Main Criteria: Forward Education

Secondary Criteria: Pennsylvania Core and Academic Standards, Rhode Island World-Class Standards, South Carolina Standards & Learning, South Dakota Content Standards, Tennessee Academic Standards, Texas Essential Knowledge and Skills (TEKS), Utah Core Standards, Vermont Content Standards, Virginia Standards of Learning, Washington State K-12 Learning Standards and Guidelines, Washington DC Academic Standards, West Virginia College and Career Readiness Standards, Wisconsin Academic Standards, Wyoming Content and Performance Standards

Subjects: Mathematics, Science, Technology Education

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

Forward Education

Replanting our Forests with Automated Tree Seeders

Pennsylvania Core and Academic Standards

Mathematics

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

SUBJECT / STANDARD AREA	PA.CC.M P.	Standards for Mathematical Practice
STANDARD AREA / STATEMENT	CC.MP.1.	Make sense of problems and persevere in solving them.
STANDARD AREA / STATEMENT	CC.MP.2.	Reason abstractly and quantitatively.
STANDARD AREA / STATEMENT	CC.MP.3.	Construct viable arguments and critique the reasoning of others.
STANDARD AREA / STATEMENT	CC.MP.4.	Model with mathematics.
STANDARD AREA / STATEMENT	CC.MP.6.	Attend to precision.
STANDARD AREA / STATEMENT	CC.MP.7.	Look for and make use of structure.
STANDARD AREA / STATEMENT	CC.MP.8.	Look for and express regularity in repeated reasoning.

SUBJECT / STANDARD AREA	PA.CC.2.2.HS.	Algebraic Concepts
STANDARD AREA / STATEMENT	**CC.2.2.HS.C.**	**Functions**
STANDARD	CC.2.2.HS.C.2.	Graph and analyze functions and use their properties to make connections between the different representations.

Pennsylvania Core and Academic Standards

Mathematics

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

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

SUBJECT / STANDARD AREA	PA.CC.2.2.HS.	Algebraic Concepts
STANDARD AREA / STATEMENT	**CC.2.2.HS.C.**	**Functions**
STANDARD	CC.2.2.HS.C.2.	Graph and analyze functions and use their properties to make connections between the different representations.

Pennsylvania Core and Academic Standards

Science

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

SUBJECT / STANDARD AREA	PA.SI.	Science as Inquiry
STANDARD AREA / STATEMENT	SI.4.	Formulate and revise explanations and models using logic and evidence.
STANDARD AREA / STATEMENT	SI.5.	Recognize and analyze alternative explanations and models.

SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.3.**	**Earth and Space Sciences**
STANDARD	**3.3.A.**	**Earth Structure, Processes and Cycles**
DESCRIPTOR / STANDARD	3.3.10.A2.	Analyze the effects on the environment and the carbon cycle of using both renewable and nonrenewable sources of energy.

SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**
STANDARD	**3.4.A.**	**The Scope of Technology**
DESCRIPTOR / STANDARD	3.4.10.A1.	Illustrate how the development of technologies is often driven by profit and an economic market.
DESCRIPTOR / STANDARD	3.4.10.A2.	Interpret how systems thinking applies logic and creativity with appropriate comprises in complex real-life problems.
DESCRIPTOR / STANDARD	3.4.10.A3.	Examine how technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function.

SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**
STANDARD	**3.4.B.**	**Technology and Society**
DESCRIPTOR / STANDARD	3.4.10.B1.	Compare and contrast how the use of technology involves weighing the trade-offs between the positive and negative effects.
DESCRIPTOR / STANDARD	3.4.10.B2.	Demonstrate how humans devise technologies to reduce the negative consequences of other technologies.
DESCRIPTOR / STANDARD	3.4.10.B4.	Recognize that technological development has been evolutionary, the result of a series of refinements to a basic invention.

SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**
STANDARD	**3.4.C.**	**Technology and Engineering Design**

DESCRIPTOR / STANDARD	3.4.10.C1.	Apply the components of the technological design process.
DESCRIPTOR / STANDARD	3.4.10.C2.	Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments.
DESCRIPTOR / STANDARD	3.4.10.C3.	Illustrate the concept that not all problems are technological and not every problem can be solved using technology.
SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**
STANDARD	**3.4.D.**	**Abilities for a Technological World**
DESCRIPTOR / STANDARD	3.4.10.D1.	Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product.
DESCRIPTOR / STANDARD	3.4.10.D2.	Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.
DESCRIPTOR / STANDARD	3.4.10.D3.	Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment.
SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**
STANDARD	**3.4.E.**	**The Designed World**
DESCRIPTOR / STANDARD	3.4.10.E7.	Evaluate structure design as related to function, considering such factors as style, convenience, safety, and efficiency.
SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.1.**	**Ecology**
STANDARD	**4.1.10.A.**	**Examine the effects of limiting factors on population dynamics.**
DESCRIPTOR / STANDARD	4.1.10.A.3.	Describe how organisms become classified as threatened or endangered.
SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.1.**	**Ecology**

STANDARD	4.1.10.B.	Explain the consequences of interrupting natural cycles.

SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.1.**	**Ecology**
STANDARD	**4.1.10.D.**	**Research practices that impact biodiversity in specific ecosystems.**

DESCRIPTOR / STANDARD	4.1.10.D.1.	Analyze the relationship between habitat changes to plant and animal population fluctuations.

SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.1.**	**Ecology**

STANDARD	4.1.10.E.	Analyze how humans influence the pattern of natural changes (e.g. primary /secondary succession and desertification) in ecosystems over time.

SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.3.**	**Natural Resources**
STANDARD	**4.3.10.A.**	**Evaluate factors affecting the use of natural resources.**

DESCRIPTOR / STANDARD	4.3.10.A.1.	Evaluate the effect of consumer demands on the use of natural resources.
DESCRIPTOR / STANDARD	4.3.10.A.2.	Analyze how technologies such as modern mining, harvesting, and transportation equipment affect the use of our natural resources.
DESCRIPTOR / STANDARD	4.3.10.A.3.	Describe how local and state agencies manage natural resources.

SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.3.**	**Natural Resources**
STANDARD	**4.3.10.B.**	**Analyze how humans manage and distribute natural resources.**

DESCRIPTOR / STANDARD	4.3.10.B.1.	Describe the use of a natural resource with an emphasis on the environmental consequences of extracting, processing, transporting, using, and disposing of it.
DESCRIPTOR / STANDARD	4.3.10.B.2.	Analyze the impact of technology on the management, distribution, and disposal of natural resources.

SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.5.**	**Humans and the Environment**
STANDARD	**4.5.10.C.**	**Analyze real world data and explain how point and non-point source pollution can be detected and eliminated.**
DESCRIPTOR / STANDARD	4.5.10.C.1.	Compare and contrast the environmental effects of different industrial strategies.

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

SUBJECT / STANDARD AREA	**PA.CC.3.5.9-10.**	**Reading Informational Text: Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.**
STANDARD AREA / STATEMENT		**Key Ideas and Details**
STANDARD	CC.3.5.9-10.B.	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	CC.3.5.9-10.C.	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.
SUBJECT / STANDARD AREA	**PA.CC.3.5.9-10.**	**Reading Informational Text: Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.**
STANDARD AREA / STATEMENT		**Craft and Structure**
STANDARD	CC.3.5.9-10.D.	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	CC.3.5.9-10.E.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
SUBJECT / STANDARD AREA	**PA.CC.3.5.9-10.**	**Reading Informational Text: Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.**
STANDARD AREA / STATEMENT		**Integration of Knowledge and Ideas**
STANDARD	CC.3.5.9-10.I.	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.
SUBJECT / STANDARD AREA	**PA.CC.3.5.9-10.**	**Reading Informational Text: Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.**
STANDARD AREA / STATEMENT		**Range and Level of Complex Texts**
STANDARD	CC.3.5.9-10.J.	By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

SUBJECT / STANDARD AREA	**PA.CC.3.6.9-10.**	**Writing: Students write for different purposes and audiences. Students write clear and focused text to convey a well-defined perspective and appropriate content.**
STANDARD AREA / STATEMENT		**Text Types and Purposes**
STANDARD	**CC.3.6.9-10.B.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
DESCRIPTOR / STANDARD	CC.3.6.9-10.B.4.	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.

SUBJECT / STANDARD AREA	**PA.CC.3.6.9-10.**	**Writing: Students write for different purposes and audiences. Students write clear and focused text to convey a well-defined perspective and appropriate content.**
STANDARD AREA / STATEMENT		**Production and Distribution of Writing**
STANDARD	CC.3.6.9-10.C.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
STANDARD	CC.3.6.9-10.E.	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.

Pennsylvania Core and Academic Standards

Science

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

SUBJECT / STANDARD AREA	**PA.SI.**	**Science as Inquiry**
STANDARD AREA / STATEMENT	SI.4.	Formulate and revise explanations and models using logic and evidence.
STANDARD AREA / STATEMENT	SI.5.	Recognize and analyze alternative explanations and models.

SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.3.**	**Earth and Space Sciences**
STANDARD	**3.3.A.**	**Earth Structure, Processes and Cycles**
DESCRIPTOR / STANDARD	3.3.10.A2.	Analyze the effects on the environment and the carbon cycle of using both renewable and nonrenewable sources of energy.

SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**

STANDARD	**3.4.A.**	**The Scope of Technology**
DESCRIPTOR / STANDARD	3.4.10.A1.	Illustrate how the development of technologies is often driven by profit and an economic market.
DESCRIPTOR / STANDARD	3.4.10.A2.	Interpret how systems thinking applies logic and creativity with appropriate comprises in complex real-life problems.
DESCRIPTOR / STANDARD	3.4.10.A3.	Examine how technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function.
SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**
STANDARD	**3.4.B.**	**Technology and Society**
DESCRIPTOR / STANDARD	3.4.10.B1.	Compare and contrast how the use of technology involves weighing the trade-offs between the positive and negative effects.
DESCRIPTOR / STANDARD	3.4.10.B2.	Demonstrate how humans devise technologies to reduce the negative consequences of other technologies.
DESCRIPTOR / STANDARD	3.4.10.B4.	Recognize that technological development has been evolutionary, the result of a series of refinements to a basic invention.
SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**
STANDARD	**3.4.C.**	**Technology and Engineering Design**
DESCRIPTOR / STANDARD	3.4.10.C1.	Apply the components of the technological design process.
DESCRIPTOR / STANDARD	3.4.10.C2.	Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments.
DESCRIPTOR / STANDARD	3.4.10.C3.	Illustrate the concept that not all problems are technological and not every problem can be solved using technology.
SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**
STANDARD	**3.4.D.**	**Abilities for a Technological World**

DESCRIPTOR / STANDARD	3.4.10.D1.	Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product.
DESCRIPTOR / STANDARD	3.4.10.D2.	Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it.
DESCRIPTOR / STANDARD	3.4.10.D3.	Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment.
SUBJECT / STANDARD AREA	**PA.3.**	**Science and Technology and Engineering Education**
STANDARD AREA / STATEMENT	**3.4.**	**Technology and Engineering Education**
STANDARD	**3.4.E.**	**The Designed World**
DESCRIPTOR / STANDARD	3.4.10.E7.	Evaluate structure design as related to function, considering such factors as style, convenience, safety, and efficiency.
SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.1.**	**Ecology**
STANDARD	**4.1.10.A.**	**Examine the effects of limiting factors on population dynamics.**
DESCRIPTOR / STANDARD	4.1.10.A.3.	Describe how organisms become classified as threatened or endangered.
SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.1.**	**Ecology**
STANDARD	4.1.10.B.	Explain the consequences of interrupting natural cycles.
SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.1.**	**Ecology**
STANDARD	**4.1.10.D.**	**Research practices that impact biodiversity in specific ecosystems.**
DESCRIPTOR / STANDARD	4.1.10.D.1.	Analyze the relationship between habitat changes to plant and animal population fluctuations.
SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**

STANDARD AREA / STATEMENT	**4.1.**	**Ecology**
STANDARD	4.1.10.E.	Analyze how humans influence the pattern of natural changes (e.g. primary /secondary succession and desertification) in ecosystems over time.

SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.3.**	**Natural Resources**
STANDARD	**4.3.10.A.**	**Evaluate factors affecting the use of natural resources.**
DESCRIPTOR / STANDARD	4.3.10.A.1.	Evaluate the effect of consumer demands on the use of natural resources.
DESCRIPTOR / STANDARD	4.3.10.A.2.	Analyze how technologies such as modern mining, harvesting, and transportation equipment affect the use of our natural resources.
DESCRIPTOR / STANDARD	4.3.10.A.3.	Describe how local and state agencies manage natural resources.

SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.3.**	**Natural Resources**
STANDARD	**4.3.10.B.**	**Analyze how humans manage and distribute natural resources.**
DESCRIPTOR / STANDARD	4.3.10.B.1.	Describe the use of a natural resource with an emphasis on the environmental consequences of extracting, processing, transporting, using, and disposing of it.
DESCRIPTOR / STANDARD	4.3.10.B.2.	Analyze the impact of technology on the management, distribution, and disposal of natural resources.

SUBJECT / STANDARD AREA	**PA.4.**	**Environment and Ecology**
STANDARD AREA / STATEMENT	**4.5.**	**Humans and the Environment**
STANDARD	**4.5.10.C.**	**Analyze real world data and explain how point and non-point source pollution can be detected and eliminated.**
DESCRIPTOR / STANDARD	4.5.10.C.1.	Compare and contrast the environmental effects of different industrial strategies.

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

SUBJECT / STANDARD AREA	**PA.CC.3.5.9-10.**	**Reading Informational Text: Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.**

STANDARD AREA / STATEMENT		**Key Ideas and Details**
STANDARD	CC.3.5.9-10.B.	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	CC.3.5.9-10.C.	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.
SUBJECT / STANDARD AREA	**PA.CC.3.5.9-10.**	**Reading Informational Text: Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.**
STANDARD AREA / STATEMENT		**Craft and Structure**
STANDARD	CC.3.5.9-10.D.	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	CC.3.5.9-10.E.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
SUBJECT / STANDARD AREA	**PA.CC.3.5.9-10.**	**Reading Informational Text: Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.**
STANDARD AREA / STATEMENT		**Integration of Knowledge and Ideas**
STANDARD	CC.3.5.9-10.I.	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.
SUBJECT / STANDARD AREA	**PA.CC.3.5.9-10.**	**Reading Informational Text: Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.**
STANDARD AREA / STATEMENT		**Range and Level of Complex Texts**
STANDARD	CC.3.5.9-10.J.	By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
SUBJECT / STANDARD AREA	**PA.CC.3.6.9-10.**	**Writing: Students write for different purposes and audiences. Students write clear and focused text to convey a well-defined perspective and appropriate content.**
STANDARD AREA / STATEMENT		**Text Types and Purposes**
STANDARD	**CC.3.6.9-10.B.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
DESCRIPTOR / STANDARD	CC.3.6.9-10.B.4.	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.
SUBJECT / STANDARD AREA	**PA.CC.3.6.9-10.**	**Writing: Students write for different purposes and audiences. Students write clear and focused text to convey a well-defined perspective and appropriate content.**

STANDARD AREA / STATEMENT		**Production and Distribution of Writing**
STANDARD	CC.3.6.9-10.C.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
STANDARD	CC.3.6.9-10.E.	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.

Pennsylvania Core and Academic Standards

Technology Education

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

SUBJECT / STANDARD AREA	**CSTA.3A.**	**Level 3A (Ages 14-16)**
STANDARD AREA / STATEMENT	**3A-AP.**	**Algorithms & Programming**
STANDARD		**Algorithms**
DESCRIPTOR / STANDARD	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. (P5.2)

SUBJECT / STANDARD AREA	**CSTA.3A.**	**Level 3A (Ages 14-16)**
STANDARD AREA / STATEMENT	**3A-IC.**	**Impacts of Computing**
STANDARD		**Culture**
DESCRIPTOR / STANDARD	3A-IC-25.	Test and refine computational artifacts to reduce bias and equity deficits. (P1.2)

Pennsylvania Core and Academic Standards

Technology Education

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

SUBJECT / STANDARD AREA	**CSTA.3A.**	**Level 3A (Ages 14-16)**
STANDARD AREA / STATEMENT	**3A-AP.**	**Algorithms & Programming**
STANDARD		**Algorithms**
DESCRIPTOR / STANDARD	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. (P5.2)

SUBJECT / STANDARD AREA	**CSTA.3A.**	**Level 3A (Ages 14-16)**
STANDARD AREA / STATEMENT	**3A-IC.**	**Impacts of Computing**
STANDARD		**Culture**

DESCRIPTOR / STANDARD	3A-IC-25.	Test and refine computational artifacts to reduce bias and equity deficits. (P1.2)

Rhode Island World-Class Standards

Mathematics

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

DOMAIN		The Standards for Mathematical Practice
STATEMENT OF ENDURING KNOWLEDGE	MP1	Make sense of problems and persevere in solving them.
STATEMENT OF ENDURING KNOWLEDGE	MP2	Reason abstractly and quantitatively.
STATEMENT OF ENDURING KNOWLEDGE	MP3	Construct viable arguments and critique the reasoning of others.
STATEMENT OF ENDURING KNOWLEDGE	MP4	Model with mathematics.
STATEMENT OF ENDURING KNOWLEDGE	MP6	Attend to precision.
STATEMENT OF ENDURING KNOWLEDGE	MP7	Look for and make use of structure.
STATEMENT OF ENDURING KNOWLEDGE	MP8	Look for and express regularity in repeated reasoning.

DOMAIN		Conceptual Category: Functions Content Standards [F]
STATEMENT OF ENDURING KNOWLEDGE	**F-IF.**	**Interpreting Functions**
GSE STEM	**F-IF.B.**	**Interpret functions that arise in applications in terms of the context (linear, quadratic, exponential, rational, polynomial, square root, cube root, trigonometric, logarithmic).**
SPECIFIC 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.

Rhode Island World-Class Standards

Mathematics

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

DOMAIN		The Standards for Mathematical Practice

STATEMENT OF ENDURING KNOWLEDGE	MP1	Make sense of problems and persevere in solving them.
STATEMENT OF ENDURING KNOWLEDGE	MP2	Reason abstractly and quantitatively.
STATEMENT OF ENDURING KNOWLEDGE	MP3	Construct viable arguments and critique the reasoning of others.
STATEMENT OF ENDURING KNOWLEDGE	MP4	Model with mathematics.
STATEMENT OF ENDURING KNOWLEDGE	MP6	Attend to precision.
STATEMENT OF ENDURING KNOWLEDGE	MP7	Look for and make use of structure.
STATEMENT OF ENDURING KNOWLEDGE	MP8	Look for and express regularity in repeated reasoning.

DOMAIN		**Conceptual Category: Functions Content Standards [F]**
STATEMENT OF ENDURING KNOWLEDGE	**F-IF.**	**Interpreting Functions**
GSE STEM	**F-IF.B.**	**Interpret functions that arise in applications in terms of the context (linear, quadratic, exponential, rational, polynomial, square root, cube root, trigonometric, logarithmic).**
SPECIFIC 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.

Rhode Island World-Class Standards

Science

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

DOMAIN	**NGSS.HS-PS.**	**PHYSICAL SCIENCE**
STATEMENT OF ENDURING KNOWLEDGE	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
GSE STEM		**Students who demonstrate understanding can:**
SPECIFIC INDICATOR	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

DOMAIN	**NGSS.HS-LS.**	**LIFE SCIENCE**

STATEMENT OF ENDURING KNOWLEDGE	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GSE STEM		**Students who demonstrate understanding can:**
SPECIFIC 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.
SPECIFIC INDICATOR	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
SPECIFIC 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.
SPECIFIC INDICATOR	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
DOMAIN	**NGSS.HS-LS.**	**LIFE SCIENCE**
STATEMENT OF ENDURING KNOWLEDGE	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
GSE STEM		**Students who demonstrate understanding can:**
SPECIFIC INDICATOR	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
DOMAIN	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STATEMENT OF ENDURING KNOWLEDGE	**HS-ESS2.**	**Earth's Systems**
GSE STEM		**Students who demonstrate understanding can:**
SPECIFIC 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.
SPECIFIC INDICATOR	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
DOMAIN	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STATEMENT OF ENDURING KNOWLEDGE	**HS-ESS3.**	**Earth and Human Activity**
GSE STEM		**Students who demonstrate understanding can:**
SPECIFIC 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.
SPECIFIC INDICATOR	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

SPECIFIC INDICATOR	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
SPECIFIC 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.
DOMAIN	**NGSS.HS-ETS.**	**ENGINEERING DESIGN**
STATEMENT OF ENDURING KNOWLEDGE	**HS-ETS1.**	**Engineering Design**
GSE STEM		**Students who demonstrate understanding can:**
SPECIFIC 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.
SPECIFIC 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.
SPECIFIC 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.

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

DOMAIN	**RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STATEMENT OF ENDURING KNOWLEDGE		**Key Ideas and Details**
GSE STEM	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.
GSE STEM	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.
DOMAIN	**RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STATEMENT OF ENDURING KNOWLEDGE		**Craft and Structure**
GSE STEM	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.
GSE STEM	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).
DOMAIN	**RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STATEMENT OF ENDURING KNOWLEDGE		**Integration of Knowledge and Ideas**

GSE STEM	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.

DOMAIN	**RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STATEMENT OF ENDURING KNOWLEDGE		**Range of Reading and Level of Text Complexity**

GSE STEM	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.

DOMAIN	**WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STATEMENT OF ENDURING KNOWLEDGE		**Text Types and Purposes**
GSE STEM	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**

SPECIFIC INDICATOR	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.

DOMAIN	**WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STATEMENT OF ENDURING KNOWLEDGE		**Production and Distribution of Writing**

GSE STEM	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

GSE STEM	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.

Rhode Island World-Class Standards

Science

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

DOMAIN	**NGSS.HS-PS.**	**PHYSICAL SCIENCE**
STATEMENT OF ENDURING KNOWLEDGE	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
GSE STEM		**Students who demonstrate understanding can:**

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

DOMAIN	**NGSS.HS-LS.**	**LIFE SCIENCE**
STATEMENT OF ENDURING KNOWLEDGE	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GSE STEM		**Students who demonstrate understanding can:**

SPECIFIC 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.
SPECIFIC INDICATOR	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
SPECIFIC 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.
SPECIFIC INDICATOR	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
DOMAIN	**NGSS.HS-LS.**	**LIFE SCIENCE**
STATEMENT OF ENDURING KNOWLEDGE	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
GSE STEM		**Students who demonstrate understanding can:**
SPECIFIC INDICATOR	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
DOMAIN	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STATEMENT OF ENDURING KNOWLEDGE	**HS-ESS2.**	**Earth's Systems**
GSE STEM		**Students who demonstrate understanding can:**
SPECIFIC 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.
SPECIFIC INDICATOR	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
DOMAIN	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STATEMENT OF ENDURING KNOWLEDGE	**HS-ESS3.**	**Earth and Human Activity**
GSE STEM		**Students who demonstrate understanding can:**
SPECIFIC 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.
SPECIFIC INDICATOR	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
SPECIFIC INDICATOR	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
SPECIFIC 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.

