: 9, 10, Key Stage 3, Key Stage 4

Forward Education

Replanting our Forests with Automated Tree Seeders

Nebraska Content Area Standards

Science

Grade **9** - Adopted: **2017**

CONTENT STANDARD	**NE.SC.HS-PS.**	**HS Physical Sciences**
STRAND	**SC.HS.2.**	**Waves and Electromagnetic Radiation**
INDICATOR	**SC.HS.2.2.**	**Gather, analyze, and communicate evidence of the interactions of waves.**
STRAND	SC.HS.2.2.B.	Evaluate questions about the advantages of using digital transmission and storage of information.

CONTENT STANDARD	**NE.SC.HS-PS.**	**HS Physical Sciences**
STRAND	**SC.HS.4.**	**Energy**
INDICATOR	**SC.HS.4.4.**	**Gather, analyze, and communicate evidence of the interactions of energy.**
STRAND	SC.HS.4.4.D.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

CONTENT STANDARD	**NE.SC.HS-LS.**	**HS Life Sciences**
STRAND	**SC.HS.7.**	**Interdependent Relationships in Ecosystems**
INDICATOR	**SC.HS.7.2.**	**Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.**
STRAND	SC.HS.7.2.B.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STRAND	SC.HS.7.2.E.	Design, evaluate, and refine a solution for increasing the positive impacts of human activities on the environment and biodiversity.
STRAND	SC.HS.7.2.F.	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

CONTENT STANDARD	**NE.SC.HS-LS.**	**HS Life Sciences**
STRAND	**SC.HS.8.**	**Matter and Energy in Organisms and Ecosystems**
INDICATOR	**SC.HS.8.3.**	**Gather, analyze, and communicate evidence of the flow of energy and cycling of matter in organisms and ecosystems.**

STRAND	SC.HS.8.3.E.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STRAND	SC.HS.8.3.F.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
CONTENT STANDARD	**NE.SC.HS-ESS.**	**HS Earth and Space Sciences**
STRAND	**SC.HS.12.**	**Weather and Climate**
INDICATOR	**SC.HS.12.2.**	**Gather, analyze, and communicate evidence to support that Earth's climate and weather are influenced by energy flow through Earth systems.**
STRAND	SC.HS.12.2.B.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
CONTENT STANDARD	**NE.SC.HS-ESS.**	**HS Earth and Space Sciences**
STRAND	**SC.HS.15.**	**Sustainability**
INDICATOR	**SC.HS.15.5.**	**Gather, analyze, and communicate evidence to describe the interactions between society, environment, and economy.**
STRAND	SC.HS.15.5.A.	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.
STRAND	SC.HS.15.5.B.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STRAND	SC.HS.15.5.C.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STRAND	SC.HS.15.5.F.	Use a computational representation to illustrate the relationships among Earth systems and the degree to which those relationships are being modified due to human activity.
CONTENT STANDARD	**NE.SC.HSP-P.**	**HS Physics – Plus Standards**
STRAND	**SC.HSP.4.**	**Energy: Physics**
INDICATOR	**SC.HSP.4.3.**	**Gather, analyze, and communicate evidence of the interactions of energy.**
STRAND	SC.HSP.4.3.D.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
CONTENT STANDARD	**NE.SC.HSP-P.**	**HS Physics – Plus Standards**
STRAND	**SC.HSP.16.**	**Electricity and Magnetism**
INDICATOR	**SC.HSP.16.4.**	**Gather, analyze, and communicate evidence of electricity and magnetism.**

STRAND	SC.HSP.16.4.G.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

CONTENT STANDARD	**NE.SC.HSP-C.**	**HS Chemistry – Plus Standards**
STRAND	**SC.HSP.3.**	**Structure and Properties of Matter**
INDICATOR	**SC.HSP.3.1.**	**Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter.**
STRAND	SC.HSP.3.3.D.	Evaluate a solution to a complex, real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

CONTENT STANDARD	**NE.SC.HSP-C.**	**HS Chemistry – Plus Standards**
STRAND	**SC.HSP.4.**	**Energy: Chemistry**
INDICATOR	**SC.HSP.4.2.**	**Gather, analyze, and communicate evidence of the interactions of energy.**
STRAND	SC.HSP.4.2.D.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

CONTENT STANDARD	**NE.SC.HSP-B.**	**HS Biology – Plus Standards**
STRAND	**SC.HSP.7.**	**Interdependent Relationships in Ecosystems**
INDICATOR	**SC.HSP.7.2.**	**Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.**
STRAND	SC.HSP.7.2.B.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STRAND	SC.HSP.7.2.D.	Design, evaluate, and refine a solution for increasing the positive impacts of human activities on the environment and biodiversity.
STRAND	SC.HSP.7.2.E.	Create or revise a simulation to test a solution to mitigate the impacts of human activity on biodiversity.

CONTENT STANDARD	**NE.SC.HSP-B.**	**HS Biology – Plus Standards**
STRAND	**SC.HSP.8.**	**Matter and Energy in Organisms and Ecosystems**
INDICATOR	**SC.HSP.8.3.**	**Gather, analyze, and communicate evidence of the flow of energy and cycling of matter in organisms and ecosystems.**
STRAND	SC.HSP.8.3.E.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STRAND	SC.HSP.8.3.F.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

CONTENT STANDARD	**NE.SC.HSP-AP.**	**HS Anatomy and Physiology – Plus Standards**
STRAND	**SC.HSP.18**	**Engineering in Health Sciences**
INDICATOR	**SC.HSP.17.1.**	**Gather, analyze, and communicate evidence of the connection between health science careers and engineering.**
STRAND	SC.HSP.17.1.B.	Design a solution to a complex real-world problem affecting body systems that can be solved through engineering.

Nebraska Content Area Standards

Science

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

CONTENT STANDARD	**NE.SC.HS-PS.**	**HS Physical Sciences**
STRAND	**SC.HS.2.**	**Waves and Electromagnetic Radiation**
INDICATOR	**SC.HS.2.2.**	**Gather, analyze, and communicate evidence of the interactions of waves.**
STRAND	SC.HS.2.2.B.	Evaluate questions about the advantages of using digital transmission and storage of information.

CONTENT STANDARD	**NE.SC.HS-PS.**	**HS Physical Sciences**
STRAND	**SC.HS.4.**	**Energy**
INDICATOR	**SC.HS.4.4.**	**Gather, analyze, and communicate evidence of the interactions of energy.**
STRAND	SC.HS.4.4.D.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

CONTENT STANDARD	**NE.SC.HS-LS.**	**HS Life Sciences**
STRAND	**SC.HS.7.**	**Interdependent Relationships in Ecosystems**
INDICATOR	**SC.HS.7.2.**	**Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.**
STRAND	SC.HS.7.2.B.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STRAND	SC.HS.7.2.E.	Design, evaluate, and refine a solution for increasing the positive impacts of human activities on the environment and biodiversity.
STRAND	SC.HS.7.2.F.	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

CONTENT STANDARD	**NE.SC.HS-LS.**	**HS Life Sciences**
STRAND	**SC.HS.8.**	**Matter and Energy in Organisms and Ecosystems**
INDICATOR	**SC.HS.8.3.**	**Gather, analyze, and communicate evidence of the flow of energy and cycling of matter in organisms and ecosystems.**

STRAND	SC.HS.8.3.E.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STRAND	SC.HS.8.3.F.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
CONTENT STANDARD	**NE.SC.HS-ESS.**	**HS Earth and Space Sciences**
STRAND	**SC.HS.12.**	**Weather and Climate**
INDICATOR	**SC.HS.12.2.**	**Gather, analyze, and communicate evidence to support that Earth's climate and weather are influenced by energy flow through Earth systems.**
STRAND	SC.HS.12.2.B.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
CONTENT STANDARD	**NE.SC.HS-ESS.**	**HS Earth and Space Sciences**
STRAND	**SC.HS.15.**	**Sustainability**
INDICATOR	**SC.HS.15.5.**	**Gather, analyze, and communicate evidence to describe the interactions between society, environment, and economy.**
STRAND	SC.HS.15.5.A.	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.
STRAND	SC.HS.15.5.B.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STRAND	SC.HS.15.5.C.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STRAND	SC.HS.15.5.F.	Use a computational representation to illustrate the relationships among Earth systems and the degree to which those relationships are being modified due to human activity.
CONTENT STANDARD	**NE.SC.HSP-P.**	**HS Physics – Plus Standards**
STRAND	**SC.HSP.4.**	**Energy: Physics**
INDICATOR	**SC.HSP.4.3.**	**Gather, analyze, and communicate evidence of the interactions of energy.**
STRAND	SC.HSP.4.3.D.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
CONTENT STANDARD	**NE.SC.HSP-P.**	**HS Physics – Plus Standards**
STRAND	**SC.HSP.16.**	**Electricity and Magnetism**
INDICATOR	**SC.HSP.16.4.**	**Gather, analyze, and communicate evidence of electricity and magnetism.**

STRAND	SC.HSP.16.4.G.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

CONTENT STANDARD	**NE.SC.HSP-C.**	**HS Chemistry – Plus Standards**
STRAND	**SC.HSP.3.**	**Structure and Properties of Matter**
INDICATOR	**SC.HSP.3.1.**	**Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter.**
STRAND	SC.HSP.3.3.D.	Evaluate a solution to a complex, real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

CONTENT STANDARD	**NE.SC.HSP-C.**	**HS Chemistry – Plus Standards**
STRAND	**SC.HSP.4.**	**Energy: Chemistry**
INDICATOR	**SC.HSP.4.2.**	**Gather, analyze, and communicate evidence of the interactions of energy.**
STRAND	SC.HSP.4.2.D.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

CONTENT STANDARD	**NE.SC.HSP-B.**	**HS Biology – Plus Standards**
STRAND	**SC.HSP.7.**	**Interdependent Relationships in Ecosystems**
INDICATOR	**SC.HSP.7.2.**	**Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.**
STRAND	SC.HSP.7.2.B.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STRAND	SC.HSP.7.2.D.	Design, evaluate, and refine a solution for increasing the positive impacts of human activities on the environment and biodiversity.
STRAND	SC.HSP.7.2.E.	Create or revise a simulation to test a solution to mitigate the impacts of human activity on biodiversity.

CONTENT STANDARD	**NE.SC.HSP-B.**	**HS Biology – Plus Standards**
STRAND	**SC.HSP.8.**	**Matter and Energy in Organisms and Ecosystems**
INDICATOR	**SC.HSP.8.3.**	**Gather, analyze, and communicate evidence of the flow of energy and cycling of matter in organisms and ecosystems.**
STRAND	SC.HSP.8.3.E.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STRAND	SC.HSP.8.3.F.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

CONTENT STANDARD	**NE.SC.HSP-AP.**	**HS Anatomy and Physiology – Plus Standards**
STRAND	**SC.HSP.18**	**Engineering in Health Sciences**
INDICATOR	**SC.HSP.17.1.**	**Gather, analyze, and communicate evidence of the connection between health science careers and engineering.**
STRAND	SC.HSP.17.1.B.	Design a solution to a complex real-world problem affecting body systems that can be solved through engineering.

Nebraska Content Area Standards

Technology Education

Grade **9** - Adopted: **2018**

CONTENT STANDARD		**NEBRASKA K-12 TECHNOLOGY Scope & Sequence**
STRAND		**BASIC TECHNOLOGY - Operations/Concepts**
INDICATOR		**HARDWARE/SOFTWARE STANDARDS**
STRAND		Apply strategies for identifying and solving routine problems that occur during everyday computer use.

CONTENT STANDARD		**NEBRASKA K-12 TECHNOLOGY Scope & Sequence**
STRAND		**DIGITAL MEDIA**
INDICATOR		**DIGITAL MEDIA STANDARDS**
STRAND		Independently use appropriate technology tools (graphic organizers, audio and video) to define problems and propose hypotheses.

CONTENT STANDARD		**NEBRASKA K-12 TECHNOLOGY Scope & Sequence**
STRAND		**COMPUTER SCIENCE/PROGRAMMING**
INDICATOR		**COMPUTATIONAL THINKING STANDARDS**
STRAND		Create algorithms, or series of ordered steps, to solve problems.
STRAND		Decompose a problem into smaller more manageable parts.
STRAND		Optimize an algorithm for execution by a computer.
STRAND		Create simulations/models to understand natural phenomena and test hypotheses.
STRAND		Evaluate algorithms by their efficiency, correctness, and clarity.

CONTENT STANDARD		**NEBRASKA K-12 TECHNOLOGY Scope & Sequence**
STRAND		**COMPUTER SCIENCE/PROGRAMMING**
INDICATOR		**PROGRAMMING STANDARDS**

STRAND		Write programs using visual (block-based) programming languages (scratch, code.org).

Nebraska Content Area Standards

Technology Education

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

CONTENT STANDARD		**NEBRASKA K-12 TECHNOLOGY Scope & Sequence**
STRAND		**BASIC TECHNOLOGY - Operations/Concepts**
INDICATOR		**HARDWARE/SOFTWARE STANDARDS**
STRAND		Apply strategies for identifying and solving routine problems that occur during everyday computer use.

CONTENT STANDARD		**NEBRASKA K-12 TECHNOLOGY Scope & Sequence**
STRAND		**DIGITAL MEDIA**
INDICATOR		**DIGITAL MEDIA STANDARDS**
STRAND		Independently use appropriate technology tools (graphic organizers, audio and video) to define problems and propose hypotheses.

CONTENT STANDARD		**NEBRASKA K-12 TECHNOLOGY Scope & Sequence**
STRAND		**COMPUTER SCIENCE/PROGRAMMING**
INDICATOR		**COMPUTATIONAL THINKING STANDARDS**
STRAND		Create algorithms, or series of ordered steps, to solve problems.
STRAND		Decompose a problem into smaller more manageable parts.
STRAND		Optimize an algorithm for execution by a computer.
STRAND		Create simulations/models to understand natural phenomena and test hypotheses.
STRAND		Evaluate algorithms by their efficiency, correctness, and clarity.

CONTENT STANDARD		**NEBRASKA K-12 TECHNOLOGY Scope & Sequence**
STRAND		**COMPUTER SCIENCE/PROGRAMMING**
INDICATOR		**PROGRAMMING STANDARDS**
STRAND		Write programs using visual (block-based) programming languages (scratch, code.org).

Nevada Academic Content Standards

Mathematics

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

CONTENT STANDARD	**NV.CC.MP.**	**Mathematical Practices**

STRAND / INDICATOR	MP-1.	Make sense of problems and persevere in solving them.
STRAND / INDICATOR	MP-2.	Reason abstractly and quantitatively.
STRAND / INDICATOR	MP-3.	Construct viable arguments and critique the reasoning of others.
STRAND / INDICATOR	MP-4.	Model with mathematics.
STRAND / INDICATOR	MP-6.	Attend to precision.
STRAND / INDICATOR	MP-7.	Look for and make use of structure.
STRAND / INDICATOR	MP-8.	Look for and express regularity in repeated reasoning.
CONTENT STANDARD	**NV.CC.F.**	**Functions**
STRAND / INDICATOR	**F-IF.**	**Interpreting Functions**
INDICATOR / GRADE LEVEL EXPECTATION		**Interpret functions that arise in applications in terms of the context.**
GRADE LEVEL 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.

Nevada Academic Content Standards

Mathematics

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

CONTENT STANDARD	**NV.CC.MP.**	**Mathematical Practices**
STRAND / INDICATOR	MP-1.	Make sense of problems and persevere in solving them.
STRAND / INDICATOR	MP-2.	Reason abstractly and quantitatively.
STRAND / INDICATOR	MP-3.	Construct viable arguments and critique the reasoning of others.
STRAND / INDICATOR	MP-4.	Model with mathematics.
STRAND / INDICATOR	MP-6.	Attend to precision.

STRAND / INDICATOR	MP-7.	Look for and make use of structure.
STRAND / INDICATOR	MP-8.	Look for and express regularity in repeated reasoning.
CONTENT STANDARD	**NV.CC.F.**	**Functions**
STRAND / INDICATOR	**F-IF.**	**Interpreting Functions**
INDICATOR / GRADE LEVEL EXPECTATION		**Interpret functions that arise in applications in terms of the context.**
GRADE LEVEL 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.

Nevada Academic Content Standards

Science

Grade **9** - Adopted: **2014**

CONTENT STANDARD	**NV.HS-PS.**	**PHYSICAL SCIENCE**
STRAND / INDICATOR	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
INDICATOR / GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
GRADE LEVEL EXPECTATION	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
CONTENT STANDARD	**NV.HS-LS.**	**LIFE SCIENCE**
STRAND / INDICATOR	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
INDICATOR / GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
GRADE LEVEL EXPECTATION	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
GRADE LEVEL EXPECTATION	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
GRADE LEVEL EXPECTATION	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
GRADE LEVEL EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
CONTENT STANDARD	**NV.HS-LS.**	**LIFE SCIENCE**

STRAND / INDICATOR	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
INDICATOR / GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
GRADE LEVEL EXPECTATION	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

CONTENT STANDARD	**NV.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STRAND / INDICATOR	**HS-ESS2.**	**Earth's Systems**
INDICATOR / GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
GRADE LEVEL EXPECTATION	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
GRADE LEVEL EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

CONTENT STANDARD	**NV.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STRAND / INDICATOR	**HS-ESS3.**	**Earth and Human Activity**
INDICATOR / GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
GRADE LEVEL EXPECTATION	HS-ESS3-1.	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.
GRADE LEVEL EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
GRADE LEVEL EXPECTATION	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
GRADE LEVEL EXPECTATION	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

CONTENT STANDARD	**NV.HS-ETS.**	**ENGINEERING DESIGN**
STRAND / INDICATOR	**HS-ETS1.**	**Engineering Design**
INDICATOR / GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
GRADE LEVEL EXPECTATION	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

GRADE LEVEL EXPECTATION	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

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

CONTENT STANDARD	**NV.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Key Ideas and Details**
INDICATOR / GRADE LEVEL EXPECTATION	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.
INDICATOR / GRADE LEVEL EXPECTATION	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	**NV.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Craft and Structure**
INDICATOR / GRADE LEVEL EXPECTATION	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.
INDICATOR / GRADE LEVEL EXPECTATION	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	**NV.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Integration of Knowledge and Ideas**
INDICATOR / GRADE LEVEL EXPECTATION	RST.9-10.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

CONTENT STANDARD	**NV.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Range of Reading and Level of Text Complexity**
INDICATOR / GRADE LEVEL EXPECTATION	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	**NV.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**

STRAND / INDICATOR		**Text Types and Purposes**
INDICATOR / GRADE LEVEL EXPECTATION	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
GRADE LEVEL 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	**NV.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Production and Distribution of Writing**
INDICATOR / GRADE LEVEL EXPECTATION	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
INDICATOR / GRADE LEVEL EXPECTATION	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.

Nevada Academic Content Standards

Science

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

CONTENT STANDARD	**NV.HS-PS.**	**PHYSICAL SCIENCE**
STRAND / INDICATOR	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
INDICATOR / GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
GRADE LEVEL EXPECTATION	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

CONTENT STANDARD	**NV.HS-LS.**	**LIFE SCIENCE**
STRAND / INDICATOR	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
INDICATOR / GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
GRADE LEVEL EXPECTATION	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
GRADE LEVEL EXPECTATION	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
GRADE LEVEL EXPECTATION	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
GRADE LEVEL EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

CONTENT STANDARD	NV.HS-LS.	LIFE SCIENCE
STRAND / INDICATOR	HS-LS4.	Biological Evolution: Unity and Diversity
INDICATOR / GRADE LEVEL EXPECTATION		Students who demonstrate understanding can:
GRADE LEVEL EXPECTATION	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

CONTENT STANDARD	NV.HS-ESS.	EARTH AND SPACE SCIENCE
STRAND / INDICATOR	HS-ESS2.	Earth's Systems
INDICATOR / GRADE LEVEL EXPECTATION		Students who demonstrate understanding can:
GRADE LEVEL EXPECTATION	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
GRADE LEVEL EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

CONTENT STANDARD	NV.HS-ESS.	EARTH AND SPACE SCIENCE
STRAND / INDICATOR	HS-ESS3.	Earth and Human Activity
INDICATOR / GRADE LEVEL EXPECTATION		Students who demonstrate understanding can:
GRADE LEVEL EXPECTATION	HS-ESS3-1.	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.
GRADE LEVEL EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
GRADE LEVEL EXPECTATION	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
GRADE LEVEL EXPECTATION	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

CONTENT STANDARD	NV.HS-ETS.	ENGINEERING DESIGN
STRAND / INDICATOR	HS-ETS1.	Engineering Design
INDICATOR / GRADE LEVEL EXPECTATION		Students who demonstrate understanding can:
GRADE LEVEL EXPECTATION	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

GRADE LEVEL EXPECTATION	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

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

CONTENT STANDARD	**NV.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Key Ideas and Details**
INDICATOR / GRADE LEVEL EXPECTATION	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.
INDICATOR / GRADE LEVEL EXPECTATION	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	**NV.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Craft and Structure**
INDICATOR / GRADE LEVEL EXPECTATION	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.
INDICATOR / GRADE LEVEL EXPECTATION	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	**NV.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Integration of Knowledge and Ideas**
INDICATOR / GRADE LEVEL EXPECTATION	RST.9-10.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

CONTENT STANDARD	**NV.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Range of Reading and Level of Text Complexity**
INDICATOR / GRADE LEVEL EXPECTATION	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	**NV.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**

STRAND / INDICATOR		**Text Types and Purposes**
INDICATOR / GRADE LEVEL EXPECTATION	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
GRADE LEVEL 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	**NV.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND / INDICATOR		**Production and Distribution of Writing**
INDICATOR / GRADE LEVEL EXPECTATION	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
INDICATOR / GRADE LEVEL EXPECTATION	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.

Nevada Academic Content Standards

Technology Education

Grade **9** - Adopted: **2019**

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Practices**
INDICATOR / GRADE LEVEL EXPECTATION	**P1.**	**Fostering an Inclusive Computing Culture**
GRADE LEVEL EXPECTATION	P1.2.	Address the needs of diverse end users during the design process to produce artifacts with broad accessibility and usability.
GRADE LEVEL EXPECTATION	P1.3.	Employ self- and peer-advocacy to address bias in interactions, product design, and development methods.

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Practices**
INDICATOR / GRADE LEVEL EXPECTATION	**P3.**	**Recognizing and Defining Computational Problems**
GRADE LEVEL EXPECTATION	P3.1.	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
GRADE LEVEL EXPECTATION	P3.2.	Decompose complex real-world problems into manageable subproblems that could integrate existing solutions or procedures.
GRADE LEVEL EXPECTATION	P3.3.	Evaluate whether it is appropriate and feasible to solve a problem computationally.

CONTENT STANDARD		NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE
STRAND / INDICATOR		Practices
INDICATOR / GRADE LEVEL EXPECTATION	P4.	Developing and Using Abstractions
GRADE LEVEL EXPECTATION	P4.3.	Create modules and develop points of interaction that can apply to multiple situations and reduce complexity.

CONTENT STANDARD		NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE
STRAND / INDICATOR		Practices
INDICATOR / GRADE LEVEL EXPECTATION	P5.	Creating Computational Artifacts
GRADE LEVEL EXPECTATION	P5.1.	Plan the development of a computational artifact using an iterative process that includes reflection on and modification of the plan, taking into account key features, time and resource constraints, and user expectations.
GRADE LEVEL EXPECTATION	P5.2.	Create a computational artifact for practical intent, personal expression, or to address a societal issue.

CONTENT STANDARD		NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE
STRAND / INDICATOR		Practices
INDICATOR / GRADE LEVEL EXPECTATION	P6.	Testing and Refining Computational Artifacts
GRADE LEVEL EXPECTATION	P6.1.	Systematically test computational artifacts by considering all scenarios and using test cases.

CONTENT STANDARD		NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE
STRAND / INDICATOR		Practices
INDICATOR / GRADE LEVEL EXPECTATION	P7.	Communicating About Computing
GRADE LEVEL EXPECTATION	P7.1.	Select, organize, and interpret large data sets from multiple sources to support a claim.

CONTENT STANDARD		NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE
STRAND / INDICATOR		Algorithms and Programming
INDICATOR / GRADE LEVEL EXPECTATION	9-12.AP.A.1.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Impacts of Computing**
INDICATOR / GRADE LEVEL EXPECTATION	9-12.IC.C.2.	Test and refine computational artifacts to reduce bias and equity deficits.

CONTENT STANDARD		**Grades 9-12 Advanced Computer Science Standards**
STRAND / INDICATOR		**Algorithms and Programming**
INDICATOR / GRADE LEVEL EXPECTATION	A9-12.AP.A.3.	Use and adapt classic algorithms to solve computational problems.

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for INTEGRATED TECHNOLOGY**
STRAND / INDICATOR		**Innovative Designer**
INDICATOR / GRADE LEVEL EXPECTATION	9-12.ID.B.1.	Creatively use digital tools to support a design process and expand their understanding to identify constraints, trade-offs, and to weigh risks.
INDICATOR / GRADE LEVEL EXPECTATION	9-12.ID.C.1.	Engage in a cyclical design process to inquire and analyze, develop ideas, test, and revise prototypes, presenting finished products and best practices learned during the development.
INDICATOR / GRADE LEVEL EXPECTATION	9-12.ID.D.1.	Demonstrate an ability to persevere and handle greater ambiguity as they work to solve open-ended problems.

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for INTEGRATED TECHNOLOGY**
STRAND / INDICATOR		**Computational Thinker**
INDICATOR / GRADE LEVEL EXPECTATION	9-12.CT.A.1.	Define complex issues, create a plan, and select appropriate technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.
INDICATOR / GRADE LEVEL EXPECTATION	9-12.CT.C.1.	Collaborate to break problems into component parts, identify key pieces, and use that information to problem-solve.

Nevada Academic Content Standards

Technology Education

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

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Practices**

INDICATOR / GRADE LEVEL EXPECTATION	**P1.**	**Fostering an Inclusive Computing Culture**
GRADE LEVEL EXPECTATION	P1.2.	Address the needs of diverse end users during the design process to produce artifacts with broad accessibility and usability.
GRADE LEVEL EXPECTATION	P1.3.	Employ self- and peer-advocacy to address bias in interactions, product design, and development methods.
CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Practices**
INDICATOR / GRADE LEVEL EXPECTATION	**P3.**	**Recognizing and Defining Computational Problems**
GRADE LEVEL EXPECTATION	P3.1.	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
GRADE LEVEL EXPECTATION	P3.2.	Decompose complex real-world problems into manageable subproblems that could integrate existing solutions or procedures.
GRADE LEVEL EXPECTATION	P3.3.	Evaluate whether it is appropriate and feasible to solve a problem computationally.
CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Practices**
INDICATOR / GRADE LEVEL EXPECTATION	**P4.**	**Developing and Using Abstractions**
GRADE LEVEL EXPECTATION	P4.3.	Create modules and develop points of interaction that can apply to multiple situations and reduce complexity.
CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Practices**
INDICATOR / GRADE LEVEL EXPECTATION	**P5.**	**Creating Computational Artifacts**
GRADE LEVEL EXPECTATION	P5.1.	Plan the development of a computational artifact using an iterative process that includes reflection on and modification of the plan, taking into account key features, time and resource constraints, and user expectations.
GRADE LEVEL EXPECTATION	P5.2.	Create a computational artifact for practical intent, personal expression, or to address a societal issue.
CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Practices**

INDICATOR / GRADE LEVEL EXPECTATION	**P6.**	**Testing and Refining Computational Artifacts**
GRADE LEVEL EXPECTATION	P6.1.	Systematically test computational artifacts by considering all scenarios and using test cases.

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Practices**
INDICATOR / GRADE LEVEL EXPECTATION	**P7.**	**Communicating About Computing**
GRADE LEVEL EXPECTATION	P7.1.	Select, organize, and interpret large data sets from multiple sources to support a claim.

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Algorithms and Programming**
INDICATOR / GRADE LEVEL EXPECTATION	9-12.AP.A.1.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for COMPUTER SCIENCE**
STRAND / INDICATOR		**Impacts of Computing**
INDICATOR / GRADE LEVEL EXPECTATION	9-12.IC.C.2.	Test and refine computational artifacts to reduce bias and equity deficits.

CONTENT STANDARD		**Grades 9-12 Advanced Computer Science Standards**
STRAND / INDICATOR		**Algorithms and Programming**
INDICATOR / GRADE LEVEL EXPECTATION	A9-12.AP.A.3.	Use and adapt classic algorithms to solve computational problems.

CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for INTEGRATED TECHNOLOGY**
STRAND / INDICATOR		**Innovative Designer**
INDICATOR / GRADE LEVEL EXPECTATION	9-12.ID.B.1.	Creatively use digital tools to support a design process and expand their understanding to identify constraints, trade-offs, and to weigh risks.

INDICATOR / GRADE LEVEL EXPECTATION	9-12.ID.C.1.	Engage in a cyclical design process to inquire and analyze, develop ideas, test, and revise prototypes, presenting finished products and best practices learned during the development.
INDICATOR / GRADE LEVEL EXPECTATION	9-12.ID.D.1.	Demonstrate an ability to persevere and handle greater ambiguity as they work to solve open-ended problems.
CONTENT STANDARD		**NEVADA ACADEMIC CONTENT STANDARDS for INTEGRATED TECHNOLOGY**
STRAND / INDICATOR		**Computational Thinker**
INDICATOR / GRADE LEVEL EXPECTATION	9-12.CT.A.1.	Define complex issues, create a plan, and select appropriate technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.
INDICATOR / GRADE LEVEL EXPECTATION	9-12.CT.C.1.	Collaborate to break problems into component parts, identify key pieces, and use that information to problem-solve.

New Hampshire College and Career Ready Standards

Mathematics

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

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

STRAND / STANDARD	**NH.CC.F.**	**Functions**
STANDARD / GLE	**F-IF.**	**Interpreting Functions**

GRADE LEVEL EXPECTATION		**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.

New Hampshire College and Career Ready Standards

Mathematics

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

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

STRAND / STANDARD	NH.CC.F.	Functions
STANDARD / GLE	**F-IF.**	**Interpreting Functions**
GRADE LEVEL EXPECTATION		**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.

New Hampshire College and Career Ready Standards

Science

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

STRAND / STANDARD	NGSS.HS-PS.	PHYSICAL SCIENCE
STANDARD / GLE	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**

EXPECTATION	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

STRAND / STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
STANDARD / GLE	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
EXPECTATION	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
EXPECTATION	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

STRAND / STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
STANDARD / GLE	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

STRAND / STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STANDARD / GLE	**HS-ESS2.**	**Earth's Systems**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

STRAND / STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STANDARD / GLE	**HS-ESS3.**	**Earth and Human Activity**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**

EXPECTATION	HS-ESS3-1.	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.
EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
EXPECTATION	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
EXPECTATION	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / STANDARD	**NGSS.HS-ETS.**	**ENGINEERING DESIGN**
STANDARD / GLE	**HS-ETS1.**	**Engineering Design**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
EXPECTATION	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
EXPECTATION	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

New Hampshire College and Career Ready Standards

Science

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

STRAND / STANDARD	**NGSS.HS-PS.**	**PHYSICAL SCIENCE**
STANDARD / GLE	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STRAND / STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
STANDARD / GLE	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

EXPECTATION	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
EXPECTATION	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND / STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
STANDARD / GLE	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STRAND / STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STANDARD / GLE	**HS-ESS2.**	**Earth's Systems**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND / STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STANDARD / GLE	**HS-ESS3.**	**Earth and Human Activity**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-ESS3-1.	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.
EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
EXPECTATION	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
EXPECTATION	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / STANDARD	**NGSS.HS-ETS.**	**ENGINEERING DESIGN**

STANDARD / GLE	**HS-ETS1.**	**Engineering Design**
GRADE LEVEL EXPECTATION		**Students who demonstrate understanding can:**
EXPECTATION	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
EXPECTATION	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
EXPECTATION	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

New Hampshire College and Career Ready Standards

Technology Education

Grade **9** - Adopted: **2005**

STRAND / STANDARD	**NH.ICT.**	**Information and Communication Technologies Program**
STANDARD / GLE	**ICT.2.**	**USE WITH CORE SUBJECTS: Become proficient in the use of 21st century tools to access, manage, integrate, evaluate, and create information within the context of the core subjects of:**
GRADE LEVEL EXPECTATION	ICT.2.d.	Science

STRAND / STANDARD	**NH.ICT.**	**Information and Communication Technologies Program**
STANDARD / GLE	**ICT.3.**	**COGNITIVE PROFICIENCY: Use 21st century tools to develop cognitive proficiency in:**
GRADE LEVEL EXPECTATION	ICT.3.c.	Problem solving

STRAND / STANDARD	**NH.ICT.**	**Information and Communication Technologies Program**
STANDARD / GLE	**ICT.5.**	**DIGITAL PORTFOLIOS: Create digital portfolios which:**
GRADE LEVEL EXPECTATION	ICT.5.b.	Represent proficient, ethical, responsible use of 21st century tools within the context of the core subjects

Grade **9** - Adopted: **2018**

STRAND / STANDARD		**Computer Science**
STANDARD / GLE		**Algorithms & Programming**
GRADE LEVEL EXPECTATION	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

New Hampshire College and Career Ready Standards

Technology Education

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

STRAND / STANDARD	NH.ICT.	Information and Communication Technologies Program
STANDARD / GLE	**ICT.2.**	**USE WITH CORE SUBJECTS: Become proficient in the use of 21st century tools to access, manage, integrate, evaluate, and create information within the context of the core subjects of:**
GRADE LEVEL EXPECTATION	ICT.2.d.	Science

STRAND / STANDARD	NH.ICT.	Information and Communication Technologies Program
STANDARD / GLE	**ICT.3.**	**COGNITIVE PROFICIENCY: Use 21st century tools to develop cognitive proficiency in:**
GRADE LEVEL EXPECTATION	ICT.3.c.	Problem solving

STRAND / STANDARD	NH.ICT.	Information and Communication Technologies Program
STANDARD / GLE	**ICT.5.**	**DIGITAL PORTFOLIOS: Create digital portfolios which:**
GRADE LEVEL EXPECTATION	ICT.5.b.	Represent proficient, ethical, responsible use of 21st century tools within the context of the core subjects

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

STRAND / STANDARD		Computer Science
STANDARD / GLE		**Algorithms & Programming**
GRADE LEVEL EXPECTATION	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

New Jersey Student Learning Standards

Mathematics

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

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

CONTENT AREA / STANDARD	**NJ.F.**	**Functions**
STRAND	**F-IF.**	**Interpreting Functions**
CONTENT STATEMENT	**F-IF.B.**	**Interpret functions that arise in applications in terms of the context**
CUMULATIVE PROGRESS INDICATOR	F-IF.B.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.