DOMAIN	NGSS.HS-ETS.	ENGINEERING DESIGN
STATEMENT OF ENDURING KNOWLEDGE	HS-ETS1.	Engineering Design
GSE STEM		Students who demonstrate understanding can:
SPECIFIC 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.
SPECIFIC 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.
SPECIFIC 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.

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

DOMAIN	RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STATEMENT OF ENDURING KNOWLEDGE		Key Ideas and Details
GSE STEM	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.
GSE STEM	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.

DOMAIN	RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STATEMENT OF ENDURING KNOWLEDGE		Craft and Structure
GSE STEM	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.
GSE STEM	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).

DOMAIN	RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STATEMENT OF ENDURING KNOWLEDGE		Integration of Knowledge and Ideas
GSE STEM	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.

DOMAIN	RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STATEMENT OF ENDURING KNOWLEDGE		Range of Reading and Level of Text Complexity

GSE STEM	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.

DOMAIN	**WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STATEMENT OF ENDURING KNOWLEDGE		**Text Types and Purposes**
GSE STEM	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
SPECIFIC INDICATOR	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.

DOMAIN	**WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STATEMENT OF ENDURING KNOWLEDGE		**Production and Distribution of Writing**
GSE STEM	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GSE STEM	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.

Rhode Island World-Class Standards

Technology Education

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

DOMAIN		**ISTE Standards for Students**
STATEMENT OF ENDURING KNOWLEDGE	**RI.ISTE-S.3.**	**Knowledge Constructors: 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.**
GSE STEM	ISTE-S.3.d.	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

DOMAIN		**ISTE Standards for Students**
STATEMENT OF ENDURING KNOWLEDGE	**RI.ISTE-S.4.**	**Innovative Designers: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
GSE STEM	ISTE-S.4.a.	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
GSE STEM	ISTE-S.4.b.	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

DOMAIN		**ISTE Standards for Students**
STATEMENT OF ENDURING KNOWLEDGE	**RI.ISTE-S.5.**	**Computational Thinkers: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**

GSE STEM	ISTE-S.5.a.	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.
GSE STEM	ISTE-S.5.b.	Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
GSE STEM	ISTE-S.5.d.	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Rhode Island World-Class Standards

Technology Education

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

DOMAIN		ISTE Standards for Students
STATEMENT OF ENDURING KNOWLEDGE	**RI.ISTE-S.3.**	**Knowledge Constructors: 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.**
GSE STEM	ISTE-S.3.d.	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

DOMAIN		ISTE Standards for Students
STATEMENT OF ENDURING KNOWLEDGE	**RI.ISTE-S.4.**	**Innovative Designers: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
GSE STEM	ISTE-S.4.a.	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
GSE STEM	ISTE-S.4.b.	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

DOMAIN		ISTE Standards for Students
STATEMENT OF ENDURING KNOWLEDGE	**RI.ISTE-S.5.**	**Computational Thinkers: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
GSE STEM	ISTE-S.5.a.	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.
GSE STEM	ISTE-S.5.b.	Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
GSE STEM	ISTE-S.5.d.	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

South Carolina Standards & Learning

Mathematics

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

STANDARD / COURSE	SC.PS.	South Carolina College- and Career-Ready Mathematical Process Standards
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.1.**	**Make sense of problems and persevere in solving them.**

PERFORMANCE DESCRIPTOR / STANDARD	PS.1b.	Recognize there may be multiple entry points to a problem and more than one path to a solution.
PERFORMANCE DESCRIPTOR / STANDARD	PS.1c.	Analyze what is given, what is not given, what is being asked, and what strategies are needed, and make an initial attempt to solve a problem.
PERFORMANCE DESCRIPTOR / STANDARD	PS.1d.	Evaluate the success of an approach to solve a problem and refine it if necessary.
STANDARD / COURSE	**SC.PS.**	**South Carolina College- and Career-Ready Mathematical Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.2.**	**Reason both contextually and abstractly.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.2d.	Connect the meaning of mathematical operations to the context of a given situation.
STANDARD / COURSE	**SC.PS.**	**South Carolina College- and Career-Ready Mathematical Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.3.**	**Use critical thinking skills to justify mathematical reasoning and critique the reasoning of others.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.3a.	Construct and justify a solution to a problem.
PERFORMANCE DESCRIPTOR / STANDARD	PS.3b.	Compare and discuss the validity of various reasoning strategies.
PERFORMANCE DESCRIPTOR / STANDARD	PS.3d.	Reflect on and provide thoughtful responses to the reasoning of others.
STANDARD / COURSE	**SC.PS.**	**South Carolina College- and Career-Ready Mathematical Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.4.**	**Connect mathematical ideas and real-world situations through modeling.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.4a.	Identify relevant quantities and develop a model to describe their relationships.
PERFORMANCE DESCRIPTOR / STANDARD	PS.4b.	Interpret mathematical models in the context of the situation.

PERFORMANCE DESCRIPTOR / STANDARD	PS.4d.	Evaluate the reasonableness of a model and refine if necessary.

STANDARD / COURSE	**SC.PS.**	**South Carolina College- and Career-Ready Mathematical Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.6.**	**Communicate mathematically and approach mathematical situations with precision.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.6a.	Express numerical answers with the degree of precision appropriate for the context of a situation.
PERFORMANCE DESCRIPTOR / STANDARD	PS.6b.	Represent numbers in an appropriate form according to the context of the situation.

STANDARD / COURSE	**SC.PS.**	**South Carolina College- and Career-Ready Mathematical Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.7.**	**Identify and utilize structure and patterns.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.7a.	Recognize complex mathematical objects as being composed of more than one simple object.
PERFORMANCE DESCRIPTOR / STANDARD	PS.7b.	Recognize mathematical repetition in order to make generalizations.
PERFORMANCE DESCRIPTOR / STANDARD	PS.7c.	Look for structures to interpret meaning and develop solution strategies.

STANDARD / COURSE	**SC.9-12.PS.**	**Probability and Statistics**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.SPMJ.**	**Making Inferences and Justifying Conclusions**
PERFORMANCE DESCRIPTOR / STANDARD	PS.SPMJ.4.	Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

STANDARD / COURSE	**SC.9-12.PS.**	**Probability and Statistics**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.SPID.**	**Interpreting Data**

PERFORMANCE DESCRIPTOR / STANDARD	PS.SPID.4.	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

South Carolina Standards & Learning

Mathematics

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

STANDARD / COURSE	SC.PS.	South Carolina College- and Career-Ready Mathematical Process Standards
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.1.**	**Make sense of problems and persevere in solving them.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.1b.	Recognize there may be multiple entry points to a problem and more than one path to a solution.
PERFORMANCE DESCRIPTOR / STANDARD	PS.1c.	Analyze what is given, what is not given, what is being asked, and what strategies are needed, and make an initial attempt to solve a problem.
PERFORMANCE DESCRIPTOR / STANDARD	PS.1d.	Evaluate the success of an approach to solve a problem and refine it if necessary.

STANDARD / COURSE	SC.PS.	South Carolina College- and Career-Ready Mathematical Process Standards
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.2.**	**Reason both contextually and abstractly.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.2d.	Connect the meaning of mathematical operations to the context of a given situation.

STANDARD / COURSE	SC.PS.	South Carolina College- and Career-Ready Mathematical Process Standards
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.3.**	**Use critical thinking skills to justify mathematical reasoning and critique the reasoning of others.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.3a.	Construct and justify a solution to a problem.
PERFORMANCE DESCRIPTOR / STANDARD	PS.3b.	Compare and discuss the validity of various reasoning strategies.
PERFORMANCE DESCRIPTOR / STANDARD	PS.3d.	Reflect on and provide thoughtful responses to the reasoning of others.

STANDARD / COURSE	SC.PS.	South Carolina College- and Career-Ready Mathematical Process Standards
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.4.**	**Connect mathematical ideas and real-world situations through modeling.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.4a.	Identify relevant quantities and develop a model to describe their relationships.
PERFORMANCE DESCRIPTOR / STANDARD	PS.4b.	Interpret mathematical models in the context of the situation.
PERFORMANCE DESCRIPTOR / STANDARD	PS.4d.	Evaluate the reasonableness of a model and refine if necessary.

STANDARD / COURSE	SC.PS.	South Carolina College- and Career-Ready Mathematical Process Standards
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.6.**	**Communicate mathematically and approach mathematical situations with precision.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.6a.	Express numerical answers with the degree of precision appropriate for the context of a situation.
PERFORMANCE DESCRIPTOR / STANDARD	PS.6b.	Represent numbers in an appropriate form according to the context of the situation.

STANDARD / COURSE	SC.PS.	South Carolina College- and Career-Ready Mathematical Process Standards
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.7.**	**Identify and utilize structure and patterns.**
PERFORMANCE DESCRIPTOR / STANDARD	PS.7a.	Recognize complex mathematical objects as being composed of more than one simple object.
PERFORMANCE DESCRIPTOR / STANDARD	PS.7b.	Recognize mathematical repetition in order to make generalizations.
PERFORMANCE DESCRIPTOR / STANDARD	PS.7c.	Look for structures to interpret meaning and develop solution strategies.

STANDARD / COURSE	SC.9-12.PS.	Probability and Statistics

KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.SPMJ.**	**Making Inferences and Justifying Conclusions**
PERFORMANCE DESCRIPTOR / STANDARD	PS.SPMJ.4.	Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
STANDARD / COURSE	**SC.9-12.PS.**	**Probability and Statistics**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**PS.SPID.**	**Interpreting Data**
PERFORMANCE DESCRIPTOR / STANDARD	PS.SPID.4.	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

South Carolina Standards & Learning

Science

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

STANDARD / COURSE		**Biology (LS)**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Ecosystems: Interactions, Energy, and Dynamics (LS2)**
PERFORMANCE DESCRIPTOR / STANDARD	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.
PERFORMANCE DESCRIPTOR / STANDARD	B-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
PERFORMANCE DESCRIPTOR / STANDARD	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.
PERFORMANCE DESCRIPTOR / STANDARD	B-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on biodiversity and ecosystem health.
STANDARD / COURSE		**Biology (LS)**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Biological Evolution: Unity and Diversity (LS4)**
PERFORMANCE DESCRIPTOR / STANDARD	B-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STANDARD / COURSE		**Physics (PS)**

KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Waves and Their Applications in Technologies for Information Transfer (PS4)**
PERFORMANCE DESCRIPTOR / STANDARD	P-PS4-2.	Design, evaluate, and refine a solution for improving how digital devices store and transmit information.
STANDARD / COURSE		**Earth and Space Science (ESS)**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Earth's Systems (ESS2)**
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS2-4.	Use a model to describe how causes of short and long-term variations in the flow of energy into and out of Earth's systems result in changes to climate.
STANDARD / COURSE		**Earth and Space Science (ESS)**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Earth and Human Activity (ESS3)**
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources and occurrence of natural hazards have influenced human activity.
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-2.	Evaluate competing design solutions that address the impacts of developing, managing, and using Earth's energy and mineral resources.
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-3.	Use computational representation to illustrate the relationships among the management of Earth's resources, the sustainability of human populations, and biodiversity.
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-7.	Create an argument, based on evidence that describes how changes in climate on Earth have affected human activity.