New Jersey Student Learning Standards

Mathematics

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

CONTENT AREA / STANDARD	**NJ.MP.**	**Mathematical Practices**
STRAND	MP.1.	Make sense of problems and persevere in solving them.
STRAND	MP.2.	Reason abstractly and quantitatively.
STRAND	MP.3.	Construct viable arguments and critique the reasoning of others.
STRAND	MP.4.	Model with mathematics.
STRAND	MP.6.	Attend to precision.
STRAND	MP.7.	Look for and make use of structure.
STRAND	MP.8.	Look for and express regularity in repeated reasoning.
CONTENT AREA / STANDARD	**NJ.F.**	**Functions**
STRAND	**F-IF.**	**Interpreting Functions**
CONTENT STATEMENT	**F-IF.B.**	**Interpret functions that arise in applications in terms of the context**
CUMULATIVE PROGRESS INDICATOR	F-IF.B.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.

New Jersey Student Learning Standards

Science

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

CONTENT AREA / STANDARD	**HS-PS.**	**Physical Science**
STRAND	**HS-PS4:**	**Waves and Their Applications in Technologies for Information Transfer**

CONTENT STATEMENT	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
CONTENT AREA / STANDARD	**HS-LS.**	**Life Science**
STRAND	**HS-LS2:**	**Ecosystems: Interactions, Energy, and Dynamics**
CONTENT STATEMENT	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
CONTENT STATEMENT	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
CONTENT STATEMENT	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
CONTENT STATEMENT	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
CONTENT AREA / STANDARD	**HS-LS.**	**Life Science**
STRAND	**HS-LS4:**	**Biological Evolution: Unity and Diversity**
CONTENT STATEMENT	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
CONTENT AREA / STANDARD	**HS-ESS.**	**Earth and Space Science**
STRAND	**HS-ESS2:**	**Earth's Systems**
CONTENT STATEMENT	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
CONTENT AREA / STANDARD	**HS-ESS.**	**Earth and Space Science**
STRAND	**HS-ESS3:**	**Earth and Human Activity**
CONTENT STATEMENT	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and climate change have influenced human activity.
CONTENT STATEMENT	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
CONTENT STATEMENT	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
CONTENT STATEMENT	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change).

CONTENT AREA / STANDARD	**HS-ETS.**	**Engineering, Technology and Applications of Science**
STRAND	**HS-ETS1:**	**Engineering Design**
CONTENT STATEMENT	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
CONTENT STATEMENT	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
CONTENT STATEMENT	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

New Jersey Student Learning Standards

Science

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

CONTENT AREA / STANDARD	**HS-PS.**	**Physical Science**
STRAND	**HS-PS4:**	**Waves and Their Applications in Technologies for Information Transfer**
CONTENT STATEMENT	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

CONTENT AREA / STANDARD	**HS-LS.**	**Life Science**
STRAND	**HS-LS2:**	**Ecosystems: Interactions, Energy, and Dynamics**
CONTENT STATEMENT	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
CONTENT STATEMENT	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
CONTENT STATEMENT	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
CONTENT STATEMENT	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

CONTENT AREA / STANDARD	**HS-LS.**	**Life Science**
STRAND	**HS-LS4:**	**Biological Evolution: Unity and Diversity**
CONTENT STATEMENT	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

CONTENT AREA / STANDARD	**HS-ESS.**	**Earth and Space Science**

STRAND	**HS-ESS2:**	**Earth's Systems**
CONTENT STATEMENT	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
CONTENT AREA / STANDARD	**HS-ESS.**	**Earth and Space Science**
STRAND	**HS-ESS3:**	**Earth and Human Activity**
CONTENT STATEMENT	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and climate change have influenced human activity.
CONTENT STATEMENT	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
CONTENT STATEMENT	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
CONTENT STATEMENT	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change).
CONTENT AREA / STANDARD	**HS-ETS.**	**Engineering, Technology and Applications of Science**
STRAND	**HS-ETS1:**	**Engineering Design**
CONTENT STATEMENT	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
CONTENT STATEMENT	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
CONTENT STATEMENT	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

New Jersey Student Learning Standards

Technology Education

Grade **9** - Adopted: **2020**

CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**1 Fostering an Inclusive Computing and Design Culture**
CONTENT STATEMENT		**Building an inclusive and diverse computing culture requires strategies for incorporating perspectives from people of different genders, ethnicities, and abilities. Incorporating these perspectives involves understanding the personal, ethical, social, economic, and cultural contexts in which people operate. Considering the needs of diverse users during the design process is essential to producing inclusive computational products. When engaging in this practice, students:**
CUMULATIVE PROGRESS INDICATOR		Employ self- and peer-advocacy to address bias in interactions, product design, and development methods.

CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**3 Recognizing and Defining Computational Problems**
CONTENT STATEMENT		**The ability to recognize appropriate and worthwhile opportunities to apply computation is a skill that develops over time and is central to computing. Solving a problem with a computational approach requires defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate. When engaging in this practice, students:**
CUMULATIVE PROGRESS INDICATOR		Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures.
CUMULATIVE PROGRESS INDICATOR		Evaluate whether it is appropriate and feasible to solve a problem computationally.

CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**4 Developing and Using Abstractions**
CONTENT STATEMENT		**Abstractions are formed by identifying patterns and extracting common features from specific examples in order to create generalizations. Using generalized solutions and parts of solutions designed for broad reuse simplifies the development process by managing complexity. When engaging in this practice, students:**
CUMULATIVE PROGRESS INDICATOR		Evaluate existing technological functionalities and incorporate them into new designs.
CUMULATIVE PROGRESS INDICATOR		Create modules and develop points of interaction that can apply to multiple situations and reduce complexity.

CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**5 Creating Computational Artifacts**
CONTENT STATEMENT		**The process of developing computational artifacts embraces both creative expression and the exploration of ideas to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to their community and beyond. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps. When engaging in this practice, students:**
CUMULATIVE PROGRESS INDICATOR		Plan the development of a computational artifact using an iterative process that includes reflection on and modification of the plan, taking into account key features, time and resource constraints, and user expectations.
CUMULATIVE PROGRESS INDICATOR		Create a computational artifact for practical intent, personal expression, or to address a societal issue.

CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**6 Testing and Refining Computational Artifacts**

CONTENT STATEMENT		**Testing and refinement is the deliberate and iterative process of improving a computational artifact. This process includes debugging (identifying and fixing errors) and comparing actual outcomes to intended outcomes. Students also respond to the changing needs and expectations of end users and improve the performance, reliability, usability, and accessibility of artifacts. When engaging in this practice, students:**
CUMULATIVE PROGRESS INDICATOR		Systematically test computational artifacts by considering all scenarios and using test cases.

CONTENT AREA / STANDARD	**8.1.**	**Computer Science and Design Thinking – Computer Science**
STRAND		**Impacts of Computing**
CONTENT STATEMENT		**The design and use of computing technologies and artifacts can positively or negatively affect equitable access to information and opportunities.**
CUMULATIVE PROGRESS INDICATOR	8.1.12.IC.2:	Test and refine computational artifacts to reduce bias and equity deficits.

CONTENT AREA / STANDARD	**8.1.**	**Computer Science and Design Thinking – Computer Science**
STRAND		**Algorithms & Programming**
CONTENT STATEMENT		**Individuals evaluate and select algorithms based on performance, reusability, and ease of implementation.**
CUMULATIVE PROGRESS INDICATOR	8.1.12.AP.1:	Design algorithms to solve computational problems using a combination of original and existing algorithms.

CONTENT AREA / STANDARD	**8.1.**	**Computer Science and Design Thinking – Computer Science**
STRAND		**Algorithms & Programming**
CONTENT STATEMENT		**Complex programs are developed, tested, and analyzed by teams drawing on the members' diverse strengths using a variety of resources, libraries, and tools.**
CUMULATIVE PROGRESS INDICATOR	8.1.12.AP.9:	Collaboratively document and present design decisions in the development of complex programs.

CONTENT AREA / STANDARD	**8.2.**	**Computer Science and Design Thinking – Design Thinking**
STRAND		**Engineering Design**
CONTENT STATEMENT		**Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.**
CUMULATIVE PROGRESS INDICATOR	8.2.12.ED.1:	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.

CUMULATIVE PROGRESS INDICATOR	8.2.12.ED.4:	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
CONTENT AREA / STANDARD	**8.2.**	**Computer Science and Design Thinking – Design Thinking**
STRAND		**Engineering Design**
CONTENT STATEMENT		**Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.**
CUMULATIVE PROGRESS INDICATOR	8.2.12.ED.5:	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CUMULATIVE PROGRESS INDICATOR	8.2.12.ED.6:	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CONTENT AREA / STANDARD	**8.2.**	**Computer Science and Design Thinking – Design Thinking**
STRAND		**Interaction of Technology and Humans**
CONTENT STATEMENT		**Decisions to develop new technology are driven by societal and cultural opinions and demands that differ from culture to culture.**
CUMULATIVE PROGRESS INDICATOR	8.2.12.ITH.1:	Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints.
CONTENT AREA / STANDARD	**8.2.**	**Computer Science and Design Thinking – Design Thinking**
STRAND		**Effects of Technology on the Natural World**
CONTENT STATEMENT		**Development and modification of any technological system needs to take into account how the operation of the system will affect natural resources and ecosystems. Impacts of technological systems on the environment need to be monitored and must inform decision-making. Many technologies have been designed to have a positive impact on the environment and to monitor environmental change over time.**
CUMULATIVE PROGRESS INDICATOR	8.2.12.ETW.1:	Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation, and maintenance of a chosen product.
CUMULATIVE PROGRESS INDICATOR	8.2.12.ETW.2:	Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment.

New Jersey Student Learning Standards

Technology Education

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

CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**1 Fostering an Inclusive Computing and Design Culture**

CONTENT STATEMENT		**Building an inclusive and diverse computing culture requires strategies for incorporating perspectives from people of different genders, ethnicities, and abilities. Incorporating these perspectives involves understanding the personal, ethical, social, economic, and cultural contexts in which people operate. Considering the needs of diverse users during the design process is essential to producing inclusive computational products. When engaging in this practice, students:**
CUMULATIVE PROGRESS INDICATOR		Employ self- and peer-advocacy to address bias in interactions, product design, and development methods.
CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**3 Recognizing and Defining Computational Problems**
CONTENT STATEMENT		**The ability to recognize appropriate and worthwhile opportunities to apply computation is a skill that develops over time and is central to computing. Solving a problem with a computational approach requires defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate. When engaging in this practice, students:**
CUMULATIVE PROGRESS INDICATOR		Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures.
CUMULATIVE PROGRESS INDICATOR		Evaluate whether it is appropriate and feasible to solve a problem computationally.
CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**4 Developing and Using Abstractions**
CONTENT STATEMENT		**Abstractions are formed by identifying patterns and extracting common features from specific examples in order to create generalizations. Using generalized solutions and parts of solutions designed for broad reuse simplifies the development process by managing complexity. When engaging in this practice, students:**
CUMULATIVE PROGRESS INDICATOR		Evaluate existing technological functionalities and incorporate them into new designs.
CUMULATIVE PROGRESS INDICATOR		Create modules and develop points of interaction that can apply to multiple situations and reduce complexity.
CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**5 Creating Computational Artifacts**
CONTENT STATEMENT		**The process of developing computational artifacts embraces both creative expression and the exploration of ideas to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to their community and beyond. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps. When engaging in this practice, students:**
CUMULATIVE PROGRESS INDICATOR		Plan the development of a computational artifact using an iterative process that includes reflection on and modification of the plan, taking into account key features, time and resource constraints, and user expectations.

CUMULATIVE PROGRESS INDICATOR		Create a computational artifact for practical intent, personal expression, or to address a societal issue.

CONTENT AREA / STANDARD		**Computer Science and Design Thinking Practices**
STRAND		**6 Testing and Refining Computational Artifacts**
CONTENT STATEMENT		**Testing and refinement is the deliberate and iterative process of improving a computational artifact. This process includes debugging (identifying and fixing errors) and comparing actual outcomes to intended outcomes. Students also respond to the changing needs and expectations of end users and improve the performance, reliability, usability, and accessibility of artifacts. When engaging in this practice, students:**

CUMULATIVE PROGRESS INDICATOR		Systematically test computational artifacts by considering all scenarios and using test cases.

CONTENT AREA / STANDARD	**8.1.**	**Computer Science and Design Thinking – Computer Science**
STRAND		**Impacts of Computing**
CONTENT STATEMENT		**The design and use of computing technologies and artifacts can positively or negatively affect equitable access to information and opportunities.**

CUMULATIVE PROGRESS INDICATOR	8.1.12.IC.2:	Test and refine computational artifacts to reduce bias and equity deficits.

CONTENT AREA / STANDARD	**8.1.**	**Computer Science and Design Thinking – Computer Science**
STRAND		**Algorithms & Programming**
CONTENT STATEMENT		**Individuals evaluate and select algorithms based on performance, reusability, and ease of implementation.**

CUMULATIVE PROGRESS INDICATOR	8.1.12.AP.1:	Design algorithms to solve computational problems using a combination of original and existing algorithms.

CONTENT AREA / STANDARD	**8.1.**	**Computer Science and Design Thinking – Computer Science**
STRAND		**Algorithms & Programming**
CONTENT STATEMENT		**Complex programs are developed, tested, and analyzed by teams drawing on the members' diverse strengths using a variety of resources, libraries, and tools.**

CUMULATIVE PROGRESS INDICATOR	8.1.12.AP.9:	Collaboratively document and present design decisions in the development of complex programs.

CONTENT AREA / STANDARD	**8.2.**	**Computer Science and Design Thinking – Design Thinking**
STRAND		**Engineering Design**

CONTENT STATEMENT		**Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.**
CUMULATIVE PROGRESS INDICATOR	8.2.12.ED.1:	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CUMULATIVE PROGRESS INDICATOR	8.2.12.ED.4:	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
CONTENT AREA / STANDARD	**8.2.**	**Computer Science and Design Thinking – Design Thinking**
STRAND		**Engineering Design**
CONTENT STATEMENT		**Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.**
CUMULATIVE PROGRESS INDICATOR	8.2.12.ED.5:	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CUMULATIVE PROGRESS INDICATOR	8.2.12.ED.6:	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CONTENT AREA / STANDARD	**8.2.**	**Computer Science and Design Thinking – Design Thinking**
STRAND		**Interaction of Technology and Humans**
CONTENT STATEMENT		**Decisions to develop new technology are driven by societal and cultural opinions and demands that differ from culture to culture.**
CUMULATIVE PROGRESS INDICATOR	8.2.12.ITH.1:	Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints.
CONTENT AREA / STANDARD	**8.2.**	**Computer Science and Design Thinking – Design Thinking**
STRAND		**Effects of Technology on the Natural World**
CONTENT STATEMENT		**Development and modification of any technological system needs to take into account how the operation of the system will affect natural resources and ecosystems. Impacts of technological systems on the environment need to be monitored and must inform decision-making. Many technologies have been designed to have a positive impact on the environment and to monitor environmental change over time.**
CUMULATIVE PROGRESS INDICATOR	8.2.12.ETW.1:	Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation, and maintenance of a chosen product.
CUMULATIVE PROGRESS INDICATOR	8.2.12.ETW.2:	Synthesize and analyze data collected to monitor the effects of a technological product or system on the environment.

Grade **9** - Adopted: **2012**

STRAND / CONTENT STANDARD	NM.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.

STRAND / CONTENT STANDARD	NM.F.	Functions
BENCHMARK / STANDARD	**F-IF.**	**Interpreting Functions**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Interpret functions that arise in applications in terms of the context.**
PERFORMANCE STANDARD / INDICATOR	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.

New Mexico Content Standards

Mathematics

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

STRAND / CONTENT STANDARD	NM.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.
STRAND / CONTENT STANDARD	**NM.F.**	**Functions**
BENCHMARK / STANDARD	**F-IF.**	**Interpreting Functions**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Interpret functions that arise in applications in terms of the context.**
PERFORMANCE STANDARD / INDICATOR	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.

New Mexico Content Standards

Science

Grade **9** - Adopted: **2013**

STRAND / CONTENT STANDARD	**NGSS.HS-PS.**	**PHYSICAL SCIENCE**
BENCHMARK / STANDARD	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STRAND / CONTENT STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
BENCHMARK / STANDARD	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

PERFORMANCE STANDARD / INDICATOR	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
PERFORMANCE STANDARD / INDICATOR	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
PERFORMANCE STANDARD / INDICATOR	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND / CONTENT STANDARD	**NM.HS-LS.**	**LIFE SCIENCE**
BENCHMARK / STANDARD	**HS-LS2.**	**Interdependent Relationships in Ecosystems**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-LS2-7 NM.	Using a local issue in your solution design, describe and analyze the advantages and disadvantages of human activities that support the local population such as reclamation projects, building dams, and habitat restoration.
STRAND / CONTENT STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
BENCHMARK / STANDARD	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STRAND / CONTENT STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
BENCHMARK / STANDARD	**HS-ESS2.**	**Earth's Systems**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
PERFORMANCE STANDARD / INDICATOR	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

STRAND / CONTENT STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
BENCHMARK / STANDARD	**HS-ESS3.**	**Earth and Human Activity**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-ESS3-1.	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.
PERFORMANCE STANDARD / INDICATOR	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
PERFORMANCE STANDARD / INDICATOR	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
PERFORMANCE STANDARD / INDICATOR	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / CONTENT STANDARD	**NGSS.HS-ETS.**	**ENGINEERING DESIGN**
BENCHMARK / STANDARD	**HS-ETS1.**	**Engineering Design**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
PERFORMANCE STANDARD / INDICATOR	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
PERFORMANCE STANDARD / INDICATOR	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
STRAND / CONTENT STANDARD	**NM.SS.**	**SCIENCE AND SOCIETY**
BENCHMARK / STANDARD	**HS-SS.**	**Science and Society**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**

PERFORMANCE STANDARD / INDICATOR	HS-SS-1 NM.	Obtain and communicate information about the role of New Mexico in nuclear science and 21st century innovations including how the national laboratories have contributed to theoretical, experimental, and applied science; have illustrated the interdependence of science, engineering, and technology; and have used systems involving hardware, software, production, simulation, and information flow.

New Mexico Content Standards

Science

Grade **10** - Adopted: **2013**

STRAND / CONTENT STANDARD	**NGSS.HS-PS.**	**PHYSICAL SCIENCE**
BENCHMARK / STANDARD	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

STRAND / CONTENT STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
BENCHMARK / STANDARD	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
PERFORMANCE STANDARD / INDICATOR	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
PERFORMANCE STANDARD / INDICATOR	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
PERFORMANCE STANDARD / INDICATOR	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

STRAND / CONTENT STANDARD	**NM.HS-LS.**	**LIFE SCIENCE**
BENCHMARK / STANDARD	**HS-LS2.**	**Interdependent Relationships in Ecosystems**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**

PERFORMANCE STANDARD / INDICATOR	HS-LS2-7 NM.	Using a local issue in your solution design, describe and analyze the advantages and disadvantages of human activities that support the local population such as reclamation projects, building dams, and habitat restoration.

STRAND / CONTENT STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
BENCHMARK / STANDARD	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

STRAND / CONTENT STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
BENCHMARK / STANDARD	**HS-ESS2.**	**Earth's Systems**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
PERFORMANCE STANDARD / INDICATOR	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

STRAND / CONTENT STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
BENCHMARK / STANDARD	**HS-ESS3.**	**Earth and Human Activity**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-ESS3-1.	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.
PERFORMANCE STANDARD / INDICATOR	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
PERFORMANCE STANDARD / INDICATOR	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

PERFORMANCE STANDARD / INDICATOR	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

STRAND / CONTENT STANDARD	**NGSS.HS-ETS.**	**ENGINEERING DESIGN**
BENCHMARK / STANDARD	**HS-ETS1.**	**Engineering Design**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
PERFORMANCE STANDARD / INDICATOR	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
PERFORMANCE STANDARD / INDICATOR	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

STRAND / CONTENT STANDARD	**NM.SS.**	**SCIENCE AND SOCIETY**
BENCHMARK / STANDARD	**HS-SS.**	**Science and Society**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY		**Students who demonstrate understanding can:**
PERFORMANCE STANDARD / INDICATOR	HS-SS-1 NM.	Obtain and communicate information about the role of New Mexico in nuclear science and 21st century innovations including how the national laboratories have contributed to theoretical, experimental, and applied science; have illustrated the interdependence of science, engineering, and technology; and have used systems involving hardware, software, production, simulation, and information flow.

New Mexico Content Standards

Technology Education

Grade **9** - Adopted: **2019**

STRAND / CONTENT STANDARD		**CSTA K-12 Computer Science Standards**
BENCHMARK / STANDARD	**CSTA.3A.**	**Level 3A (Ages 14-16)**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY	**3A-AP.**	**Algorithms & Programming**
PERFORMANCE STANDARD / INDICATOR		**Algorithms**

INDICATOR	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. (P5.2)

STRAND / CONTENT STANDARD		**CSTA K-12 Computer Science Standards**
BENCHMARK / STANDARD	**CSTA.3 A.**	**Level 3A (Ages 14-16)**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY	**3A-IC.**	**Impacts of Computing**
PERFORMANCE STANDARD / INDICATOR		**Culture**
INDICATOR	3A-IC-25.	Test and refine computational artifacts to reduce bias and equity deficits. (P1.2)

New Mexico Content Standards

Technology Education

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

STRAND / CONTENT STANDARD		**CSTA K-12 Computer Science Standards**
BENCHMARK / STANDARD	**CSTA.3 A.**	**Level 3A (Ages 14-16)**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY	**3A-AP.**	**Algorithms & Programming**
PERFORMANCE STANDARD / INDICATOR		**Algorithms**
INDICATOR	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. (P5.2)

STRAND / CONTENT STANDARD		**CSTA K-12 Computer Science Standards**
BENCHMARK / STANDARD	**CSTA.3 A.**	**Level 3A (Ages 14-16)**
PERFORMANCE STANDARD / BENCHMARK / PROFICIENCY	**3A-IC.**	**Impacts of Computing**
PERFORMANCE STANDARD / INDICATOR		**Culture**
INDICATOR	3A-IC-25.	Test and refine computational artifacts to reduce bias and equity deficits. (P1.2)

New York State Learning Standards and Core Curriculum

Mathematics

Grade **9** - Adopted: **2017/Updated 2019**

STRAND / DOMAIN / UNIFYING THEME		Mathematical Practices
CATEGORY / CLUSTER / KEY IDEA	MP.1	Make sense of problems and persevere in solving them.
CATEGORY / CLUSTER / KEY IDEA	MP.2	Reason abstractly and quantitatively.
CATEGORY / CLUSTER / KEY IDEA	MP.3	Construct viable arguments and critique the reasoning of others.
CATEGORY / CLUSTER / KEY IDEA	MP.4	Model with mathematics.
CATEGORY / CLUSTER / KEY IDEA	MP.6	Attend to precision.
CATEGORY / CLUSTER / KEY IDEA	MP.7	Look for and make use of structure.
CATEGORY / CLUSTER / KEY IDEA	MP.8	Look for and express regularity in repeated reasoning.

STRAND / DOMAIN / UNIFYING THEME		Algebra I
CATEGORY / CLUSTER / KEY IDEA	**AI-F.IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPTUAL UNDERSTANDING		**Interpret functions that arise in applications in terms of the context.**
EXPECTATION / CONTENT SPECIFICATION	AI-F.IF.6.	Calculate and interpret the average rate of change of a function over a specified interval. (Shared standard with Algebra II)

STRAND / DOMAIN / UNIFYING THEME		Algebra II
CATEGORY / CLUSTER / KEY IDEA	**AII-F.IF.**	**Functions - Interpreting Functions**

STANDARD / CONCEPTUAL UNDERSTANDING		**Interpret functions that arise in applications in terms of the context.**
EXPECTATION / CONTENT SPECIFICATION	AII-F.IF.6.	Calculate and interpret the average rate of change of a function over a specified interval. (Shared standard with Algebra I)

New York State Learning Standards and Core Curriculum

Mathematics

Grade **10** - Adopted: **2017/Updated 2019**

STRAND / DOMAIN / UNIFYING THEME		**Mathematical Practices**
CATEGORY / CLUSTER / KEY IDEA	MP.1	Make sense of problems and persevere in solving them.
CATEGORY / CLUSTER / KEY IDEA	MP.2	Reason abstractly and quantitatively.
CATEGORY / CLUSTER / KEY IDEA	MP.3	Construct viable arguments and critique the reasoning of others.
CATEGORY / CLUSTER / KEY IDEA	MP.4	Model with mathematics.
CATEGORY / CLUSTER / KEY IDEA	MP.6	Attend to precision.
CATEGORY / CLUSTER / KEY IDEA	MP.7	Look for and make use of structure.
CATEGORY / CLUSTER / KEY IDEA	MP.8	Look for and express regularity in repeated reasoning.

STRAND / DOMAIN / UNIFYING THEME		**Algebra I**
CATEGORY / CLUSTER / KEY IDEA	**AI-F.IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPTUAL UNDERSTANDING		**Interpret functions that arise in applications in terms of the context.**

EXPECTATION / CONTENT SPECIFICATION	AI-F.IF.6.	Calculate and interpret the average rate of change of a function over a specified interval. (Shared standard with Algebra II)

STRAND / DOMAIN / UNIFYING THEME		**Algebra II**
CATEGORY / CLUSTER / KEY IDEA	**AII-F.IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPTUAL UNDERSTANDING		**Interpret functions that arise in applications in terms of the context.**

EXPECTATION / CONTENT SPECIFICATION	AII-F.IF.6.	Calculate and interpret the average rate of change of a function over a specified interval. (Shared standard with Algebra I)

New York State Learning Standards and Core Curriculum

Science

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

STRAND / DOMAIN / UNIFYING THEME	**NY.HS.5.**	**Waves and Electromagnetic Radiation**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

STRAND / DOMAIN / UNIFYING THEME	**NY.HS.7.**	**Matter and Energy in Organisms and Ecosystems**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-LS2-5.	Develop a model to illustrate the role of various processes in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

STRAND / DOMAIN / UNIFYING THEME	**NY.HS.8.**	**Interdependent Relationships in Ecosystems**

CATEGORY / CLUSTER / KEY IDEA		Students who demonstrate understanding can:
STANDARD / CONCEPTUAL UNDERSTANDING	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND / DOMAIN / UNIFYING THEME	**NY.HS.13.**	**Earth's Systems**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND / DOMAIN / UNIFYING THEME	**NY.HS.14.**	**Weather and Climate**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STRAND / DOMAIN / UNIFYING THEME	**NY.HS.15.**	**Human Sustainability**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS3-1.	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.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / DOMAIN / UNIFYING THEME	**NY.HS.ED.**	**Engineering Design**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

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

STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Key Ideas and Details**
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.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.
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.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.
STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Craft and Structure**

STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.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.
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Integration of Knowledge and Ideas**
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Range of Reading and Level of Text Complexity**
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Text Types and Purposes**
STANDARD / CONCEPTUAL UNDERSTANDING	**9-10.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION / CONTENT SPECIFICATION	9-10.WHST.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.
STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Production and Distribution of Writing**

STANDARD / CONCEPTUAL UNDERSTANDING	9-10.WHST.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.WHST.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.

New York State Learning Standards and Core Curriculum

Science

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

STRAND / DOMAIN / UNIFYING THEME	**NY.HS.5.**	**Waves and Electromagnetic Radiation**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STRAND / DOMAIN / UNIFYING THEME	**NY.HS.7.**	**Matter and Energy in Organisms and Ecosystems**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-LS2-5.	Develop a model to illustrate the role of various processes in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
STRAND / DOMAIN / UNIFYING THEME	**NY.HS.8.**	**Interdependent Relationships in Ecosystems**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

STANDARD / CONCEPTUAL UNDERSTANDING	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND / DOMAIN / UNIFYING THEME	**NY.HS.13.**	**Earth's Systems**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND / DOMAIN / UNIFYING THEME	**NY.HS.14.**	**Weather and Climate**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STRAND / DOMAIN / UNIFYING THEME	**NY.HS.15.**	**Human Sustainability**
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS3-1.	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.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

STRAND / DOMAIN / UNIFYING THEME	NY.HS.ED.	Engineering Design
CATEGORY / CLUSTER / KEY IDEA		**Students who demonstrate understanding can:**
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
STANDARD / CONCEPTUAL UNDERSTANDING	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

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

STRAND / DOMAIN / UNIFYING THEME	NY.9-10.RST.	Reading Standards for Literacy in Science and Technical Subjects
CATEGORY / CLUSTER / KEY IDEA		**Key Ideas and Details**
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.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.
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.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.

STRAND / DOMAIN / UNIFYING THEME	NY.9-10.RST.	Reading Standards for Literacy in Science and Technical Subjects
CATEGORY / CLUSTER / KEY IDEA		**Craft and Structure**
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.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.
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Integration of Knowledge and Ideas**
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Range of Reading and Level of Text Complexity**
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.RST.10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Text Types and Purposes**
STANDARD / CONCEPTUAL UNDERSTANDING	**9-10.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION / CONTENT SPECIFICATION	9-10.WHST.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.

STRAND / DOMAIN / UNIFYING THEME	**NY.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
CATEGORY / CLUSTER / KEY IDEA		**Production and Distribution of Writing**
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.WHST.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
STANDARD / CONCEPTUAL UNDERSTANDING	9-10.WHST.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.

Technology Education

Grade **9** - Adopted: **1996**

STRAND / DOMAIN / UNIFYING THEME	**NY.5.**	**Technology: Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.**
CATEGORY / CLUSTER / KEY IDEA	**5.1.**	**Engineering Design: Engineering design is an iterative process involving modeling and optimization used to develop technological solutions to problems within given constraints.**
STANDARD / CONCEPTUAL UNDERSTANDING	5.1.1.	Students engage in the following steps in a design process initiate and carry out a thorough investigation of an unfamiliar situation and identify needs and opportunities for technological invention or innovation.
STANDARD / CONCEPTUAL UNDERSTANDING	5.1.2.	Students identify, locate, and use a wide range of information resources including subject experts, library references, magazines, videotapes, films, electronic data bases and on-line services, and discuss and document through notes and sketches how findings relate to the problem.
STANDARD / CONCEPTUAL UNDERSTANDING	5.1.3.	Students generate creative solution ideas, break ideas into the significant functional elements, and explore possible refinements; predict possible outcomes using mathematical and functional modeling techniques; choose the optimal solution to the problem, clearly documenting ideas against design criteria and constraints; and explain how human values, economics, ergonomics, and environmental considerations have influenced the solution.
STANDARD / CONCEPTUAL UNDERSTANDING	5.1.4.	Students develop work schedules and plans which include optimal use and cost of materials, processes, time, and expertise; construct a model of the solution, incorporating developmental modifications while working to a high degree of quality (craftsmanship).
STANDARD / CONCEPTUAL UNDERSTANDING	5.1.5.	Students in a group setting, devise a test of the solution relative to the design criteria and perform the test; record, portray, and logically evaluate performance test results through quantitative, graphic, and verbal means; and use a variety of creative verbal and graphic techniques effectively and persuasively to present conclusions, predict impacts and new problems, and suggest and pursue modifications.
STRAND / DOMAIN / UNIFYING THEME	**NY.5.**	**Technology: Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.**
CATEGORY / CLUSTER / KEY IDEA	**5.3.**	**Computer Technology: Computers, as tools for design, modeling, information processing, communication, and system control, have greatly increased human productivity and knowledge.**
STANDARD / CONCEPTUAL UNDERSTANDING	5.3.5.	Students develop an understanding of computer programming and attain some facility in writing computer programs.

New York State Learning Standards and Core Curriculum

Technology Education

Grade **10** - Adopted: **1996**

STRAND / DOMAIN / UNIFYING THEME	**NY.5.**	**Technology: Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.**
CATEGORY / CLUSTER / KEY IDEA	**5.1.**	**Engineering Design: Engineering design is an iterative process involving modeling and optimization used to develop technological solutions to problems within given constraints.**

STANDARD / CONCEPTUAL UNDERSTANDING	5.1.1.	Students engage in the following steps in a design process initiate and carry out a thorough investigation of an unfamiliar situation and identify needs and opportunities for technological invention or innovation.
STANDARD / CONCEPTUAL UNDERSTANDING	5.1.2.	Students identify, locate, and use a wide range of information resources including subject experts, library references, magazines, videotapes, films, electronic data bases and on-line services, and discuss and document through notes and sketches how findings relate to the problem.
STANDARD / CONCEPTUAL UNDERSTANDING	5.1.3.	Students generate creative solution ideas, break ideas into the significant functional elements, and explore possible refinements; predict possible outcomes using mathematical and functional modeling techniques; choose the optimal solution to the problem, clearly documenting ideas against design criteria and constraints; and explain how human values, economics, ergonomics, and environmental considerations have influenced the solution.
STANDARD / CONCEPTUAL UNDERSTANDING	5.1.4.	Students develop work schedules and plans which include optimal use and cost of materials, processes, time, and expertise; construct a model of the solution, incorporating developmental modifications while working to a high degree of quality (craftsmanship).
STANDARD / CONCEPTUAL UNDERSTANDING	5.1.5.	Students in a group setting, devise a test of the solution relative to the design criteria and perform the test; record, portray, and logically evaluate performance test results through quantitative, graphic, and verbal means; and use a variety of creative verbal and graphic techniques effectively and persuasively to present conclusions, predict impacts and new problems, and suggest and pursue modifications.
STRAND / DOMAIN / UNIFYING THEME	**NY.5.**	**Technology: Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.**
CATEGORY / CLUSTER / KEY IDEA	**5.3.**	**Computer Technology: Computers, as tools for design, modeling, information processing, communication, and system control, have greatly increased human productivity and knowledge.**
STANDARD / CONCEPTUAL UNDERSTANDING	5.3.5.	Students develop an understanding of computer programming and attain some facility in writing computer programs.