South Carolina Standards & Learning

Science

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

STANDARD / COURSE		**Biology (LS)**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Ecosystems: Interactions, Energy, and Dynamics (LS2)**

PERFORMANCE DESCRIPTOR / STANDARD	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.
PERFORMANCE DESCRIPTOR / STANDARD	B-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
PERFORMANCE DESCRIPTOR / STANDARD	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.
PERFORMANCE DESCRIPTOR / STANDARD	B-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on biodiversity and ecosystem health.
STANDARD / COURSE		**Biology (LS)**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Biological Evolution: Unity and Diversity (LS4)**
PERFORMANCE DESCRIPTOR / STANDARD	B-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STANDARD / COURSE		**Physics (PS)**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Waves and Their Applications in Technologies for Information Transfer (PS4)**
PERFORMANCE DESCRIPTOR / STANDARD	P-PS4-2.	Design, evaluate, and refine a solution for improving how digital devices store and transmit information.
STANDARD / COURSE		**Earth and Space Science (ESS)**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Earth's Systems (ESS2)**
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS2-4.	Use a model to describe how causes of short and long-term variations in the flow of energy into and out of Earth's systems result in changes to climate.
STANDARD / COURSE		**Earth and Space Science (ESS)**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**Earth and Human Activity (ESS3)**

PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources and occurrence of natural hazards have influenced human activity.
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-2.	Evaluate competing design solutions that address the impacts of developing, managing, and using Earth's energy and mineral resources.
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-3.	Use computational representation to illustrate the relationships among the management of Earth's resources, the sustainability of human populations, and biodiversity.
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
PERFORMANCE DESCRIPTOR / STANDARD	E-ESS3-7.	Create an argument, based on evidence that describes how changes in climate on Earth have affected human activity.

South Carolina Standards & Learning

Technology Education

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

STANDARD / COURSE		**Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**A computer science literate student can:**
PERFORMANCE DESCRIPTOR / STANDARD	**3**	**Recognize, define, and analyze computational problems.**
GRADE LEVEL EXAMPLE / STAGE	3.a.	Recognize when it is appropriate to solve a problem computationally.
GRADE LEVEL EXAMPLE / STAGE	3.b.	Make sense of computational problems and persevere in solving them.
GRADE LEVEL EXAMPLE / STAGE	3.c.	Relate computational problems to prior knowledge.
GRADE LEVEL EXAMPLE / STAGE	3.d.	Recognize that there may be multiple approaches to solving a problem.
GRADE LEVEL EXAMPLE / STAGE	3.e.	Approach problem solving iteratively, using a cyclical process.
STANDARD / COURSE		**Process Standards**

KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**A computer science literate student can:**
PERFORMANCE DESCRIPTOR / STANDARD	**4**	**Create, test, and refine computational artifacts.**
GRADE LEVEL EXAMPLE / STAGE	4.b.	Recognize when to use the same solution for multiple problems.
GRADE LEVEL EXAMPLE / STAGE	4.c.	Test computational artifacts systematically by considering multiple scenarios and using test cases.
STANDARD / COURSE		**Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**A computer science literate student can:**
PERFORMANCE DESCRIPTOR / STANDARD	**5**	**Communicate about computing.**
GRADE LEVEL EXAMPLE / STAGE	5.a.	Select and use appropriate technological tools to convey solutions to computing problems.
STANDARD / COURSE		**Computing Systems**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 1:**	**Examine how hardware and software contribute to computing devices solving relevant problems.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 2**
GRADE LEVEL EXAMPLE / STAGE	HS2.CS.1.1.	Investigate how a problem is systematically solved through the selection and integration of hardware and software components.
STANDARD / COURSE		**Computing Systems**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 1:**	**Examine how hardware and software contribute to computing devices solving relevant problems.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 4**
GRADE LEVEL EXAMPLE / STAGE	HS4.CS.1.1.	Develop a solution to a given problem using appropriate hardware and software (e.g., sensor devices, Wi-Fi capabilities, specialized displays, runtime modules, operating systems, application programming interfaces (APIs)).

STANDARD / COURSE		**Data and Analysis**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 3:**	**Create various ways to visually represent data.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 3**
GRADE LEVEL EXAMPLE / STAGE	HS3.DA.3.2.	Evaluate possible computational models for data visualizations that aid in solving a variety of problems.

STANDARD / COURSE		**Algorithms and Programming**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 1:**	**Design algorithms that can be adapted to express an idea or solve a problem.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 1**
GRADE LEVEL EXAMPLE / STAGE	HS1.AP.1.1.	Create flowcharts and/or pseudocode to express a problem or idea as an algorithm.

STANDARD / COURSE		**Algorithms and Programming**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 1:**	**Design algorithms that can be adapted to express an idea or solve a problem.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 2**
GRADE LEVEL EXAMPLE / STAGE	HS2.AP.1.1.	Create algorithms to solve computational problems that have an application in the real world (e.g., local community, church, civic organization, school, home life).

STANDARD / COURSE		**Algorithms and Programming**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 4:**	**Plan, build, test, refine, and document programs using text-based coding languages to solve problems with varying degrees of difficulty.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 3**
GRADE LEVEL EXAMPLE / STAGE	HS3.AP.4.4.	Develop a systematic solution that incorporates licensed resources.

STANDARD / COURSE		**Algorithms and Programming**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 4:**	**Plan, build, test, refine, and document programs using text-based coding languages to solve problems with varying degrees of difficulty.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 4**
GRADE LEVEL EXAMPLE / STAGE	HS4.AP.4.2.	Implement version control to track program refinements.

STANDARD / COURSE		**Impact of Computing**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 3:**	**Understand the importance of access and equity in computing.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 1**
GRADE LEVEL EXAMPLE / STAGE	HS1.IC.3.3.	Identify the advantages and disadvantages of diverse perspectives and backgrounds when solving computational problems.

South Carolina Standards & Learning

Technology Education

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

STANDARD / COURSE		**Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**A computer science literate student can:**
PERFORMANCE DESCRIPTOR / STANDARD	**3**	**Recognize, define, and analyze computational problems.**
GRADE LEVEL EXAMPLE / STAGE	3.a.	Recognize when it is appropriate to solve a problem computationally.
GRADE LEVEL EXAMPLE / STAGE	3.b.	Make sense of computational problems and persevere in solving them.
GRADE LEVEL EXAMPLE / STAGE	3.c.	Relate computational problems to prior knowledge.

GRADE LEVEL EXAMPLE / STAGE	3.d.	Recognize that there may be multiple approaches to solving a problem.
GRADE LEVEL EXAMPLE / STAGE	3.e.	Approach problem solving iteratively, using a cyclical process.
STANDARD / COURSE		**Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**A computer science literate student can:**
PERFORMANCE DESCRIPTOR / STANDARD	**4**	**Create, test, and refine computational artifacts.**
GRADE LEVEL EXAMPLE / STAGE	4.b.	Recognize when to use the same solution for multiple problems.
GRADE LEVEL EXAMPLE / STAGE	4.c.	Test computational artifacts systematically by considering multiple scenarios and using test cases.
STANDARD / COURSE		**Process Standards**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION		**A computer science literate student can:**
PERFORMANCE DESCRIPTOR / STANDARD	**5**	**Communicate about computing.**
GRADE LEVEL EXAMPLE / STAGE	5.a.	Select and use appropriate technological tools to convey solutions to computing problems.
STANDARD / COURSE		**Computing Systems**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 1:**	**Examine how hardware and software contribute to computing devices solving relevant problems.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 2**
GRADE LEVEL EXAMPLE / STAGE	HS2.CS.1.1.	Investigate how a problem is systematically solved through the selection and integration of hardware and software components.
STANDARD / COURSE		**Computing Systems**

KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 1:**	**Examine how hardware and software contribute to computing devices solving relevant problems.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 4**
GRADE LEVEL EXAMPLE / STAGE	HS4.CS.1.1.	Develop a solution to a given problem using appropriate hardware and software (e.g., sensor devices, Wi-Fi capabilities, specialized displays, runtime modules, operating systems, application programming interfaces (APIs)).

STANDARD / COURSE		**Data and Analysis**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 3:**	**Create various ways to visually represent data.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 3**
GRADE LEVEL EXAMPLE / STAGE	HS3.DA.3.2.	Evaluate possible computational models for data visualizations that aid in solving a variety of problems.

STANDARD / COURSE		**Algorithms and Programming**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 1:**	**Design algorithms that can be adapted to express an idea or solve a problem.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 1**
GRADE LEVEL EXAMPLE / STAGE	HS1.AP.1.1.	Create flowcharts and/or pseudocode to express a problem or idea as an algorithm.

STANDARD / COURSE		**Algorithms and Programming**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 1:**	**Design algorithms that can be adapted to express an idea or solve a problem.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 2**
GRADE LEVEL EXAMPLE / STAGE	HS2.AP.1.1.	Create algorithms to solve computational problems that have an application in the real world (e.g., local community, church, civic organization, school, home life).

STANDARD / COURSE		**Algorithms and Programming**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 4:**	**Plan, build, test, refine, and document programs using text-based coding languages to solve problems with varying degrees of difficulty.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 3**
GRADE LEVEL EXAMPLE / STAGE	HS3.AP.4.4.	Develop a systematic solution that incorporates licensed resources.

STANDARD / COURSE		**Algorithms and Programming**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 4:**	**Plan, build, test, refine, and document programs using text-based coding languages to solve problems with varying degrees of difficulty.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 4**
GRADE LEVEL EXAMPLE / STAGE	HS4.AP.4.2.	Implement version control to track program refinements.

STANDARD / COURSE		**Impact of Computing**
KNOWLEDGE AND SKILLS / ESSENTIAL QUESTION	**Standard 3:**	**Understand the importance of access and equity in computing.**
PERFORMANCE DESCRIPTOR / STANDARD		**Level 1**
GRADE LEVEL EXAMPLE / STAGE	HS1.IC.3.3.	Identify the advantages and disadvantages of diverse perspectives and backgrounds when solving computational problems.

South Dakota Content Standards

Mathematics

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

GOAL/STRAND		**Standards for Mathematical Practice**
INDICATOR/BENCHMARK	1	Make sense of problems and persevere in solving them.
INDICATOR/BENCHMARK	2	Reason abstractly and quantitatively.