North Carolina Standard Course of Study

Mathematics

Grade **9** - Adopted: **2016/IMPL 2016**

CONTENT AREA / STRAND		**Math 1**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.

CONTENT AREA / STRAND		**Math 1**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Interpret functions that arise in applications in terms of the context.**
CLARIFYING OBJECTIVE	NC.M1.F-IF.6.	Calculate and interpret the average rate of change over a specified interval for a function presented numerically, graphically, and/or symbolically.

CONTENT AREA / STRAND		**Math 1**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Analyze functions using different representations.**
CLARIFYING OBJECTIVE	NC.M1.F-IF.7.	Analyze linear, exponential, and quadratic functions by generating different representations, by hand in simple cases and using technology for more complicated cases, to show key features, including: domain and range; rate of change; intercepts; intervals where the function is increasing, decreasing, positive, or negative; maximums and minimums; and end behavior.

CONTENT AREA / STRAND		**Math 2**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**

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

CONTENT AREA / STRAND		**Math 2**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Interpret functions that arise in applications in terms of the context.**
CLARIFYING OBJECTIVE	NC.M2.F-IF.4.	Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities, including: domain and range, rate of change, symmetries, and end behavior.

CONTENT AREA / STRAND		**Math 2**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Analyze functions using different representations.**

CLARIFYING OBJECTIVE	NC.M2.F-IF.7.	Analyze quadratic, square root, and inverse variation functions by generating different representations, by hand in simple cases and using technology for more complicated cases, to show key features, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; maximums and minimums; symmetries; and end behavior.

CONTENT AREA / STRAND		**Math 3**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.

CONTENT AREA / STRAND		**Math 3**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Analyze functions using different representations.**

CLARIFYING OBJECTIVE	NC.M3.F-IF.7.	Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities.

Grade **9** - Adopted: **2019/IMPL 2020**

CONTENT AREA / STRAND		**Math 4**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.9.	Use strategies and procedures flexibly.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.10.	Reflect on mistakes and misconceptions.

CONTENT AREA / STRAND		Discrete Mathematics for Computer Science
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.9.	Use strategies and procedures flexibly.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.10.	Reflect on mistakes and misconceptions.

CONTENT AREA / STRAND		Precalculus
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.9.	Use strategies and procedures flexibly.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.10.	Reflect on mistakes and misconceptions.

North Carolina Standard Course of Study

Mathematics

Grade **10** - Adopted: **2016/IMPL 2016**

CONTENT AREA / STRAND		**Math 1**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**

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

CONTENT AREA / STRAND		**Math 1**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Interpret functions that arise in applications in terms of the context.**
CLARIFYING OBJECTIVE	NC.M1.F-IF.6.	Calculate and interpret the average rate of change over a specified interval for a function presented numerically, graphically, and/or symbolically.

CONTENT AREA / STRAND		**Math 1**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Analyze functions using different representations.**

CLARIFYING OBJECTIVE	NC.M1.F-IF.7.	Analyze linear, exponential, and quadratic functions by generating different representations, by hand in simple cases and using technology for more complicated cases, to show key features, including: domain and range; rate of change; intercepts; intervals where the function is increasing, decreasing, positive, or negative; maximums and minimums; and end behavior.

CONTENT AREA / STRAND		**Math 2**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.

CONTENT AREA / STRAND		**Math 2**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Interpret functions that arise in applications in terms of the context.**

CLARIFYING OBJECTIVE	NC.M2.F-IF.4.	Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities, including: domain and range, rate of change, symmetries, and end behavior.

CONTENT AREA / STRAND		**Math 2**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Analyze functions using different representations.**
CLARIFYING OBJECTIVE	NC.M2.F-IF.7.	Analyze quadratic, square root, and inverse variation functions by generating different representations, by hand in simple cases and using technology for more complicated cases, to show key features, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; maximums and minimums; symmetries; and end behavior.

CONTENT AREA / STRAND		**Math 3**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.

CONTENT AREA / STRAND		**Math 3**
STRAND / ESSENTIAL STANDARD		**Functions: Interpreting Functions**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Analyze functions using different representations.**
CLARIFYING OBJECTIVE	NC.M3.F-IF.7.	Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities.

Grade **10** - Adopted: **2019/IMPL 2020**

CONTENT AREA / STRAND		**Math 4**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.9.	Use strategies and procedures flexibly.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.10.	Reflect on mistakes and misconceptions.
CONTENT AREA / STRAND		**Discrete Mathematics for Computer Science**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.9.	Use strategies and procedures flexibly.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.10.	Reflect on mistakes and misconceptions.
CONTENT AREA / STRAND		**Precalculus**
STRAND / ESSENTIAL STANDARD		**Standards for Mathematical Practice**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.1.	Make sense of problems and persevere in solving them.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.2.	Reason abstractly and quantitatively.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.3.	Construct viable arguments and critique the reasoning of others.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.4.	Model with mathematics.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.6.	Attend to precision.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.7.	Look for and make use of structure.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.8.	Look for and express regularity in repeated reasoning.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.9.	Use strategies and procedures flexibly.

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	MP.10.	Reflect on mistakes and misconceptions.

North Carolina Standard Course of Study

Science

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

CONTENT AREA / STRAND	NC.Bio.	Biology
STRAND / ESSENTIAL STANDARD		**Ecosystems**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**Bio.2.1.**	**Analyze the interdependence of living organisms within their environments.**
CLARIFYING OBJECTIVE	Bio.2.1.1.	Analyze the flow of energy and cycling of matter (water, carbon, nitrogen and oxygen) through ecosystems relating the significance of each to maintaining the health and sustainability of an ecosystem.

CONTENT AREA / STRAND	NC.Bio.	Biology
STRAND / ESSENTIAL STANDARD		**Ecosystems**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**Bio.2.2.**	**Understand the impact of human activities on the environment (one generation affects the next).**
CLARIFYING OBJECTIVE	Bio.2.2.1.	Infer how human activities (including population growth, pollution, global warming, burning of fossil fuels, habitat destruction and introduction of nonnative species) may impact the environment.
CLARIFYING OBJECTIVE	Bio.2.2.2.	Explain how the use, protection and conservation of natural resources by humans impact the environment from one generation to the next.

CONTENT AREA / STRAND	NC.EEn.	Earth/Environmental Science
STRAND / ESSENTIAL STANDARD		**Earth: Systems, Structures and Processes**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**EEn.2.2.**	**Understand how human influences impact the lithosphere.**
CLARIFYING OBJECTIVE	EEn.2.2.1.	Explain the consequences of human activities on the lithosphere (such as mining, deforestation, agriculture, overgrazing, urbanization, and land use) past and present.

CONTENT AREA / STRAND	NC.EEn.	Earth/Environmental Science
STRAND / ESSENTIAL STANDARD		**Earth: Systems, Structures and Processes**

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**EEn.2.6.**	**Analyze patterns of global climate change over time.**
CLARIFYING OBJECTIVE	EEn.2.6.2.	Explain changes in global climate due to natural processes.
CLARIFYING OBJECTIVE	EEn.2.6.3.	Analyze the impacts that human activities have on global climate change (such as burning hydrocarbons, greenhouse effect, and deforestation).
CLARIFYING OBJECTIVE	EEn.2.6.4.	Attribute changes in Earth systems to global climate change (temperature change, changes in pH of ocean, sea level changes, etc.).
CONTENT AREA / STRAND	**NC.EEn.**	**Earth/Environmental Science**
STRAND / ESSENTIAL STANDARD		**Earth: Systems, Structures and Processes**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**EEn.2.7.**	**Explain how the lithosphere, hydrosphere, and atmosphere individually and collectively affect the biosphere.**
CLARIFYING OBJECTIVE	EEn.2.7.2.	Explain why biodiversity is important to the biosphere.
CLARIFYING OBJECTIVE	EEn.2.7.3.	Explain how human activities impact the biosphere.
CONTENT AREA / STRAND	**NC.OBio.**	**Occupational Course of Study - Biology**
STRAND / ESSENTIAL STANDARD		**Ecosystems**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**OBio.2.1.**	**Analyze the interdependence of living organisms within their environments.**
CLARIFYING OBJECTIVE	Bio.2.1.1.	Compare the flow of energy and cycling of matter (water, carbon, nitrogen and oxygen) through ecosystems relating the significance of each to maintaining the health and sustainability of an ecosystem.
CONTENT AREA / STRAND	**NC.OBio.**	**Occupational Course of Study - Biology**
STRAND / ESSENTIAL STANDARD		**Ecosystems**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**OBio.2.2.**	**Understand the impact of human activities on the environment (one generation affects the next).**
CLARIFYING OBJECTIVE	Bio.2.2.1.	Infer how human activities (including population growth, pollution, global warming, burning of fossil fuels, habitat destruction and introduction of nonnative species) may impact the environment.

CLARIFYING OBJECTIVE	Bio.2.2.2.	Explain how the use, protection and conservation of natural resources by humans impact the environment from one generation to the next.

CONTENT AREA / STRAND	**NC.OA.**	**Occupational Course of Study - Applied Science**
STRAND / ESSENTIAL STANDARD		**The Environment**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**OA6.1.**	**Understand how humans can have positive and negative effects on the environment.**
CLARIFYING OBJECTIVE	OA6.1.1.	Explain how humans can have a positive impact on natural resources.
CLARIFYING OBJECTIVE	OA6.1.2.	Explain the effects of pollution on the earth, air and waterways and what can be done at the individual, family and community level to reduce pollution.

CONTENT AREA / STRAND	**NC.CC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Key Ideas and Details**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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 AREA / STRAND	**NC.CC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Craft and Structure**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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 AREA / STRAND	**NC.CC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Integration of Knowledge and Ideas**

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

CONTENT AREA / STRAND	**NC.CC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Range of Reading and Level of Text Complexity**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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 AREA / STRAND	**NC.CC.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Text Types and Purposes**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**9-10.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
CLARIFYING OBJECTIVE	9-10.WHST.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 AREA / STRAND	**NC.CC.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Production and Distribution of Writing**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.WHST.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.WHST.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.

North Carolina Standard Course of Study

Science

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

CONTENT AREA / STRAND	**NC.Bio.**	**Biology**
STRAND / ESSENTIAL STANDARD		**Ecosystems**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**Bio.2.1.**	**Analyze the interdependence of living organisms within their environments.**

CLARIFYING OBJECTIVE	Bio.2.1.1.	Analyze the flow of energy and cycling of matter (water, carbon, nitrogen and oxygen) through ecosystems relating the significance of each to maintaining the health and sustainability of an ecosystem.

CONTENT AREA / STRAND	**NC.Bio.**	**Biology**
STRAND / ESSENTIAL STANDARD		**Ecosystems**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**Bio.2.2.**	**Understand the impact of human activities on the environment (one generation affects the next).**
CLARIFYING OBJECTIVE	Bio.2.2.1.	Infer how human activities (including population growth, pollution, global warming, burning of fossil fuels, habitat destruction and introduction of nonnative species) may impact the environment.
CLARIFYING OBJECTIVE	Bio.2.2.2.	Explain how the use, protection and conservation of natural resources by humans impact the environment from one generation to the next.

CONTENT AREA / STRAND	**NC.EEn.**	**Earth/Environmental Science**
STRAND / ESSENTIAL STANDARD		**Earth: Systems, Structures and Processes**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**EEn.2.2.**	**Understand how human influences impact the lithosphere.**
CLARIFYING OBJECTIVE	EEn.2.2.1.	Explain the consequences of human activities on the lithosphere (such as mining, deforestation, agriculture, overgrazing, urbanization, and land use) past and present.

CONTENT AREA / STRAND	**NC.EEn.**	**Earth/Environmental Science**
STRAND / ESSENTIAL STANDARD		**Earth: Systems, Structures and Processes**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**EEn.2.6.**	**Analyze patterns of global climate change over time.**
CLARIFYING OBJECTIVE	EEn.2.6.2.	Explain changes in global climate due to natural processes.
CLARIFYING OBJECTIVE	EEn.2.6.3.	Analyze the impacts that human activities have on global climate change (such as burning hydrocarbons, greenhouse effect, and deforestation).
CLARIFYING OBJECTIVE	EEn.2.6.4.	Attribute changes in Earth systems to global climate change (temperature change, changes in pH of ocean, sea level changes, etc.).

CONTENT AREA / STRAND	**NC.EEn.**	**Earth/Environmental Science**
STRAND / ESSENTIAL STANDARD		**Earth: Systems, Structures and Processes**

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**EEn.2.7.**	**Explain how the lithosphere, hydrosphere, and atmosphere individually and collectively affect the biosphere.**
CLARIFYING OBJECTIVE	EEn.2.7.2.	Explain why biodiversity is important to the biosphere.
CLARIFYING OBJECTIVE	EEn.2.7.3.	Explain how human activities impact the biosphere.
CONTENT AREA / STRAND	**NC.OBio.**	**Occupational Course of Study - Biology**
STRAND / ESSENTIAL STANDARD		**Ecosystems**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**OBio.2.1.**	**Analyze the interdependence of living organisms within their environments.**
CLARIFYING OBJECTIVE	Bio.2.1.1.	Compare the flow of energy and cycling of matter (water, carbon, nitrogen and oxygen) through ecosystems relating the significance of each to maintaining the health and sustainability of an ecosystem.
CONTENT AREA / STRAND	**NC.OBio.**	**Occupational Course of Study - Biology**
STRAND / ESSENTIAL STANDARD		**Ecosystems**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**OBio.2.2.**	**Understand the impact of human activities on the environment (one generation affects the next).**
CLARIFYING OBJECTIVE	Bio.2.2.1.	Infer how human activities (including population growth, pollution, global warming, burning of fossil fuels, habitat destruction and introduction of nonnative species) may impact the environment.
CLARIFYING OBJECTIVE	Bio.2.2.2.	Explain how the use, protection and conservation of natural resources by humans impact the environment from one generation to the next.
CONTENT AREA / STRAND	**NC.OA.**	**Occupational Course of Study - Applied Science**
STRAND / ESSENTIAL STANDARD		**The Environment**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**OA6.1.**	**Understand how humans can have positive and negative effects on the environment.**
CLARIFYING OBJECTIVE	OA6.1.1.	Explain how humans can have a positive impact on natural resources.
CLARIFYING OBJECTIVE	OA6.1.2.	Explain the effects of pollution on the earth, air and waterways and what can be done at the individual, family and community level to reduce pollution.
CONTENT AREA / STRAND	**NC.CC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**

STRAND / ESSENTIAL STANDARD		**Key Ideas and Details**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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 AREA / STRAND	**NC.CC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Craft and Structure**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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 AREA / STRAND	**NC.CC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Integration of Knowledge and Ideas**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
CONTENT AREA / STRAND	**NC.CC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Range of Reading and Level of Text Complexity**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.RST.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 AREA / STRAND	**NC.CC.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Text Types and Purposes**

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	**9-10.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
CLARIFYING OBJECTIVE	9-10.WHST.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 AREA / STRAND	**NC.CC.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND / ESSENTIAL STANDARD		**Production and Distribution of Writing**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.WHST.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	9-10.WHST.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.

North Carolina Standard Course of Study

Technology Education

Grade **9** - Adopted: **2020 (ISTE-S)**

CONTENT AREA / STRAND		**Digital Learning Standards**
STRAND / ESSENTIAL STANDARD	**ISTE-S.3.**	**Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.
CONTENT AREA / STRAND		**Digital Learning Standards**
STRAND / ESSENTIAL STANDARD	**ISTE-S.4.**	**Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.4.a.	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
CONTENT AREA / STRAND		**Digital Learning Standards**

STRAND / ESSENTIAL STANDARD	**ISTE-S.5.**	**Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.5.a.	Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.5.b.	Students 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.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.5.d.	Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Grade **9** - Adopted: **2020**

CONTENT AREA / STRAND		**NC K-12 Computer Science Standards**
STRAND / ESSENTIAL STANDARD		**Introduction to CS**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Algorithms & Programming**
CLARIFYING OBJECTIVE		**Algorithms**
INDICATOR	ICS-AP-01.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

CONTENT AREA / STRAND		**NC K-12 Computer Science Standards**
STRAND / ESSENTIAL STANDARD		**Introduction to CS**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Algorithms & Programming**
CLARIFYING OBJECTIVE		**Program Development**
INDICATOR	ICS-AP-13.	Develop computational artifacts working in team roles using collaborative tools.

CONTENT AREA / STRAND		**NC K-12 Computer Science Standards**
STRAND / ESSENTIAL STANDARD		**Introduction to CS**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Impacts of Computing**

CLARIFYING OBJECTIVE		**Culture**
INDICATOR	ICS-IC-04.	Test computational artifacts to reduce bias and equity deficits.
INDICATOR	ICS-IC-05.	Demonstrate ways a given algorithm applies to problems across disciplines.
CONTENT AREA / STRAND		**NC K-12 Computer Science Standards**
STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Networks & The Internet**
CLARIFYING OBJECTIVE		**Network Communication & Organization**
INDICATOR	HS-NI-01.	Identify issues of network functionality in computational artifact design.
INDICATOR	HS-NI-02.	Analyze issues of network functionality in computational artifact design.
CONTENT AREA / STRAND		**NC K-12 Computer Science Standards**
STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Networks & The Internet**
CLARIFYING OBJECTIVE		**Cybersecurity**
INDICATOR	HS-NI-03.	Identify issues of unauthorized access and cybersecurity in computational artifact design.
INDICATOR	HS-NI-04.	Analyze issues of unauthorized access and cybersecurity in computational artifact design.
CONTENT AREA / STRAND		**NC K-12 Computer Science Standards**
STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Algorithms & Programming**
CLARIFYING OBJECTIVE		**Algorithms**
INDICATOR	HS-AP-01.	Identify artificial intelligence algorithms.

INDICATOR	HS-AP-02.	Solve computational problems with classic algorithms.

CONTENT AREA / STRAND		NC K-12 Computer Science Standards
STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Algorithms & Programming**
CLARIFYING OBJECTIVE		**Program Development**
INDICATOR	HS-AP-09.	Create a computational artifact through an industry-standard process.
INDICATOR	HS-AP-10.	Justify that a computational artifact meets design specifications with systematic testing and debugging methods.

CONTENT AREA / STRAND		NC K-12 Computer Science Standards
STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Impacts of Computing**
CLARIFYING OBJECTIVE		**Culture**
INDICATOR	HS-IC-05.	Create computational artifacts to ensure accessibility and reduce computational bias.

North Carolina Standard Course of Study

Technology Education

Grade **10** - Adopted: **2020 (ISTE-S)**

CONTENT AREA / STRAND		Digital Learning Standards
STRAND / ESSENTIAL STANDARD	**ISTE-S.3.**	**Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

CONTENT AREA / STRAND		Digital Learning Standards
STRAND / ESSENTIAL STANDARD	**ISTE-S.4.**	**Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**

ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.4.a.	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

CONTENT AREA / STRAND		Digital Learning Standards
STRAND / ESSENTIAL STANDARD	**ISTE-S.5.**	**Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.5.a.	Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.5.b.	Students 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.
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE	ISTE-S.5.d.	Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

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

CONTENT AREA / STRAND		NC K-12 Computer Science Standards
STRAND / ESSENTIAL STANDARD		**Introduction to CS**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Algorithms & Programming**
CLARIFYING OBJECTIVE		**Algorithms**
INDICATOR	ICS-AP-01.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

CONTENT AREA / STRAND		NC K-12 Computer Science Standards
STRAND / ESSENTIAL STANDARD		**Introduction to CS**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Algorithms & Programming**
CLARIFYING OBJECTIVE		**Program Development**

INDICATOR	ICS-AP-13.	Develop computational artifacts working in team roles using collaborative tools.

CONTENT AREA / STRAND		NC K-12 Computer Science Standards
STRAND / ESSENTIAL STANDARD		**Introduction to CS**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Impacts of Computing**
CLARIFYING OBJECTIVE		**Culture**
INDICATOR	ICS-IC-04.	Test computational artifacts to reduce bias and equity deficits.
INDICATOR	ICS-IC-05.	Demonstrate ways a given algorithm applies to problems across disciplines.

CONTENT AREA / STRAND		NC K-12 Computer Science Standards
STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Networks & The Internet**
CLARIFYING OBJECTIVE		**Network Communication & Organization**
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INDICATOR	HS-NI-02.	Analyze issues of network functionality in computational artifact design.

CONTENT AREA / STRAND		NC K-12 Computer Science Standards
STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Networks & The Internet**
CLARIFYING OBJECTIVE		**Cybersecurity**
INDICATOR	HS-NI-03.	Identify issues of unauthorized access and cybersecurity in computational artifact design.
INDICATOR	HS-NI-04.	Analyze issues of unauthorized access and cybersecurity in computational artifact design.

CONTENT AREA / STRAND		NC K-12 Computer Science Standards

STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Algorithms & Programming**
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CONTENT AREA / STRAND		**NC K-12 Computer Science Standards**
STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Algorithms & Programming**
CLARIFYING OBJECTIVE		**Program Development**
INDICATOR	HS-AP-09.	Create a computational artifact through an industry-standard process.
INDICATOR	HS-AP-10.	Justify that a computational artifact meets design specifications with systematic testing and debugging methods.

CONTENT AREA / STRAND		**NC K-12 Computer Science Standards**
STRAND / ESSENTIAL STANDARD		**High School – CS Level 1**
ESSENTIAL STANDARD / CLARIFYING OBJECTIVE		**Impacts of Computing**
CLARIFYING OBJECTIVE		**Culture**
INDICATOR	HS-IC-05.	Create computational artifacts to ensure accessibility and reduce computational bias.

North Dakota Content Standards

Mathematics

Grade **9** - Adopted: **2017**

CONTENT STANDARD		**Standards for Mathematical Practice**
BENCHMARK	MP.1	Make sense of problems and persevere in solving them.

BENCHMARK	MP.2	Reason abstractly and quantitatively.
BENCHMARK	MP.3	Construct viable arguments and critique the reasoning of others.
BENCHMARK	MP.4	Model with mathematics.
BENCHMARK	MP.6	Attend to precision.
BENCHMARK	MP.7	Look for and make use of structure.
BENCHMARK	MP.8	Look for and express regularity in repeated reasoning.
CONTENT STANDARD		**High School—Functions**
BENCHMARK		**Interpreting Functions**
GRADE LEVEL EXPECTATION		**Interpret functions that arise in applications in terms of the context**
INDICATOR	HS.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.

North Dakota Content Standards

Mathematics

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

CONTENT STANDARD		**Standards for Mathematical Practice**
BENCHMARK	MP.1	Make sense of problems and persevere in solving them.
BENCHMARK	MP.2	Reason abstractly and quantitatively.
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CONTENT STANDARD		**High School—Functions**
BENCHMARK		**Interpreting Functions**
GRADE LEVEL EXPECTATION		**Interpret functions that arise in applications in terms of the context**
INDICATOR	HS.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.

North Dakota Content Standards

Science

Grade **9** - Adopted: **2019**

CONTENT STANDARD		**Science and Engineering Practices**
BENCHMARK	**2**	**Developing and using models**
GRADE LEVEL EXPECTATION		Modeling in K-12 builds on prior experiences and progresses to include using and developing models (i.e., diagrams, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

CONTENT STANDARD		**Science and Engineering Practices**
BENCHMARK	**6**	**Constructing explanations and designing solutions**
GRADE LEVEL EXPECTATION		Constructing explanations and designing solutions in K-12 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

CONTENT STANDARD		**Life Science (LS)**
BENCHMARK	**HS-LS2.**	**ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS**
GRADE LEVEL EXPECTATION	HS-LS2-2.	Use evidence from mathematical representations to explain factors that affect population dynamics and biodiversity.
GRADE LEVEL EXPECTATION	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
GRADE LEVEL EXPECTATION	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
GRADE LEVEL EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

CONTENT STANDARD		**Life Science (LS)**
BENCHMARK	**HS-LS4.**	**BIOLOGICAL EVOLUTION: UNITY AND DIVERSITY**
GRADE LEVEL EXPECTATION	HS-LS4-6.	Design and revise a solution to mitigate impacts of human activity on biodiversity.

CONTENT STANDARD		**Earth and Space Science (ESS)**
BENCHMARK	**HS-ESS2.**	**Earth's Systems**
GRADE LEVEL EXPECTATION	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
GRADE LEVEL EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

CONTENT STANDARD		**Earth and Space Science (ESS)**
BENCHMARK	**HS-ESS3.**	**EARTH AND HUMAN ACTIVITY**
GRADE LEVEL EXPECTATION	HS-ESS3-1.	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.
GRADE LEVEL EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
GRADE LEVEL EXPECTATION	HS-ESS3-3.	Analyze the relationships among management of natural resources, the sustainability of human populations, and biodiversity through the use of a computational simulation.
GRADE LEVEL EXPECTATION	HS-ESS3-6.	Use data from computational representations to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
CONTENT STANDARD		**Engineering and Technology (ET)**
BENCHMARK	**HS-ET1.**	**Engineering & Technology**
GRADE LEVEL EXPECTATION	HS-ET1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	HS-ET1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	HS-ET1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

North Dakota Content Standards

Science

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

CONTENT STANDARD		**Science and Engineering Practices**
BENCHMARK	**2**	**Developing and using models**
GRADE LEVEL EXPECTATION		Modeling in K-12 builds on prior experiences and progresses to include using and developing models (i.e., diagrams, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.
CONTENT STANDARD		**Science and Engineering Practices**
BENCHMARK	**6**	**Constructing explanations and designing solutions**
GRADE LEVEL EXPECTATION		Constructing explanations and designing solutions in K-12 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.
CONTENT STANDARD		**Life Science (LS)**
BENCHMARK	**HS-LS2.**	**ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS**

GRADE LEVEL EXPECTATION	HS-LS2-2.	Use evidence from mathematical representations to explain factors that affect population dynamics and biodiversity.
GRADE LEVEL EXPECTATION	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
GRADE LEVEL EXPECTATION	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
GRADE LEVEL EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
CONTENT STANDARD		**Life Science (LS)**
BENCHMARK	**HS-LS4.**	**BIOLOGICAL EVOLUTION: UNITY AND DIVERSITY**
GRADE LEVEL EXPECTATION	HS-LS4-6.	Design and revise a solution to mitigate impacts of human activity on biodiversity.
CONTENT STANDARD		**Earth and Space Science (ESS)**
BENCHMARK	**HS-ESS2.**	**Earth's Systems**
GRADE LEVEL EXPECTATION	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
GRADE LEVEL EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
CONTENT STANDARD		**Earth and Space Science (ESS)**
BENCHMARK	**HS-ESS3.**	**EARTH AND HUMAN ACTIVITY**
GRADE LEVEL EXPECTATION	HS-ESS3-1.	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.
GRADE LEVEL EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
GRADE LEVEL EXPECTATION	HS-ESS3-3.	Analyze the relationships among management of natural resources, the sustainability of human populations, and biodiversity through the use of a computational simulation.
GRADE LEVEL EXPECTATION	HS-ESS3-6.	Use data from computational representations to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
CONTENT STANDARD		**Engineering and Technology (ET)**
BENCHMARK	**HS-ET1.**	**Engineering & Technology**

GRADE LEVEL EXPECTATION	HS-ET1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
GRADE LEVEL EXPECTATION	HS-ET1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
GRADE LEVEL EXPECTATION	HS-ET1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

North Dakota Content Standards

Technology Education

Grade **9** - Adopted: **2019**

CONTENT STANDARD		**Computer Science and Cybersecurity Standards**
BENCHMARK		**Computational Thinking**
GRADE LEVEL EXPECTATION		**Problem Solving & Algorithms**
INDICATOR		**Strategies for understanding and solving problems.**
INDICATOR	9.PSA.1.	Identify, recognize, and use an algorithm to solve a complex problem across disciplines.

CONTENT STANDARD		**Computer Science and Cybersecurity Standards**
BENCHMARK		**CS Extension Standards**
GRADE LEVEL EXPECTATION		**Computational Thinking**
INDICATOR		**Algorithms & Programming**
INDICATOR	ES.AP.1.	Design algorithms to solve computational problems using a combination of original and existing algorithms.

North Dakota Content Standards

Technology Education

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

CONTENT STANDARD		**Computer Science and Cybersecurity Standards**
BENCHMARK		**Computational Thinking**
GRADE LEVEL EXPECTATION		**Problem Solving & Algorithms**
INDICATOR		**Strategies for understanding and solving problems.**
INDICATOR	10.PSA.1.	Create and test an algorithm to solve a complex problem across disciplines.

CONTENT STANDARD		**Computer Science and Cybersecurity Standards**
BENCHMARK		**CS Extension Standards**
GRADE LEVEL EXPECTATION		**Computational Thinking**
INDICATOR		**Algorithms & Programming**

INDICATOR	ES.AP.1.	Design algorithms to solve computational problems using a combination of original and existing algorithms.

Ohio Learning Standards

Mathematics

Grade **9** - Adopted: **2017**

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

DOMAIN / ACADEMIC CONTENT STANDARD	OH.F.	Functions Standards
STANDARD / BENCHMARK	**F.IF.**	**INTERPRETING FUNCTIONS**
BENCHMARK / GRADE LEVEL INDICATOR		**Interpret functions that arise in applications in terms of the context.**
PROFICIENCY LEVEL	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. (A2, M3)

Ohio Learning Standards

Mathematics

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

DOMAIN / ACADEMIC CONTENT STANDARD	OH.MP.	Standards for Mathematical Practice
STANDARD / BENCHMARK	MP.1.	Make sense of problems and persevere in solving them.

STANDARD / BENCHMARK	MP.2.	Reason abstractly and quantitatively.
STANDARD / BENCHMARK	MP.3.	Construct viable arguments and critique the reasoning of others.
STANDARD / BENCHMARK	MP.4.	Model with mathematics.
STANDARD / BENCHMARK	MP.6.	Attend to precision.
STANDARD / BENCHMARK	MP.7.	Look for and make use of structure.
STANDARD / BENCHMARK	MP.8.	Look for and express regularity in repeated reasoning.
DOMAIN / ACADEMIC CONTENT STANDARD	**OH.F.**	**Functions Standards**
STANDARD / BENCHMARK	**F.IF.**	**INTERPRETING FUNCTIONS**
BENCHMARK / GRADE LEVEL INDICATOR		**Interpret functions that arise in applications in terms of the context.**
PROFICIENCY LEVEL	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. (A2, M3)

Ohio Learning Standards

Science

Grade **9** - Adopted: **2018**

DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH SYSTEMS: INTERCONNECTED SPHERES OF EARTH**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ES. 1:**	**Biosphere**
PROFICIENCY LEVEL		Biodiversity
DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH SYSTEMS: INTERCONNECTED SPHERES OF EARTH**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ES. 5:**	**Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere**

PROFICIENCY LEVEL		Biogeochemical cycles
PROFICIENCY LEVEL		Ecosystems
PROFICIENCY LEVEL		Climate
DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH'S RESOURCES**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ER. 2:**	**Air and air pollution**
PROFICIENCY LEVEL		Greenhouse gases
DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH'S RESOURCES**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ER. 4:**	**Soil and land**
PROFICIENCY LEVEL		Land use and land management (including food production, agriculture and zoning)
DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH'S RESOURCES**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ER. 5:**	**Wildlife and wilderness**
PROFICIENCY LEVEL		**Wildlife and wilderness management**
INDICATOR		Endangered species
DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK	**ENV.GP:**	**GLOBAL ENVIRONMENTAL PROBLEMS AND ISSUES**

BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 1:	Human Population
BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 3:	Climate change
BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 4:	Sustainability
BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 5:	Species depletion and extinction
BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 8:	Deforestation and loss of biodiversity

DOMAIN / ACADEMIC CONTENT STANDARD		**Physical Geology**
STANDARD / BENCHMARK	**PG.ER:**	**EARTH'S RESOURCES**
BENCHMARK / GRADE LEVEL INDICATOR	**PG.ER.2:**	**Air**
PROFICIENCY LEVEL		Greenhouse gases

DOMAIN / ACADEMIC CONTENT STANDARD		**Biology**
STANDARD / BENCHMARK	**B.DI:**	**DIVERSITY AND INDEPENDENCE OF LIFE**
BENCHMARK / GRADE LEVEL INDICATOR	**B.DI.1:**	**Biodiversity**
PROFICIENCY LEVEL		Species diversity

DOMAIN / ACADEMIC CONTENT STANDARD		**Biology**
STANDARD / BENCHMARK	**B.DI:**	**DIVERSITY AND INDEPENDENCE OF LIFE**
BENCHMARK / GRADE LEVEL INDICATOR	**B.DI.3:**	**Loss of Diversity**

PROFICIENCY LEVEL		Climate change
PROFICIENCY LEVEL		Anthropocene effects
PROFICIENCY LEVEL		Extinction

Ohio Learning Standards

Science

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

DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH SYSTEMS: INTERCONNECTED SPHERES OF EARTH**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ES. 1:**	**Biosphere**
PROFICIENCY LEVEL		Biodiversity

DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH SYSTEMS: INTERCONNECTED SPHERES OF EARTH**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ES. 5:**	**Movement of matter and energy through the hydrosphere, lithosphere, atmosphere and biosphere**
PROFICIENCY LEVEL		Biogeochemical cycles
PROFICIENCY LEVEL		Ecosystems
PROFICIENCY LEVEL		Climate

DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH'S RESOURCES**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ER. 2:**	**Air and air pollution**
PROFICIENCY LEVEL		Greenhouse gases

DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH'S RESOURCES**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ER. 4:**	**Soil and land**
PROFICIENCY LEVEL		Land use and land management (including food production, agriculture and zoning)

DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK		**EARTH'S RESOURCES**
BENCHMARK / GRADE LEVEL INDICATOR	**ENV.ER. 5:**	**Wildlife and wilderness**
PROFICIENCY LEVEL		**Wildlife and wilderness management**
INDICATOR		Endangered species

DOMAIN / ACADEMIC CONTENT STANDARD		**Environmental Science**
STANDARD / BENCHMARK	**ENV.GP:**	**GLOBAL ENVIRONMENTAL PROBLEMS AND ISSUES**
BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 1:	Human Population
BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 3:	Climate change
BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 4:	Sustainability
BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 5:	Species depletion and extinction
BENCHMARK / GRADE LEVEL INDICATOR	ENV.GP. 8:	Deforestation and loss of biodiversity

DOMAIN / ACADEMIC CONTENT STANDARD		**Physical Geology**

STANDARD / BENCHMARK	**PG.ER:**	**EARTH'S RESOURCES**
BENCHMARK / GRADE LEVEL INDICATOR	**PG.ER.2 :**	**Air**
PROFICIENCY LEVEL		Greenhouse gases
DOMAIN / ACADEMIC CONTENT STANDARD		**Biology**
STANDARD / BENCHMARK	**B.DI:**	**DIVERSITY AND INDEPENDENCE OF LIFE**
BENCHMARK / GRADE LEVEL INDICATOR	**B.DI.1:**	**Biodiversity**
PROFICIENCY LEVEL		Species diversity
DOMAIN / ACADEMIC CONTENT STANDARD		**Biology**
STANDARD / BENCHMARK	**B.DI:**	**DIVERSITY AND INDEPENDENCE OF LIFE**
BENCHMARK / GRADE LEVEL INDICATOR	**B.DI.3:**	**Loss of Diversity**
PROFICIENCY LEVEL		Climate change
PROFICIENCY LEVEL		Anthropocene effects
PROFICIENCY LEVEL		Extinction

Ohio Learning Standards

Technology Education

Grade **9** - Adopted: **2017**

DOMAIN / ACADEMIC CONTENT STANDARD		**Ohio Learning Standards in Technology**
STANDARD / BENCHMARK		**Society and Technology: The interconnectedness of technology, self, society and the natural world, specifically addressing the ethical, legal, political and global impact of technology.**
BENCHMARK / GRADE LEVEL INDICATOR	**Topic 1:**	**Demonstrate an understanding of technology's impact on the advancement of humanity – economically, environmentally and ethically.**
PROFICIENCY LEVEL	9-12.ST.1.b.	Debate the advantages and disadvantages of widespread use, accessibility, and reliance on technology in your world, in the workplace and in global society.

PROFICIENCY LEVEL	9-12.ST.1.c.	Select a technology and analyze its global impact across multiple disciplines.

DOMAIN / ACADEMIC CONTENT STANDARD		**Ohio Learning Standards in Technology**
STANDARD / BENCHMARK		**Design and Technology: Addresses the nature of technology to develop and improve products and systems over time to meet human/societal needs and wants through design processes.**
BENCHMARK / GRADE LEVEL INDICATOR	**Topic 2:**	**Identify a problem and use an engineering design process to solve the problem.**
PROFICIENCY LEVEL	9-12.DT.2.a.	Evaluate a design solution using conceptual, physical, digital and mathematical models at various intervals of the design process in order to check for proper design and note areas where improvements are needed (e.g., check the design solutions against criteria and constraints).
PROFICIENCY LEVEL	9-12.DT.2.b.	Implement, document and present the design process as applied to a particular product, process or problem.

Grade **9** - Adopted: **2022**

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**COMPUTING SYSTEMS**
BENCHMARK / GRADE LEVEL INDICATOR		**Troubleshooting**
PROFICIENCY LEVEL	CS.T.9-12.F.a.	Apply a systemic process to identify problems and take steps to correct them within an integrated computing system.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ALGORITHMIC THINKING AND PROGRAMMING**
BENCHMARK / GRADE LEVEL INDICATOR		**Algorithms**
PROFICIENCY LEVEL	ATP.A.9-12.F.a.	Define and use appropriate problem solving strategies and visual artifacts to create and refine a solution to a real-world problem.
PROFICIENCY LEVEL	ATP.A.9-12.F.b.	Define and implement an algorithm by decomposing problem requirements from a problem statement to solve a problem.
PROFICIENCY LEVEL	ATP.A.9-12.F.c.	Define and explain iterative algorithms to understand how and when to apply them.
PROFICIENCY LEVEL	ATP.A.9-12.F.d.	Define and explain recursive algorithms to understand how and when to apply them.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ALGORITHMIC THINKING AND PROGRAMMING**
BENCHMARK / GRADE LEVEL INDICATOR		**Modularity**
PROFICIENCY LEVEL	ATP.M.9-12.F.b.	Create computational artifacts by systematically organizing, manipulating and/or processing data.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ALGORITHMIC THINKING AND PROGRAMMING**
BENCHMARK / GRADE LEVEL INDICATOR		**Program Development**
PROFICIENCY LEVEL	ATP.PD.9-12.F.c.	Correctly use consistent naming conventions, version control and comments to demonstrate why these are important for future use, maintenance and reuse of code.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ARTIFICIAL INTELLIGENCE**
BENCHMARK / GRADE LEVEL INDICATOR		**Representation & Reasoning**
PROFICIENCY LEVEL	AI.RR.9-12.F.b.	For each of these types of reasoning problems (classification, prediction, sequential decision-making, combinatorial search, heuristic search, adversarial search, logical deduction and statistical inference), list an algorithm that could be used to solve that problem.
PROFICIENCY LEVEL	AI.RR.9-12.F.c.	Describe the differences between types of search algorithms.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ARTIFICIAL INTELLIGENCE**
BENCHMARK / GRADE LEVEL INDICATOR		**Machine Learning**
PROFICIENCY LEVEL	AI.ML.9-12.F.b.	Use either a supervised or unsupervised learning algorithm to train a model on real-world data, then evaluate the results.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ARTIFICIAL INTELLIGENCE**
BENCHMARK / GRADE LEVEL INDICATOR		**Natural Interaction**
PROFICIENCY LEVEL	AI.NI.9-12.F.a.	Construct context-free grammar to parse simple languages and use language-processing tools to construct a chatbot. Use sentiment analysis tools to extract emotional tone from text.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Advanced Level**
STANDARD / BENCHMARK		**ALGORITHMIC THINKING AND PROGRAMMING**
BENCHMARK / GRADE LEVEL INDICATOR		**Algorithms**
PROFICIENCY LEVEL	ATP.A.9-12.A.a.	Define and explain Iterative and recursive algorithms to understand how and when to apply them.
PROFICIENCY LEVEL	ATP.A.9-12.A.d.	Define and explain sorting and searching algorithms to understand how and when to apply them.
PROFICIENCY LEVEL	ATP.A.9-12.A.f.	Compare and contrast classical, cluster and quantum computing algorithms.

Ohio Learning Standards
Technology Education
Grade **10** - Adopted: **2017**

DOMAIN / ACADEMIC CONTENT STANDARD		**Ohio Learning Standards in Technology**
STANDARD / BENCHMARK		**Society and Technology: The interconnectedness of technology, self, society and the natural world, specifically addressing the ethical, legal, political and global impact of technology.**
BENCHMARK / GRADE LEVEL INDICATOR	**Topic 1:**	**Demonstrate an understanding of technology's impact on the advancement of humanity – economically, environmentally and ethically.**
PROFICIENCY LEVEL	9-12.ST.1.b.	Debate the advantages and disadvantages of widespread use, accessibility, and reliance on technology in your world, in the workplace and in global society.
PROFICIENCY LEVEL	9-12.ST.1.c.	Select a technology and analyze its global impact across multiple disciplines.

DOMAIN / ACADEMIC CONTENT STANDARD		**Ohio Learning Standards in Technology**
STANDARD / BENCHMARK		**Design and Technology: Addresses the nature of technology to develop and improve products and systems over time to meet human/societal needs and wants through design processes.**

BENCHMARK / GRADE LEVEL INDICATOR	**Topic 2:**	**Identify a problem and use an engineering design process to solve the problem.**
PROFICIENCY LEVEL	9-12.DT.2.a.	Evaluate a design solution using conceptual, physical, digital and mathematical models at various intervals of the design process in order to check for proper design and note areas where improvements are needed (e.g., check the design solutions against criteria and constraints).
PROFICIENCY LEVEL	9-12.DT.2.b.	Implement, document and present the design process as applied to a particular product, process or problem.

Grade **10** - Adopted: **2022**

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**COMPUTING SYSTEMS**
BENCHMARK / GRADE LEVEL INDICATOR		**Troubleshooting**
PROFICIENCY LEVEL	CS.T.9-12.F.a.	Apply a systemic process to identify problems and take steps to correct them within an integrated computing system.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ALGORITHMIC THINKING AND PROGRAMMING**
BENCHMARK / GRADE LEVEL INDICATOR		**Algorithms**
PROFICIENCY LEVEL	ATP.A.9-12.F.a.	Define and use appropriate problem solving strategies and visual artifacts to create and refine a solution to a real-world problem.
PROFICIENCY LEVEL	ATP.A.9-12.F.b.	Define and implement an algorithm by decomposing problem requirements from a problem statement to solve a problem.
PROFICIENCY LEVEL	ATP.A.9-12.F.c.	Define and explain iterative algorithms to understand how and when to apply them.
PROFICIENCY LEVEL	ATP.A.9-12.F.d.	Define and explain recursive algorithms to understand how and when to apply them.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ALGORITHMIC THINKING AND PROGRAMMING**
BENCHMARK / GRADE LEVEL INDICATOR		**Modularity**

PROFICIENCY LEVEL	ATP.M.9-12.F.b.	Create computational artifacts by systematically organizing, manipulating and/or processing data.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ALGORITHMIC THINKING AND PROGRAMMING**
BENCHMARK / GRADE LEVEL INDICATOR		**Program Development**

PROFICIENCY LEVEL	ATP.PD.9-12.F.c.	Correctly use consistent naming conventions, version control and comments to demonstrate why these are important for future use, maintenance and reuse of code.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ARTIFICIAL INTELLIGENCE**
BENCHMARK / GRADE LEVEL INDICATOR		**Representation & Reasoning**

PROFICIENCY LEVEL	AI.RR.9-12.F.b.	For each of these types of reasoning problems (classification, prediction, sequential decision-making, combinatorial search, heuristic search, adversarial search, logical deduction and statistical inference), list an algorithm that could be used to solve that problem.

PROFICIENCY LEVEL	AI.RR.9-12.F.c.	Describe the differences between types of search algorithms.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ARTIFICIAL INTELLIGENCE**
BENCHMARK / GRADE LEVEL INDICATOR		**Machine Learning**

PROFICIENCY LEVEL	AI.ML.9-12.F.b.	Use either a supervised or unsupervised learning algorithm to train a model on real-world data, then evaluate the results.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Foundational Level**
STANDARD / BENCHMARK		**ARTIFICIAL INTELLIGENCE**
BENCHMARK / GRADE LEVEL INDICATOR		**Natural Interaction**

PROFICIENCY LEVEL	AI.NI.9-12.F.a.	Construct context-free grammar to parse simple languages and use language-processing tools to construct a chatbot. Use sentiment analysis tools to extract emotional tone from text.

DOMAIN / ACADEMIC CONTENT STANDARD		**Computer Science, Grade 9-12 Advanced Level**
STANDARD / BENCHMARK		**ALGORITHMIC THINKING AND PROGRAMMING**
BENCHMARK / GRADE LEVEL INDICATOR		**Algorithms**
PROFICIENCY LEVEL	ATP.A.9-12.A.a.	Define and explain Iterative and recursive algorithms to understand how and when to apply them.
PROFICIENCY LEVEL	ATP.A.9-12.A.d.	Define and explain sorting and searching algorithms to understand how and when to apply them.
PROFICIENCY LEVEL	ATP.A.9-12.A.f.	Compare and contrast classical, cluster and quantum computing algorithms.

Oklahoma Academic Standards

Mathematics

Grade **9** - Adopted: **2022**

CONTENT STANDARD / COURSE		**Mathematical Actions and Processes**
STRAND / STANDARD		Develop a Deep and Flexible Conceptual Understanding
STRAND / STANDARD		Develop Accurate and Appropriate Procedural Fluency
STRAND / STANDARD		Develop Strategies for Problem Solving
STRAND / STANDARD		Develop Mathematical Reasoning
STRAND / STANDARD		Develop a Productive Mathematical Disposition
STRAND / STANDARD		Develop the Ability to Make Conjectures, Model, and Generalize
STRAND / STANDARD		Develop the Ability to Communicate Mathematically
CONTENT STANDARD / COURSE	**PA.**	**Pre-Algebra (PA)**

STRAND / STANDARD	**PA.A.**	**Algebraic Reasoning & Algebra (A)**
OBJECTIVE	**PA.A.2.**	**Identify and justify linear functions using mathematical models and situations; solve problems involving linear functions and interpret results in the original context.**
SKILL / CONCEPT	PA.A.2.1.	Represent linear functions with tables, verbal descriptions, symbols, and graphs; translate from one representation to another.

CONTENT STANDARD / COURSE	**PA.**	**Pre-Algebra (PA)**
STRAND / STANDARD	**PA.D.**	**Data & Probability (D)**
OBJECTIVE	**PA.D.1.**	**Display and interpret data in a variety of ways, including using scatter plots and approximate lines of best fit. Use the line of best fit and average rate of change to make predictions and draw conclusions about data.**
SKILL / CONCEPT	PA.D.1.1.	Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Create data displays using technology to examine this impact.

CONTENT STANDARD / COURSE	**A2.**	**Algebra 2 (A2)**
STRAND / STANDARD	**A2.D.**	**Data & Probability (D)**
OBJECTIVE	**A2.D.1.**	**Display, describe, and compare data. For linear and nonlinear relationships, make predictions and assess the reliability of those predictions.**
SKILL / CONCEPT	A2.D.1.1.	Use the mean and standard deviation of a data set to create a normal distribution (bell-shaped curve).

Oklahoma Academic Standards

Mathematics

Grade **10** - Adopted: **2022**

CONTENT STANDARD / COURSE		**Mathematical Actions and Processes**
STRAND / STANDARD		Develop a Deep and Flexible Conceptual Understanding
STRAND / STANDARD		Develop Accurate and Appropriate Procedural Fluency
STRAND / STANDARD		Develop Strategies for Problem Solving
STRAND / STANDARD		Develop Mathematical Reasoning
STRAND / STANDARD		Develop a Productive Mathematical Disposition
STRAND / STANDARD		Develop the Ability to Make Conjectures, Model, and Generalize

STRAND / STANDARD		Develop the Ability to Communicate Mathematically

CONTENT STANDARD / COURSE	**PA.**	**Pre-Algebra (PA)**
STRAND / STANDARD	**PA.A.**	**Algebraic Reasoning & Algebra (A)**
OBJECTIVE	**PA.A.2.**	**Identify and justify linear functions using mathematical models and situations; solve problems involving linear functions and interpret results in the original context.**
SKILL / CONCEPT	PA.A.2.1.	Represent linear functions with tables, verbal descriptions, symbols, and graphs; translate from one representation to another.

CONTENT STANDARD / COURSE	**PA.**	**Pre-Algebra (PA)**
STRAND / STANDARD	**PA.D.**	**Data & Probability (D)**
OBJECTIVE	**PA.D.1.**	**Display and interpret data in a variety of ways, including using scatter plots and approximate lines of best fit. Use the line of best fit and average rate of change to make predictions and draw conclusions about data.**
SKILL / CONCEPT	PA.D.1.1.	Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Create data displays using technology to examine this impact.

CONTENT STANDARD / COURSE	**A2.**	**Algebra 2 (A2)**
STRAND / STANDARD	**A2.D.**	**Data & Probability (D)**
OBJECTIVE	**A2.D.1.**	**Display, describe, and compare data. For linear and nonlinear relationships, make predictions and assess the reliability of those predictions.**
SKILL / CONCEPT	A2.D.1.1.	Use the mean and standard deviation of a data set to create a normal distribution (bell-shaped curve).

Oklahoma Academic Standards

Science

Grade **9** - Adopted: **2020**

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**PHYSICAL SCIENCE (PS)**
OBJECTIVE		**Waves and Their Applications in Technologies for Information Transfer (PS4)**
SKILL / CONCEPT	PS.PS4.2	Evaluate questions about the advantages and disadvantages of using a digital transmission and storage of information.