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

South Dakota Content Standards

Mathematics

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

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

South Dakota Content Standards

Science

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

GOAL/STRAND	SD.9-12.PSS.	High School Physical Science Standards
INDICATOR/BENCHMARK	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information. (SEP: 1; DCI: PS4.A; CCC: Stability/Change, Technology)
GOAL/STRAND	**SD.9-12.LSS.**	**High School Life Science Standards**

INDICATOR/BENCHMARK	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. (SEP: 5; DCI: LS2.A, LS2.C; CCC: Scale/Prop.)
INDICATOR/BENCHMARK	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. (SEP: 5; DCI: LS2.B; CCC: Energy/Matter)
INDICATOR/BENCHMARK	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. (SEP: 2; DCI: LS2.B, PS3.D; CCC: Systems)
INDICATOR/BENCHMARK	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. (SEP: 6; DCI: LS2.C, LS4.D, ETS1.B; CCC: Stability/Change)
INDICATOR/BENCHMARK	HS-LS4-6.	Use a simulation to research and analyze possible solutions for the adverse impacts of human activity on biodiversity. (SEP: 5; DCI: LS4.C, LS4.D, ETS1.B; CCC: Cause/Effect)
GOAL/STRAND	**SD.9-12.ESS.**	**High School Earth and Space Science Standards**
INDICATOR/BENCHMARK	HS-ESS2-3.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. (SEP: 2; DCI: ESS2.A, ESS2.B, PS4.A; CCC: Energy/Matter, Technology)
INDICATOR/BENCHMARK	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. (SEP: 6; DCI: ESS3.A, ESS3.B ; CCC: Cause/Effect, Technology)
INDICATOR/BENCHMARK	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. (SEP: 7; DCI: ESS3.A, ETS1.B; CCC: Technology)
INDICATOR/BENCHMARK	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. (SEP: 5; DCI: ESS3.C; CCC: Stability/Change, Technology)
INDICATOR/BENCHMARK	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. (SEP: 5; DCI: ESS2.D, ESS3.D; CCC: Systems)

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

GOAL/STRAND	**SD.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Key Ideas and Details**
STANDARD	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.
STANDARD	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.
GOAL/STRAND	**SD.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Craft and Structure**
STANDARD	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.

STANDARD	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).
GOAL/STRAND	**SD.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Integration of Knowledge and Ideas**
STANDARD	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.
GOAL/STRAND	**SD.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Range of Reading and Level of Text Complexity**
STANDARD	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.
GOAL/STRAND	**SD.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Text Types and Purposes**
STANDARD	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
SUPPORTING SKILLS	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.
GOAL/STRAND	**SD.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Production and Distribution of Writing**
STANDARD	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
STANDARD	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.

South Dakota Content Standards

Science

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

GOAL/STRAND	**SD.9-12.PSS.**	**High School Physical Science Standards**
INDICATOR/BENCHMARK	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information. (SEP: 1; DCI: PS4.A; CCC: Stability/Change, Technology)
GOAL/STRAND	**SD.9-12.LSS.**	**High School Life Science Standards**
INDICATOR/BENCHMARK	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. (SEP: 5; DCI: LS2.A, LS2.C; CCC: Scale/Prop.)

INDICATOR/BENCHMARK	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. (SEP: 5; DCI: LS2.B; CCC: Energy/Matter)
INDICATOR/BENCHMARK	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. (SEP: 2; DCI: LS2.B, PS3.D; CCC: Systems)
INDICATOR/BENCHMARK	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. (SEP: 6; DCI: LS2.C, LS4.D, ETS1.B; CCC: Stability/Change)
INDICATOR/BENCHMARK	HS-LS4-6.	Use a simulation to research and analyze possible solutions for the adverse impacts of human activity on biodiversity. (SEP: 5; DCI: LS4.C, LS4.D, ETS1.B; CCC: Cause/Effect)
GOAL/STRAND	**SD.9-12.ESS.**	**High School Earth and Space Science Standards**
INDICATOR/BENCHMARK	HS-ESS2-3.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. (SEP: 2; DCI: ESS2.A, ESS2.B, PS4.A; CCC: Energy/Matter, Technology)
INDICATOR/BENCHMARK	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. (SEP: 6; DCI: ESS3.A, ESS3.B ; CCC: Cause/Effect, Technology)
INDICATOR/BENCHMARK	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. (SEP: 7; DCI: ESS3.A, ETS1.B; CCC: Technology)
INDICATOR/BENCHMARK	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. (SEP: 5; DCI: ESS3.C; CCC: Stability/Change, Technology)
INDICATOR/BENCHMARK	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. (SEP: 5; DCI: ESS2.D, ESS3.D; CCC: Systems)

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

GOAL/STRAND	**SD.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Key Ideas and Details**
STANDARD	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.
STANDARD	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.
GOAL/STRAND	**SD.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Craft and Structure**
STANDARD	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.
STANDARD	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).

GOAL/STRAND	**SD.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Integration of Knowledge and Ideas**
STANDARD	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.

GOAL/STRAND	**SD.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Range of Reading and Level of Text Complexity**
STANDARD	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.

GOAL/STRAND	**SD.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Text Types and Purposes**
STANDARD	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
SUPPORTING SKILLS	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.

GOAL/STRAND	**SD.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
INDICATOR/BENCHMARK		**Production and Distribution of Writing**
STANDARD	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
STANDARD	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.

South Dakota Content Standards

Technology Education

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

GOAL/STRAND	**SD.ET.**	**Educational Technology**
INDICATOR/BENCHMARK	**ET.CT.**	**9-12 Grade Critical Thinking, Problem Solving, and Decision Making**
STANDARD	**ET.CT.2.**	**Students demonstrate the design process through problem solving.**
SUPPORTING SKILLS	9-12.ET.CT.2.1.	Compare and contrast methods for problem-solving and decision-making.
SUPPORTING SKILLS	9-12.ET.CT.2.2.	Formulate a technological solution using data-driven decision making.

South Dakota Content Standards

Technology Education

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

GOAL/STRAND	SD.ET.	Educational Technology
INDICATOR/BENCHMARK	ET.CT.	9-12 Grade Critical Thinking, Problem Solving, and Decision Making
STANDARD	ET.CT.2.	Students demonstrate the design process through problem solving.
SUPPORTING SKILLS	9-12.ET.CT.2.1.	Compare and contrast methods for problem-solving and decision-making.
SUPPORTING SKILLS	9-12.ET.CT.2.2.	Formulate a technological solution using data-driven decision making.

Tennessee Academic Standards

Mathematics

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

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

CONCEPTUAL STRAND / GUIDING QUESTION	8	Look for and express regularity in repeated reasoning.

STRAND / STANDARD / COURSE		**Algebra I | A1**
CONCEPTUAL STRAND / GUIDING QUESTION	**A1.F.IF.**	**Functions – Interpreting Functions (F.IF)**
GUIDING QUESTION / LEARNING EXPECTATION	**A1.F.IF.B.**	**Interpret functions that arise in applications in terms of the context.**
LEARNING EXPECTATION	A1.F.IF.B.6.	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.

STRAND / STANDARD / COURSE		**Algebra I | A1**
CONCEPTUAL STRAND / GUIDING QUESTION	**A1.S.ID.**	**Statistics and Probability – Interpreting Categorical and Quantitative Data (S.ID)**
GUIDING QUESTION / LEARNING EXPECTATION	**A1.S.ID.A.**	**Summarize, represent, and interpret data on a single count or measurement variable.**
LEARNING EXPECTATION	A1.S.ID.A.1.	Use measures of center to solve real-world and mathematical problems.

STRAND / STANDARD / COURSE		**Algebra II | A2**
CONCEPTUAL STRAND / GUIDING QUESTION	**A2.F.IF.**	**Functions – Interpreting Functions (F.IF)**
GUIDING QUESTION / LEARNING EXPECTATION	**A2.F.IF.A.**	**Interpret functions that arise in applications in terms of the context.**
LEARNING EXPECTATION	A2.F.IF.A.2.	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.

STRAND / STANDARD / COURSE		**Integrated Math II | M2**
CONCEPTUAL STRAND / GUIDING QUESTION	**M2.F.IF.**	**Functions – Interpreting Functions (F.IF)**
GUIDING QUESTION / LEARNING EXPECTATION	**M2.F.IF.B.**	**Interpret functions that arise in applications in terms of the context.**

LEARNING EXPECTATION	M2.F.IF.B.5.	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.

STRAND / STANDARD / COURSE		**Integrated Math III | M3**
CONCEPTUAL STRAND / GUIDING QUESTION	**M3.F.IF.**	**Functions – Interpreting Functions (F.IF)**
GUIDING QUESTION / LEARNING EXPECTATION	**M3.F.IF.B.**	**Interpret functions that arise in applications in terms of the context.**
LEARNING EXPECTATION	M3.F.IF.B.4.	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.

STRAND / STANDARD / COURSE		**Integrated Math III | M3**
CONCEPTUAL STRAND / GUIDING QUESTION	**M3.S.ID.**	**Statistics and Probability – Interpreting Categorical and Quantitative Data (S.ID)**
GUIDING QUESTION / LEARNING EXPECTATION	**M3.S.ID.A.**	**Summarize, represent, and interpret data on a single count or measurement variable.**
LEARNING EXPECTATION	M3.S.ID.A.1.	Use measures of center to solve real-world and mathematical problems.

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

STRAND / STANDARD / COURSE		**Calculus | C**
CONCEPTUAL STRAND / GUIDING QUESTION	**C.D.CD.**	**Derivatives – Understand the Concept of the Derivative (D.CD)**
GUIDING QUESTION / LEARNING EXPECTATION	**C.D.CD.B.**	**Understand the derivative at a point.**
LEARNING EXPECTATION	C.D.CD.B.6.	Approximate both the instantaneous rate of change and the average rate of change given a graph or table of values.

Tennessee Academic Standards

Mathematics

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

STRAND / STANDARD / COURSE		**Standards for Mathematical Practice**
CONCEPTUAL STRAND / GUIDING QUESTION	1	Make sense of problems and persevere in solving them.

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

STRAND / STANDARD / COURSE		**Algebra I | A1**
CONCEPTUAL STRAND / GUIDING QUESTION	**A1.F.IF.**	**Functions – Interpreting Functions (F.IF)**
GUIDING QUESTION / LEARNING EXPECTATION	**A1.F.IF.B.**	**Interpret functions that arise in applications in terms of the context.**
LEARNING EXPECTATION	A1.F.IF.B.6.	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.

STRAND / STANDARD / COURSE		**Algebra I | A1**
CONCEPTUAL STRAND / GUIDING QUESTION	**A1.S.ID.**	**Statistics and Probability – Interpreting Categorical and Quantitative Data (S.ID)**
GUIDING QUESTION / LEARNING EXPECTATION	**A1.S.ID.A.**	**Summarize, represent, and interpret data on a single count or measurement variable.**
LEARNING EXPECTATION	A1.S.ID.A.1.	Use measures of center to solve real-world and mathematical problems.

STRAND / STANDARD / COURSE		**Algebra II | A2**
CONCEPTUAL STRAND / GUIDING QUESTION	**A2.F.IF.**	**Functions – Interpreting Functions (F.IF)**
GUIDING QUESTION / LEARNING EXPECTATION	**A2.F.IF.A.**	**Interpret functions that arise in applications in terms of the context.**
LEARNING EXPECTATION	A2.F.IF.A.2.	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.

STRAND / STANDARD / COURSE		**Integrated Math II | M2**
CONCEPTUAL STRAND / GUIDING QUESTION	**M2.F.IF.**	**Functions – Interpreting Functions (F.IF)**
GUIDING QUESTION / LEARNING EXPECTATION	**M2.F.IF.B.**	**Interpret functions that arise in applications in terms of the context.**
LEARNING EXPECTATION	M2.F.IF.B.5.	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.

STRAND / STANDARD / COURSE		**Integrated Math III | M3**
CONCEPTUAL STRAND / GUIDING QUESTION	**M3.F.IF.**	**Functions – Interpreting Functions (F.IF)**
GUIDING QUESTION / LEARNING EXPECTATION	**M3.F.IF.B.**	**Interpret functions that arise in applications in terms of the context.**
LEARNING EXPECTATION	M3.F.IF.B.4.	Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.