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**PHYSICS (PH)**

OBJECTIVE		**Waves and Their Applications in Technologies for Information Transfer (PS4)**
SKILL / CONCEPT	PH.PS4.2	Evaluate questions about the advantages and disadvantages of using digital transmission and storage of information.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**BIOLOGY (B)**
OBJECTIVE		**Ecosystems: Interactions, Energy, and Dynamics (LS2)**
SKILL / CONCEPT	B.LS2.2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
SKILL / CONCEPT	B.LS2.4	Use a mathematical representation to support claims for the cycling of matter and the flow of energy among organisms in an ecosystem.
SKILL / CONCEPT	B.LS2.5	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**EARTH AND SPACE SCIENCE (ES)**
OBJECTIVE		**Earth Systems (ESS2)**
SKILL / CONCEPT	ES.ESS2.4	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems causes changes to the atmosphere and climate.
SKILL / CONCEPT	ES.ESS2.6	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**EARTH AND SPACE SCIENCE (ES)**
OBJECTIVE		**Earth and Human Activities (ESS3)**
SKILL / CONCEPT	ES.ESS3.1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate effect human activity.
SKILL / CONCEPT	ES.ESS3.2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**ENVIRONMENTAL SCIENCE (EN)**
OBJECTIVE		**Ecosystems: Interactions, Energy, and Dynamics (LS2)**

SKILL / CONCEPT	EN.LS2.2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
SKILL / CONCEPT	EN.LS2.4	Use a mathematical representation to support claims for the cycling of matter and the flow of energy among organisms in an ecosystem.
SKILL / CONCEPT	EN.LS2.7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**ENVIRONMENTAL SCIENCE (EN)**
OBJECTIVE		**Earth Systems (ESS2)**
SKILL / CONCEPT	EN.ESS2.4	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems causes changes to the atmosphere and climate.
SKILL / CONCEPT	EN.ESS2.6	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**ENVIRONMENTAL SCIENCE (EN)**
OBJECTIVE		**Earth and Human Activities (ESS3)**
SKILL / CONCEPT	EN.ESS3.1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate effect human activity.
SKILL / CONCEPT	EN.ESS3.2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales.
SKILL / CONCEPT	EN.ESS3.3	Use computational simulations to illustrate changes between the relationships of natural resources, human populations, and biodiversity and their sustainability within Earth systems.

Oklahoma Academic Standards

Science

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

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards for Science**
STRAND / STANDARD		**PHYSICAL SCIENCE (PS)**
OBJECTIVE		**Waves and Their Applications in Technologies for Information Transfer (PS4)**
SKILL / CONCEPT	PS.PS4.2	Evaluate questions about the advantages and disadvantages of using a digital transmission and storage of information.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		PHYSICS (PH)
OBJECTIVE		Waves and Their Applications in Technologies for Information Transfer (PS4)
SKILL / CONCEPT	PH.PS4.2	Evaluate questions about the advantages and disadvantages of using digital transmission and storage of information.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		BIOLOGY (B)
OBJECTIVE		Ecosystems: Interactions, Energy, and Dynamics (LS2)
SKILL / CONCEPT	B.LS2.2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
SKILL / CONCEPT	B.LS2.4	Use a mathematical representation to support claims for the cycling of matter and the flow of energy among organisms in an ecosystem.
SKILL / CONCEPT	B.LS2.5	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		EARTH AND SPACE SCIENCE (ES)
OBJECTIVE		Earth Systems (ESS2)
SKILL / CONCEPT	ES.ESS2.4	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems causes changes to the atmosphere and climate.
SKILL / CONCEPT	ES.ESS2.6	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		EARTH AND SPACE SCIENCE (ES)
OBJECTIVE		Earth and Human Activities (ESS3)
SKILL / CONCEPT	ES.ESS3.1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate effect human activity.
SKILL / CONCEPT	ES.ESS3.2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		ENVIRONMENTAL SCIENCE (EN)
OBJECTIVE		Ecosystems: Interactions, Energy, and Dynamics (LS2)
SKILL / CONCEPT	EN.LS2.2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
SKILL / CONCEPT	EN.LS2.4	Use a mathematical representation to support claims for the cycling of matter and the flow of energy among organisms in an ecosystem.
SKILL / CONCEPT	EN.LS2.7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		ENVIRONMENTAL SCIENCE (EN)
OBJECTIVE		Earth Systems (ESS2)
SKILL / CONCEPT	EN.ESS2.4	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems causes changes to the atmosphere and climate.
SKILL / CONCEPT	EN.ESS2.6	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards for Science
STRAND / STANDARD		ENVIRONMENTAL SCIENCE (EN)
OBJECTIVE		Earth and Human Activities (ESS3)
SKILL / CONCEPT	EN.ESS3.1	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate effect human activity.
SKILL / CONCEPT	EN.ESS3.2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales.
SKILL / CONCEPT	EN.ESS3.3	Use computational simulations to illustrate changes between the relationships of natural resources, human populations, and biodiversity and their sustainability within Earth systems.

Oklahoma Academic Standards

Technology Education

Grade **9** - Adopted: **2023**

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices

OBJECTIVE		**Creating Computational Artifacts**
SKILL / CONCEPT		Develop computational artifacts to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to the community and beyond. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD		**Computer Science Practices**
OBJECTIVE		**Developing and Using Abstractions**
SKILL / CONCEPT		Identify patterns and extract common features from specific examples to create generalizations. Students will manage complexity by using generalized solutions and parts of solutions designed for broad reuse to simplify the development process.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD		**Computer Science Practices**
OBJECTIVE		**Developing a Productive Computing Environment**
SKILL / CONCEPT		Understand the contexts in which people operate and consider the needs of different users during the design process. Students will address the needs of different end users to produce artifacts with broad accessibility and usability and to meet the needs of all potential end users (including themselves).
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD		**Computer Science Practices**
OBJECTIVE		**Recognizing and Defining Computational Problems**
SKILL / CONCEPT		Recognize appropriate and worthwhile opportunities to apply computation. Students will work to solve a problem by defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD	**L1.**	**Ninth and Tenth Grades: Level 1 (L1)**
OBJECTIVE	**L1.AP.**	**Algorithms & Programming (AP)**
SKILL / CONCEPT	**L1.AP.A.**	**Algorithms (A)**
SKILL	L1.AP.A.01.	Create a prototype that uses algorithms (e. g., searching, sorting, finding shortest distance) to provide a possible solution for a real- world problem.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**

STRAND / STANDARD	**L1.**	**Ninth and Tenth Grades: Level 1 (L1)**
OBJECTIVE	**L1.AP.**	**Algorithms & Programming (AP)**
SKILL / CONCEPT	**L1.AP.V.**	**Variables (V)**
SKILL	L1.AP.V.01.	Demonstrate the use of lists (e.g., arrays) to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD	**L1.**	**Ninth and Tenth Grades: Level 1 (L1)**
OBJECTIVE	**L1.AP.**	**Algorithms & Programming (AP)**
SKILL / CONCEPT	**L1.AP.PD.**	**Program Development (PD)**
SKILL	L1.AP.PD.01.	Create software that will provide solutions to a variety of users using a software development process.

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD	**L1.**	**Ninth and Tenth Grades: Level 1 (L1)**
OBJECTIVE	**L1.IC.**	**Impacts of Computing (IC)**
SKILL / CONCEPT	**L1.IC.CU.**	**Culture (CU)**
SKILL	L1.IC.CU.02.	Test and refine computational artifacts to ensure access to a variety of user audiences.
SKILL	L1.IC.CU.03.	Demonstrate ways a given algorithm can help solve computational problems across disciplines.

Grade **9** - Adopted: **2019**

CONTENT STANDARD / COURSE		**ISTE for Students 2016 (ISTE-S)**
STRAND / STANDARD	**ISTE-S.3.**	**Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.**
OBJECTIVE	ISTE-S.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

CONTENT STANDARD / COURSE		**ISTE for Students 2016 (ISTE-S)**
STRAND / STANDARD	**ISTE-S.4.**	**Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
OBJECTIVE	ISTE-S.4.a.	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.

OBJECTIVE	ISTE-S.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
CONTENT STANDARD / COURSE		**ISTE for Students 2016 (ISTE-S)**
STRAND / STANDARD	**ISTE-S.5.**	**Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
OBJECTIVE	ISTE-S.5.a.	Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
OBJECTIVE	ISTE-S.5.b.	Students 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.
OBJECTIVE	ISTE-S.5.d.	Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Oklahoma Academic Standards

Technology Education

Grade **10** - Adopted: **2023**

CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD		**Computer Science Practices**
OBJECTIVE		**Creating Computational Artifacts**
SKILL / CONCEPT		Develop computational artifacts to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to the community and beyond. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD		**Computer Science Practices**
OBJECTIVE		**Developing and Using Abstractions**
SKILL / CONCEPT		Identify patterns and extract common features from specific examples to create generalizations. Students will manage complexity by using generalized solutions and parts of solutions designed for broad reuse to simplify the development process.
CONTENT STANDARD / COURSE		**Oklahoma Academic Standards - Computer Science**
STRAND / STANDARD		**Computer Science Practices**
OBJECTIVE		**Developing a Productive Computing Environment**
SKILL / CONCEPT		Understand the contexts in which people operate and consider the needs of different users during the design process. Students will address the needs of different end users to produce artifacts with broad accessibility and usability and to meet the needs of all potential end users (including themselves).

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD		Computer Science Practices
OBJECTIVE		Recognizing and Defining Computational Problems
SKILL / CONCEPT		Recognize appropriate and worthwhile opportunities to apply computation. Students will work to solve a problem by defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD	L1.	Ninth and Tenth Grades: Level 1 (L1)
OBJECTIVE	L1.AP.	Algorithms & Programming (AP)
SKILL / CONCEPT	L1.AP.A.	Algorithms (A)
SKILL	L1.AP.A.01.	Create a prototype that uses algorithms (e. g., searching, sorting, finding shortest distance) to provide a possible solution for a real- world problem.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD	L1.	Ninth and Tenth Grades: Level 1 (L1)
OBJECTIVE	L1.AP.	Algorithms & Programming (AP)
SKILL / CONCEPT	L1.AP.V.	Variables (V)
SKILL	L1.AP.V.01.	Demonstrate the use of lists (e.g., arrays) to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD	L1.	Ninth and Tenth Grades: Level 1 (L1)
OBJECTIVE	L1.AP.	Algorithms & Programming (AP)
SKILL / CONCEPT	L1.AP.PD.	Program Development (PD)
SKILL	L1.AP.PD.01.	Create software that will provide solutions to a variety of users using a software development process.

CONTENT STANDARD / COURSE		Oklahoma Academic Standards - Computer Science
STRAND / STANDARD	L1.	Ninth and Tenth Grades: Level 1 (L1)
OBJECTIVE	L1.IC.	Impacts of Computing (IC)

SKILL / CONCEPT	L1.IC.CU.	Culture (CU)
SKILL	L1.IC.CU.02.	Test and refine computational artifacts to ensure access to a variety of user audiences.
SKILL	L1.IC.CU.03.	Demonstrate ways a given algorithm can help solve computational problems across disciplines.

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

CONTENT STANDARD / COURSE		ISTE for Students 2016 (ISTE-S)
STRAND / STANDARD	**ISTE-S.3.**	**Knowledge Constructor: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.**
OBJECTIVE	ISTE-S.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

CONTENT STANDARD / COURSE		ISTE for Students 2016 (ISTE-S)
STRAND / STANDARD	**ISTE-S.4.**	**Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
OBJECTIVE	ISTE-S.4.a.	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
OBJECTIVE	ISTE-S.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

CONTENT STANDARD / COURSE		ISTE for Students 2016 (ISTE-S)
STRAND / STANDARD	**ISTE-S.5.**	**Computational Thinker: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
OBJECTIVE	ISTE-S.5.a.	Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
OBJECTIVE	ISTE-S.5.b.	Students 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.
OBJECTIVE	ISTE-S.5.d.	Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Oregon Academic Content Standards

Mathematics

Grade **9** - Adopted: **2021**

STANDARD / CONTENT AREA		Mathematical Practice Standards
CONTENT STANDARD / PROFICIENCY	1	Make sense of problems and persevere in solving them.

CONTENT STANDARD / PROFICIENCY	2	Reason abstractly and quantitatively.
CONTENT STANDARD / PROFICIENCY	3	Construct viable arguments and critique the reasoning of others.
CONTENT STANDARD / PROFICIENCY	4	Model with mathematics.
CONTENT STANDARD / PROFICIENCY	6	Attend to precision.
CONTENT STANDARD / PROFICIENCY	7	Look for and make use of structure.
CONTENT STANDARD / PROFICIENCY	8	Look for and express regularity in repeated reasoning

Oregon Academic Content Standards

Mathematics

Grade **10** - Adopted: **2021**

STANDARD / CONTENT AREA		Mathematical Practice Standards
CONTENT STANDARD / PROFICIENCY	1	Make sense of problems and persevere in solving them.
CONTENT STANDARD / PROFICIENCY	2	Reason abstractly and quantitatively.
CONTENT STANDARD / PROFICIENCY	3	Construct viable arguments and critique the reasoning of others.
CONTENT STANDARD / PROFICIENCY	4	Model with mathematics.
CONTENT STANDARD / PROFICIENCY	6	Attend to precision.
CONTENT STANDARD / PROFICIENCY	7	Look for and make use of structure.

CONTENT STANDARD / PROFICIENCY	8	Look for and express regularity in repeated reasoning

Oregon Academic Content Standards

Science

Grade **9** - Adopted: **2022**

STANDARD / CONTENT AREA	**OR.HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
BENCHMARK / STRAND	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
BENCHMARK / STRAND	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
BENCHMARK / STRAND	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD / CONTENT AREA	**OR.HS-LS4.**	**Biological Evolution: Unity and Diversity**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STANDARD / CONTENT AREA	**OR.HS-ESS2.**	**Earth's Systems**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-ESS2-4.	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 / STRAND	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STANDARD / CONTENT AREA	**OR.HS-ESS3.**	**Earth and Human Activity**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**

BENCHMARK / STRAND	HS-ESS3-1.	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 / STRAND	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
BENCHMARK / STRAND	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
BENCHMARK / STRAND	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change).
STANDARD / CONTENT AREA	**OR.HS-PS4.**	**Waves and their Applications in Technologies for Information Transfer**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STANDARD / CONTENT AREA	**OR.HS-ETS1.**	**Engineering and Design**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
BENCHMARK / STRAND	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
BENCHMARK / STRAND	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
STANDARD / CONTENT AREA	**OR.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Key Ideas and Details**
BENCHMARK / STRAND	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.
BENCHMARK / STRAND	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.
STANDARD / CONTENT AREA	**OR.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**

CONTENT STANDARD / PROFICIENCY		**Craft and Structure**
BENCHMARK / STRAND	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.
BENCHMARK / STRAND	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).
STANDARD / CONTENT AREA	**OR.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Integration of Knowledge and Ideas**
BENCHMARK / STRAND	RST.9-10.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
STANDARD / CONTENT AREA	**OR.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Range of Reading and Level of Text Complexity**
BENCHMARK / STRAND	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.
STANDARD / CONTENT AREA	**OR.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Text Types and Purposes**
BENCHMARK / STRAND	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION / BENCHMARK	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.
STANDARD / CONTENT AREA	**OR.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Production and Distribution of Writing**
BENCHMARK / STRAND	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
BENCHMARK / STRAND	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.

STANDARD / CONTENT AREA	**OR.HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
BENCHMARK / STRAND	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
BENCHMARK / STRAND	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
BENCHMARK / STRAND	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD / CONTENT AREA	**OR.HS-LS4.**	**Biological Evolution: Unity and Diversity**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STANDARD / CONTENT AREA	**OR.HS-ESS2.**	**Earth's Systems**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-ESS2-4.	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 / STRAND	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STANDARD / CONTENT AREA	**OR.HS-ESS3.**	**Earth and Human Activity**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-ESS3-1.	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 / STRAND	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

BENCHMARK / STRAND	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
BENCHMARK / STRAND	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change).
STANDARD / CONTENT AREA	**OR.HS-PS4.**	**Waves and their Applications in Technologies for Information Transfer**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STANDARD / CONTENT AREA	**OR.HS-ETS1.**	**Engineering and Design**
CONTENT STANDARD / PROFICIENCY		**Students who demonstrate understanding can:**
BENCHMARK / STRAND	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
BENCHMARK / STRAND	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
BENCHMARK / STRAND	HS-ETS1-3.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
STANDARD / CONTENT AREA	**OR.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Key Ideas and Details**
BENCHMARK / STRAND	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.
BENCHMARK / STRAND	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.
STANDARD / CONTENT AREA	**OR.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Craft and Structure**
BENCHMARK / STRAND	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.

BENCHMARK / STRAND	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).
STANDARD / CONTENT AREA	**OR.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Integration of Knowledge and Ideas**
BENCHMARK / STRAND	RST.9-10.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
STANDARD / CONTENT AREA	**OR.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Range of Reading and Level of Text Complexity**
BENCHMARK / STRAND	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.
STANDARD / CONTENT AREA	**OR.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Text Types and Purposes**
BENCHMARK / STRAND	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION / BENCHMARK	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.
STANDARD / CONTENT AREA	**OR.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
CONTENT STANDARD / PROFICIENCY		**Production and Distribution of Writing**
BENCHMARK / STRAND	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
BENCHMARK / STRAND	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.