STRAND / STANDARD / COURSE		**Integrated Math III | M3**
CONCEPTUAL STRAND / GUIDING QUESTION	**M3.S.ID.**	**Statistics and Probability – Interpreting Categorical and Quantitative Data (S.ID)**
GUIDING QUESTION / LEARNING EXPECTATION	**M3.S.ID.A.**	**Summarize, represent, and interpret data on a single count or measurement variable.**
LEARNING EXPECTATION	M3.S.ID.A.1.	Use measures of center to solve real-world and mathematical problems.

STRAND / STANDARD / COURSE		**Calculus | C**
CONCEPTUAL STRAND / GUIDING QUESTION	**C.D.CD.**	**Derivatives – Understand the Concept of the Derivative (D.CD)**
GUIDING QUESTION / LEARNING EXPECTATION	**C.D.CD.B.**	**Understand the derivative at a point.**
LEARNING EXPECTATION	C.D.CD.B.6.	Approximate both the instantaneous rate of change and the average rate of change given a graph or table of values.

Tennessee Academic Standards

Science

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

STRAND / STANDARD / COURSE	**TN.BIOI.**	**Biology I (BIO1)**
CONCEPTUAL STRAND / GUIDING QUESTION	**BIO1.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**BIO1.LS3**	**Ecosystems: Interactions, Energy, and Dynamics**
LEARNING EXPECTATION	BIO1.LS2.2.	Create a model tracking carbon atoms between inorganic and organic molecules in an ecosystem. Explain human impacts on climate based on this model.

STRAND / STANDARD / COURSE	**TN.BIOI.**	**Biology I (BIO1)**
CONCEPTUAL STRAND / GUIDING QUESTION	**BIO1.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**BIO1.LS4**	**Ecosystems: Interactions, Energy, and Dynamics**
LEARNING EXPECTATION	BIO1.LS2.3.	Analyze through research the cycling of matter in our biosphere and explain how biogeochemical cycles are critical for ecosystem function.

STRAND / STANDARD / COURSE	**TN.BIOI.**	**Biology I (BIO1)**
CONCEPTUAL STRAND / GUIDING QUESTION	**BIO1.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**BIO1.LS4.**	**Biological Change: Unity and Diversity**

LEARNING EXPECTATION	BIO1.LS4.3.	Identify ecosystem services and assess the role of biodiversity in support of these services. Analyze the role human activities have on disruption of these services.

STRAND / STANDARD / COURSE	**TN.BIOII.**	**Biology II (BIO2)**
CONCEPTUAL STRAND / GUIDING QUESTION	**BIO2.ETS.**	**Engineering, Technology, and Applications of Science (ETS)**
GUIDING QUESTION / LEARNING EXPECTATION	**BIO2.ETS2.**	**Links Among Engineering, Technology, Science, and Society**
LEARNING EXPECTATION	BIO2.ETS2.3.	Create a timeline depicting how humans have employed engineering and technology to maximize use of microorganisms, plants, and animals for various purposes. Choose one specific example and construct an argument supporting or opposing the use of engineering or technology in this instance.

STRAND / STANDARD / COURSE	**TN.ESS.**	**Earth and Space Science (ESS)**
CONCEPTUAL STRAND / GUIDING QUESTION	**ESS.ESS.**	**Earth and Space Sciences (ESS)**
GUIDING QUESTION / LEARNING EXPECTATION	**ESS.ESS2.**	**Earth's Systems**
LEARNING EXPECTATION	ESS.ESS2.1.	Given an environmental disaster, analyze its effect upon the geosphere, hydrosphere, atmosphere, and/or biosphere, including sphere-to-sphere interactions. Analysis should conclude with an identification of future research to improve our ability to predict such interactions.
LEARNING EXPECTATION	ESS.ESS2.10.	Construct a model which shows the interactions between processes of the hydrologic cycle and the greenhouse effect.
LEARNING EXPECTATION	ESS.ESS2.11.	Obtain, evaluate, and communicate information about human or natural threats to Tennessee.
LEARNING EXPECTATION	ESS.ESS2.16.	Design a mathematical model of Earth's energy budget showing how the electromagnetic radiation from the sun in watts/ m2 is reflected, absorbed, stored, redistributed among the atmosphere, ocean, and land systems, and reradiated back into space. The model should provide a means to predict how changes in greenhouse gases could affect Earth's temperatures.
LEARNING EXPECTATION	ESS.ESS2.17.	Analyze the multiple sources of energy that provide power in the state of Tennessee and compare them to each other and to an alternative energy source. The analysis should include their functional components (such as infrastructure cost, on-going costs, safety, and reliability), and their social, cultural, and environmental impacts (including emissions of greenhouse gases).
LEARNING EXPECTATION	ESS.ESS2.18.	Identify the organisms that are major drivers in the global carbon cycle and trace how greenhouse gases are continually moved through the carbon reservoirs and fluxes represented by the ocean, land, life, and atmosphere.

STRAND / STANDARD / COURSE	**TN.ESS.**	**Earth and Space Science (ESS)**

CONCEPTUAL STRAND / GUIDING QUESTION	**ESS.ESS.**	**Earth and Space Sciences (ESS)**
GUIDING QUESTION / LEARNING EXPECTATION	**ESS.ESS3.**	**Earth and Human Activity**
LEARNING EXPECTATION	ESS.ESS3.2.	Obtain, evaluate, and communicate information on how natural resource availability, natural hazard occurrences, and climatic changes impact individuals and society.

STRAND / STANDARD / COURSE	**TN.ECO.**	**Ecology (ECO)**
CONCEPTUAL STRAND / GUIDING QUESTION	**ECO.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**ECO.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
LEARNING EXPECTATION	ECO.LS2.4.	Compare patterns of stratification and zonation in various terrestrial and aquatic ecosystems. Construct an argument regarding the importance of these patterns in ecosystem diversity.
LEARNING EXPECTATION	ECO.LS2.7.	Use models to explain relationships among biogeochemical cycles (water, carbon, nitrogen, phosphorus).
LEARNING EXPECTATION	ECO.LS2.8.	Create a diagram tracing carbon through the processes of photosynthesis and respiration. Use the diagram to construct an explanation for the importance of photosynthesis and respiration in the carbon cycle.
LEARNING EXPECTATION	ECO.LS2.10.	Plan and carry out an investigation measuring species diversity (richness and evenness) and density in a local ecosystem.

STRAND / STANDARD / COURSE	**TN.ECO.**	**Ecology (ECO)**
CONCEPTUAL STRAND / GUIDING QUESTION	**ECO.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**ECO.LS4.**	**Biological Change: Unity and Diversity**
LEARNING EXPECTATION	ECO.LS4.7.	Research and evaluate the effectiveness of strategies for maintenance of biodiversity.

STRAND / STANDARD / COURSE	**TN.ECO.**	**Ecology (ECO)**
CONCEPTUAL STRAND / GUIDING QUESTION	**ECO.ESS.**	**Earth and Space Sciences (ESS)**

GUIDING QUESTION / LEARNING EXPECTATION	**ECO.ESS3.**	**Earth and Human Activity**
LEARNING EXPECTATION	ECO.ESS3.2.	Construct an argument in support of protection of native species. Develop responses to anticipated counterarguments.
LEARNING EXPECTATION	ECO.ESS3.3.	Engage in argument from evidence regarding the impacts of human activity on climate change. Design solutions to address these impacts.
STRAND / STANDARD / COURSE	**TN.EVSC.**	**Environmental Science (EVSC)**
CONCEPTUAL STRAND / GUIDING QUESTION	**EVSC.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**EVSC.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
LEARNING EXPECTATION	EVSC.LS2.4.	Compare and contrast production (photosynthesis, chemosynthesis) and respiratory (aerobic respiration, anaerobic respiration, consumption, decomposition) processes responsible for the cycling of matter and flow of energy through an ecosystem. Using evidence, construct an argument regarding the importance of homeostasis in maintaining these processes in ecosystems.
LEARNING EXPECTATION	EVSC.LS2.6.	Evaluate the interdependence among major biogeochemical cycles (water, carbon, nitrogen, phosphorus) in an ecosystem and recognize the importance each cycle has in maintaining ecosystem stability.
STRAND / STANDARD / COURSE	**TN.EVSC.**	**Environmental Science (EVSC)**
CONCEPTUAL STRAND / GUIDING QUESTION	**EVSC.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**EVSC.LS4.**	**Biological Change: Unity and Diversity**
LEARNING EXPECTATION	EVSC.LS4.2.	Justify claims with scientific evidence that changes in environmental conditions lead to speciation and extinction.
LEARNING EXPECTATION	EVSC.LS4.3.	Evaluate the impact of habitat fragmentation and destruction, invasive species, overharvesting, pollution, and climate change on biodiversity (genetic, species, and ecosystem).
STRAND / STANDARD / COURSE	**TN.EVSC.**	**Environmental Science (EVSC)**
CONCEPTUAL STRAND / GUIDING QUESTION	**EVSC.ESS.**	**Earth and Space Sciences (ESS)**
GUIDING QUESTION / LEARNING EXPECTATION	**EVSC.ESS3.**	**Earth and Human Activity**

LEARNING EXPECTATION	EVSC.ESS3.1.	Research Earth's natural resources (renewable and nonrenewable resources). Construct an argument from evidence supporting the claim that a particular type of resource is important for humans.
LEARNING EXPECTATION	EVSC.ESS3.4.	Gather, organize, analyze, and present data on current land use trends by humans. Based on analysis, predict future trends.
LEARNING EXPECTATION	EVSC.ESS3.5.	Plan and carry out an investigation examining best management practices in water usage, agriculture, forestry, urban/suburban development, mining, or fishing and communicate findings.
LEARNING EXPECTATION	EVSC.ESS3.9.	Evaluate ecosystem services provided by forests ecosystems. Construct an explanation for human impact on these services.
LEARNING EXPECTATION	EVSC.ESS3.10.	Using scientific data, analyze effectiveness of conservation versus preservation efforts. Obtain and communicate information on organizations involved in protecting natural resources.
LEARNING EXPECTATION	EVSC.ESS3.13.	Analyze and interpret data on the effects of land, water, and air pollution on the environment and on human health. Propose solutions for minimizing pollution from specific sources.
LEARNING EXPECTATION	EVSC.ESS3.17.	Using mathematics and computational thinking, analyze data linking human activity to climate change. Design solutions to address human impacts on climate change.
STRAND / STANDARD / COURSE	**TN.EVSC.**	**Environmental Science (EVSC)**
CONCEPTUAL STRAND / GUIDING QUESTION	**EVSC.ETS.**	**Engineering, Technology, and Applications of Science (ETS)**
GUIDING QUESTION / LEARNING EXPECTATION	**EVSC.ETS3.**	**Applications of Science**
LEARNING EXPECTATION	EVSC.ETS3.1.	Plan and carry out an investigation of a local ecosystem to assess human impacts. Based on your findings, design and evaluate a solution to minimize impacts.
STRAND / STANDARD / COURSE	**TN.GEO.**	**Geology (GEO)**
CONCEPTUAL STRAND / GUIDING QUESTION	**GEO.ESS.**	**Earth and Space Sciences (ESS)**
GUIDING QUESTION / LEARNING EXPECTATION	**GEO.ESS2.**	**Earth's Systems**
LEARNING EXPECTATION	GEO.ESS2.9.	Develop a model that combines the rock cycle and the carbon cycle, which explains what leads up to and follows a major volcanic eruption and its effect on carbon storage and fluxes.
STRAND / STANDARD / COURSE	**TN.SCRE.**	**Scientific Research (SCRE)**
CONCEPTUAL STRAND / GUIDING QUESTION	**SCRE.ETS.**	**Engineering, Technology, and Applications of Science (ETS)**

GUIDING QUESTION / LEARNING EXPECTATION	**SCRE.ETS2.**	**Links Among Engineering, Technology, Science, and Society**
LEARNING EXPECTATION	SCRE.ETS2.1.	Explore the impact of technology on social, political, or economic systems.
LEARNING EXPECTATION	SCRE.ETS2.2.	Describe the dynamic interplay among engineering, technology, and applied science.
LEARNING EXPECTATION	SCRE.ETS2.3.	Identify the most appropriate scientific instruments and/or computer programs for different experiments and research, and learn to use, care for, and maintain them, gather data, and analyze results.
LEARNING EXPECTATION	SCRE.ETS2.4.	Engage in evidence-based arguments through the scientific method of investigation to understand the effective role that scientific discoveries played in the progression of humankind.

Tennessee Academic Standards

Science

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

STRAND / STANDARD / COURSE	**TN.BIOI.**	**Biology I (BIO1)**
CONCEPTUAL STRAND / GUIDING QUESTION	**BIO1.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**BIO1.LS3**	**Ecosystems: Interactions, Energy, and Dynamics**
LEARNING EXPECTATION	BIO1.LS2.2.	Create a model tracking carbon atoms between inorganic and organic molecules in an ecosystem. Explain human impacts on climate based on this model.

STRAND / STANDARD / COURSE	**TN.BIOI.**	**Biology I (BIO1)**
CONCEPTUAL STRAND / GUIDING QUESTION	**BIO1.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**BIO1.LS4**	**Ecosystems: Interactions, Energy, and Dynamics**
LEARNING EXPECTATION	BIO1.LS2.3.	Analyze through research the cycling of matter in our biosphere and explain how biogeochemical cycles are critical for ecosystem function.

STRAND / STANDARD / COURSE	**TN.BIOI.**	**Biology I (BIO1)**
CONCEPTUAL STRAND / GUIDING QUESTION	**BIO1.LS.**	**Life Sciences (LS)**

GUIDING QUESTION / LEARNING EXPECTATION	**BIO1.LS4.**	**Biological Change: Unity and Diversity**
LEARNING EXPECTATION	BIO1.LS4.3.	Identify ecosystem services and assess the role of biodiversity in support of these services. Analyze the role human activities have on disruption of these services.
STRAND / STANDARD / COURSE	**TN.BIOII.**	**Biology II (BIO2)**
CONCEPTUAL STRAND / GUIDING QUESTION	**BIO2.ETS.**	**Engineering, Technology, and Applications of Science (ETS)**
GUIDING QUESTION / LEARNING EXPECTATION	**BIO2.ETS2.**	**Links Among Engineering, Technology, Science, and Society**
LEARNING EXPECTATION	BIO2.ETS2.3.	Create a timeline depicting how humans have employed engineering and technology to maximize use of microorganisms, plants, and animals for various purposes. Choose one specific example and construct an argument supporting or opposing the use of engineering or technology in this instance.
STRAND / STANDARD / COURSE	**TN.ESS.**	**Earth and Space Science (ESS)**
CONCEPTUAL STRAND / GUIDING QUESTION	**ESS.ESS.**	**Earth and Space Sciences (ESS)**
GUIDING QUESTION / LEARNING EXPECTATION	**ESS.ESS2.**	**Earth's Systems**
LEARNING EXPECTATION	ESS.ESS2.1.	Given an environmental disaster, analyze its effect upon the geosphere, hydrosphere, atmosphere, and/or biosphere, including sphere-to-sphere interactions. Analysis should conclude with an identification of future research to improve our ability to predict such interactions.
LEARNING EXPECTATION	ESS.ESS2.10.	Construct a model which shows the interactions between processes of the hydrologic cycle and the greenhouse effect.
LEARNING EXPECTATION	ESS.ESS2.11.	Obtain, evaluate, and communicate information about human or natural threats to Tennessee.
LEARNING EXPECTATION	ESS.ESS2.16.	Design a mathematical model of Earth's energy budget showing how the electromagnetic radiation from the sun in watts/ m2 is reflected, absorbed, stored, redistributed among the atmosphere, ocean, and land systems, and reradiated back into space. The model should provide a means to predict how changes in greenhouse gases could affect Earth's temperatures.
LEARNING EXPECTATION	ESS.ESS2.17.	Analyze the multiple sources of energy that provide power in the state of Tennessee and compare them to each other and to an alternative energy source. The analysis should include their functional components (such as infrastructure cost, on-going costs, safety, and reliability), and their social, cultural, and environmental impacts (including emissions of greenhouse gases).
LEARNING EXPECTATION	ESS.ESS2.18.	Identify the organisms that are major drivers in the global carbon cycle and trace how greenhouse gases are continually moved through the carbon reservoirs and fluxes represented by the ocean, land, life, and atmosphere.

STRAND / STANDARD / COURSE	**TN.ESS.**	**Earth and Space Science (ESS)**
CONCEPTUAL STRAND / GUIDING QUESTION	**ESS.ESS.**	**Earth and Space Sciences (ESS)**
GUIDING QUESTION / LEARNING EXPECTATION	**ESS.ESS3.**	**Earth and Human Activity**
LEARNING EXPECTATION	ESS.ESS3.2.	Obtain, evaluate, and communicate information on how natural resource availability, natural hazard occurrences, and climatic changes impact individuals and society.

STRAND / STANDARD / COURSE	**TN.ECO.**	**Ecology (ECO)**
CONCEPTUAL STRAND / GUIDING QUESTION	**ECO.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**ECO.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
LEARNING EXPECTATION	ECO.LS2.4.	Compare patterns of stratification and zonation in various terrestrial and aquatic ecosystems. Construct an argument regarding the importance of these patterns in ecosystem diversity.
LEARNING EXPECTATION	ECO.LS2.7.	Use models to explain relationships among biogeochemical cycles (water, carbon, nitrogen, phosphorus).
LEARNING EXPECTATION	ECO.LS2.8.	Create a diagram tracing carbon through the processes of photosynthesis and respiration. Use the diagram to construct an explanation for the importance of photosynthesis and respiration in the carbon cycle.
LEARNING EXPECTATION	ECO.LS2.10.	Plan and carry out an investigation measuring species diversity (richness and evenness) and density in a local ecosystem.

STRAND / STANDARD / COURSE	**TN.ECO.**	**Ecology (ECO)**
CONCEPTUAL STRAND / GUIDING QUESTION	**ECO.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**ECO.LS4.**	**Biological Change: Unity and Diversity**
LEARNING EXPECTATION	ECO.LS4.7.	Research and evaluate the effectiveness of strategies for maintenance of biodiversity.

STRAND / STANDARD / COURSE	**TN.ECO.**	**Ecology (ECO)**

CONCEPTUAL STRAND / GUIDING QUESTION	**ECO.ESS.**	**Earth and Space Sciences (ESS)**
GUIDING QUESTION / LEARNING EXPECTATION	**ECO.ESS3.**	**Earth and Human Activity**
LEARNING EXPECTATION	ECO.ESS3.2.	Construct an argument in support of protection of native species. Develop responses to anticipated counterarguments.
LEARNING EXPECTATION	ECO.ESS3.3.	Engage in argument from evidence regarding the impacts of human activity on climate change. Design solutions to address these impacts.
STRAND / STANDARD / COURSE	**TN.EVSC.**	**Environmental Science (EVSC)**
CONCEPTUAL STRAND / GUIDING QUESTION	**EVSC.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**EVSC.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
LEARNING EXPECTATION	EVSC.LS2.4.	Compare and contrast production (photosynthesis, chemosynthesis) and respiratory (aerobic respiration, anaerobic respiration, consumption, decomposition) processes responsible for the cycling of matter and flow of energy through an ecosystem. Using evidence, construct an argument regarding the importance of homeostasis in maintaining these processes in ecosystems.
LEARNING EXPECTATION	EVSC.LS2.6.	Evaluate the interdependence among major biogeochemical cycles (water, carbon, nitrogen, phosphorus) in an ecosystem and recognize the importance each cycle has in maintaining ecosystem stability.
STRAND / STANDARD / COURSE	**TN.EVSC.**	**Environmental Science (EVSC)**
CONCEPTUAL STRAND / GUIDING QUESTION	**EVSC.LS.**	**Life Sciences (LS)**
GUIDING QUESTION / LEARNING EXPECTATION	**EVSC.LS4.**	**Biological Change: Unity and Diversity**
LEARNING EXPECTATION	EVSC.LS4.2.	Justify claims with scientific evidence that changes in environmental conditions lead to speciation and extinction.
LEARNING EXPECTATION	EVSC.LS4.3.	Evaluate the impact of habitat fragmentation and destruction, invasive species, overharvesting, pollution, and climate change on biodiversity (genetic, species, and ecosystem).
STRAND / STANDARD / COURSE	**TN.EVSC.**	**Environmental Science (EVSC)**
CONCEPTUAL STRAND / GUIDING QUESTION	**EVSC.ESS.**	**Earth and Space Sciences (ESS)**

GUIDING QUESTION / LEARNING EXPECTATION	**EVSC.ESS3.**	**Earth and Human Activity**
LEARNING EXPECTATION	EVSC.ESS3.1.	Research Earth's natural resources (renewable and nonrenewable resources). Construct an argument from evidence supporting the claim that a particular type of resource is important for humans.
LEARNING EXPECTATION	EVSC.ESS3.4.	Gather, organize, analyze, and present data on current land use trends by humans. Based on analysis, predict future trends.
LEARNING EXPECTATION	EVSC.ESS3.5.	Plan and carry out an investigation examining best management practices in water usage, agriculture, forestry, urban/suburban development, mining, or fishing and communicate findings.
LEARNING EXPECTATION	EVSC.ESS3.9.	Evaluate ecosystem services provided by forests ecosystems. Construct an explanation for human impact on these services.
LEARNING EXPECTATION	EVSC.ESS3.10.	Using scientific data, analyze effectiveness of conservation versus preservation efforts. Obtain and communicate information on organizations involved in protecting natural resources.
LEARNING EXPECTATION	EVSC.ESS3.13.	Analyze and interpret data on the effects of land, water, and air pollution on the environment and on human health. Propose solutions for minimizing pollution from specific sources.
LEARNING EXPECTATION	EVSC.ESS3.17.	Using mathematics and computational thinking, analyze data linking human activity to climate change. Design solutions to address human impacts on climate change.
STRAND / STANDARD / COURSE	**TN.EVSC.**	**Environmental Science (EVSC)**
CONCEPTUAL STRAND / GUIDING QUESTION	**EVSC.ETS.**	**Engineering, Technology, and Applications of Science (ETS)**
GUIDING QUESTION / LEARNING EXPECTATION	**EVSC.ETS3.**	**Applications of Science**
LEARNING EXPECTATION	EVSC.ETS3.1.	Plan and carry out an investigation of a local ecosystem to assess human impacts. Based on your findings, design and evaluate a solution to minimize impacts.
STRAND / STANDARD / COURSE	**TN.GEO.**	**Geology (GEO)**
CONCEPTUAL STRAND / GUIDING QUESTION	**GEO.ESS.**	**Earth and Space Sciences (ESS)**
GUIDING QUESTION / LEARNING EXPECTATION	**GEO.ESS2.**	**Earth's Systems**
LEARNING EXPECTATION	GEO.ESS2.9.	Develop a model that combines the rock cycle and the carbon cycle, which explains what leads up to and follows a major volcanic eruption and its effect on carbon storage and fluxes.
STRAND / STANDARD / COURSE	**TN.SCRE.**	**Scientific Research (SCRE)**

CONCEPTUAL STRAND / GUIDING QUESTION	**SCRE.ETS.**	**Engineering, Technology, and Applications of Science (ETS)**
GUIDING QUESTION / LEARNING EXPECTATION	**SCRE.ETS2.**	**Links Among Engineering, Technology, Science, and Society**
LEARNING EXPECTATION	SCRE.ETS2.1.	Explore the impact of technology on social, political, or economic systems.
LEARNING EXPECTATION	SCRE.ETS2.2.	Describe the dynamic interplay among engineering, technology, and applied science.
LEARNING EXPECTATION	SCRE.ETS2.3.	Identify the most appropriate scientific instruments and/or computer programs for different experiments and research, and learn to use, care for, and maintain them, gather data, and analyze results.
LEARNING EXPECTATION	SCRE.ETS2.4.	Engage in evidence-based arguments through the scientific method of investigation to understand the effective role that scientific discoveries played in the progression of humankind.

Tennessee Academic Standards

Technology Education

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

STRAND / STANDARD / COURSE		**Tennessee K-12 Computer Science State Standards**
CONCEPTUAL STRAND / GUIDING QUESTION		**High School: Computer Science Standards**
GUIDING QUESTION / LEARNING EXPECTATION	**CS.AT.**	**Algorithmic Thinking**
LEARNING EXPECTATION	CS.AT.3.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.
LEARNING EXPECTATION	CS.AT.4.	Use effective communication and accurate computer science terminology to explain problem solving when completing a task.

STRAND / STANDARD / COURSE		**Tennessee K-12 Computer Science State Standards**
CONCEPTUAL STRAND / GUIDING QUESTION		**High School: Computer Science Standards**
GUIDING QUESTION / LEARNING EXPECTATION	**CS.PC.**	**Programming Concepts**
LEARNING EXPECTATION	CS.PC.2.	Develop a plan to manage and assign data values of different types (strings, numeric, character, integer, and date) to a variable

Tennessee Academic Standards

Technology Education

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

STRAND / STANDARD / COURSE		**Tennessee K-12 Computer Science State Standards**
CONCEPTUAL STRAND / GUIDING QUESTION		**High School: Computer Science Standards**
GUIDING QUESTION / LEARNING EXPECTATION	**CS.AT.**	**Algorithmic Thinking**
LEARNING EXPECTATION	CS.AT.3.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.
LEARNING EXPECTATION	CS.AT.4.	Use effective communication and accurate computer science terminology to explain problem solving when completing a task.

STRAND / STANDARD / COURSE		**Tennessee K-12 Computer Science State Standards**
CONCEPTUAL STRAND / GUIDING QUESTION		**High School: Computer Science Standards**
GUIDING QUESTION / LEARNING EXPECTATION	**CS.PC.**	**Programming Concepts**
LEARNING EXPECTATION	CS.PC.2.	Develop a plan to manage and assign data values of different types (strings, numeric, character, integer, and date) to a variable

Texas Essential Knowledge and Skills (TEKS)

Mathematics

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

TEKS	**111.39.**	**Algebra I, Adopted 2012 (One Credit).**
STUDENT EXPECTATION	**111.39.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.39.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.39.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.39.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

TEKS	**111.39.**	**Algebra I, Adopted 2012 (One Credit).**

STUDENT EXPECTATION	**111.39.c.3.**	**Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:**
GRADE LEVEL EXPECTATION	111.39.c.3.B.	Calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.
TEKS	**111.40.**	**Algebra II, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.40.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.40.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.40.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.40.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.
TEKS	**111.41.**	**Geometry, Adopted 2012 (One Credit).**
STUDENT EXPECTATION	**111.41.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.41.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.41.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.41.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.
TEKS	**111.42.**	**Precalculus, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.42.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.42.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.42.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.42.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.
TEKS	**111.43.**	**Mathematical Models with Applications, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.43.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**

GRADE LEVEL EXPECTATION	111.43.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.43.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.43.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.
TEKS	**111.43.**	**Mathematical Models with Applications, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.43.c.9.**	**Mathematical modeling in social sciences. The student applies mathematical processes and mathematical models to analyze data as it applies to social sciences. The student is expected to:**
GRADE LEVEL EXPECTATION	111.43.c.9.B.	Analyze numerical data using measures of central tendency (mean, median, and mode)and variability (range, interquartile range or IQR, and standard deviation) in order to make inferences with normal distributions.
TEKS	**111.44.**	**Advanced Quantitative Reasoning, Adopted 2012 (One-Half to One Credit)**
STUDENT EXPECTATION	**111.44.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.44.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.44.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.44.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.
TEKS	**111.45.**	**Independent Study in Mathematics, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.45.c.**	**Knowledge and Skills: Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.45.c.2.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.45.c.3.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.45.c.6	Analyze mathematical relationships to connect and communicate mathematical ideas.

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

TEKS	**111.46.**	**Discrete Mathematics for Problem Solving, Adopted 2013 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.46.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.46.c.1.A.	Apply mathematics to problems arising in everyday life, society, and the workplace.

GRADE LEVEL EXPECTATION	111.46.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.46.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.46.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

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

TEKS	**111.47.**	**Statistics, Adopted 2015 (One Credit)**
STUDENT EXPECTATION	**111.47.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.47.c.1.A.	Apply mathematics to problems arising in everyday life, society, and the workplace.
GRADE LEVEL EXPECTATION	111.47.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.47.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.47.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

TEKS	**111.48.**	**Algebraic Reasoning, Adopted 2015 (One Credit).**
STUDENT EXPECTATION	**111.48.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.48.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.48.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.48.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

Texas Essential Knowledge and Skills (TEKS)

Mathematics

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

TEKS	**111.39.**	**Algebra I, Adopted 2012 (One Credit).**
STUDENT EXPECTATION	**111.39.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.39.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.

GRADE LEVEL EXPECTATION	111.39.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.39.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.
TEKS	**111.39.**	**Algebra I, Adopted 2012 (One Credit).**
STUDENT EXPECTATION	**111.39.c.3.**	**Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:**
GRADE LEVEL EXPECTATION	111.39.c.3.B.	Calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems.
TEKS	**111.40.**	**Algebra II, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.40.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.40.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.40.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.40.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.
TEKS	**111.41.**	**Geometry, Adopted 2012 (One Credit).**
STUDENT EXPECTATION	**111.41.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.41.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.41.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.41.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.
TEKS	**111.42.**	**Precalculus, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.42.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.42.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.42.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.

GRADE LEVEL EXPECTATION	111.42.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

TEKS	**111.43.**	**Mathematical Models with Applications, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.43.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.43.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.43.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.43.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

TEKS	**111.43.**	**Mathematical Models with Applications, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.43.c.9.**	**Mathematical modeling in social sciences. The student applies mathematical processes and mathematical models to analyze data as it applies to social sciences. The student is expected to:**
GRADE LEVEL EXPECTATION	111.43.c.9.B.	Analyze numerical data using measures of central tendency (mean, median, and mode)and variability (range, interquartile range or IQR, and standard deviation) in order to make inferences with normal distributions.

TEKS	**111.44.**	**Advanced Quantitative Reasoning, Adopted 2012 (One-Half to One Credit)**
STUDENT EXPECTATION	**111.44.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.44.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.44.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.44.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

TEKS	**111.45.**	**Independent Study in Mathematics, Adopted 2012 (One-Half to One Credit).**
STUDENT EXPECTATION	**111.45.c.**	**Knowledge and Skills: Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.45.c.2.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.45.c.3.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.45.c.6	Analyze mathematical relationships to connect and communicate mathematical ideas.

TEKS	111.46.	Discrete Mathematics for Problem Solving, Adopted 2013 (One-Half to One Credit).
STUDENT EXPECTATION	**111.46.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.46.c.1.A.	Apply mathematics to problems arising in everyday life, society, and the workplace.
GRADE LEVEL EXPECTATION	111.46.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.46.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.46.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

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

TEKS	111.47.	Statistics, Adopted 2015 (One Credit)
STUDENT EXPECTATION	**111.47.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.47.c.1.A.	Apply mathematics to problems arising in everyday life, society, and the workplace.
GRADE LEVEL EXPECTATION	111.47.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.47.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.47.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

TEKS	111.48.	Algebraic Reasoning, Adopted 2015 (One Credit).
STUDENT EXPECTATION	**111.48.c.1.**	**Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:**
GRADE LEVEL EXPECTATION	111.48.c.1.B.	Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
GRADE LEVEL EXPECTATION	111.48.c.1.C.	Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
GRADE LEVEL EXPECTATION	111.48.c.1.F.	Analyze mathematical relationships to connect and communicate mathematical ideas.

Texas Essential Knowledge and Skills (TEKS)

Science

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

TEKS	**§112.34**	**Biology (One Credit), Adopted 2017 – The provisions of §§112.34, 112.35, 112.38, and 112.39 of this subchapter adopted in 2017 shall be implemented by school districts beginning with the 2018-2019 school year.**
STUDENT EXPECTATION	**§112.34.c**	**Knowledge and skills.**
GRADE LEVEL EXPECTATION	**§112.34.c.3**	**Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:**
INDICATOR	§112.34.c.3.D	evaluate the impact of scientific research on society and the environment

TEKS	**§112.34**	**Biology (One Credit), Adopted 2017 – The provisions of §§112.34, 112.35, 112.38, and 112.39 of this subchapter adopted in 2017 shall be implemented by school districts beginning with the 2018-2019 school year.**
STUDENT EXPECTATION	**§112.34.c**	**Knowledge and skills.**
GRADE LEVEL EXPECTATION	**§112.34.c.12**	**Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:**
INDICATOR	§112.34.c.12.D	describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles

Texas Essential Knowledge and Skills (TEKS)

Science

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

TEKS	**§112.34**	**Biology (One Credit), Adopted 2017 – The provisions of §§112.34, 112.35, 112.38, and 112.39 of this subchapter adopted in 2017 shall be implemented by school districts beginning with the 2018-2019 school year.**
STUDENT EXPECTATION	**§112.34.c**	**Knowledge and skills.**
GRADE LEVEL EXPECTATION	**§112.34.c.3**	**Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:**
INDICATOR	§112.34.c.3.D	evaluate the impact of scientific research on society and the environment

TEKS	**§112.34**	**Biology (One Credit), Adopted 2017 – The provisions of §§112.34, 112.35, 112.38, and 112.39 of this subchapter adopted in 2017 shall be implemented by school districts beginning with the 2018-2019 school year.**
STUDENT EXPECTATION	**§112.34.c**	**Knowledge and skills.**
GRADE LEVEL EXPECTATION	**§112.34.c.12**	**Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:**
INDICATOR	§112.34.c.12.D	describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles

TEKS	**§112.32**	**Aquatic Science, Beginning with School Year 2010-2011 (One Credit).**
STUDENT EXPECTATION	**§112.32.c**	**Knowledge and skills.**
GRADE LEVEL EXPECTATION	**§112.32.c.6**	**Science concepts. The student knows the role of cycles in an aquatic environment. The student is expected to:**

INDICATOR	§112.32.c.6.A	identify the role of carbon, nitrogen, water, and nutrient cycles in an aquatic environment, including upwellings and turnovers

Texas Essential Knowledge and Skills (TEKS)

Technology Education

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

TEKS	**§126.32.**	**Fundamentals of Computer Science (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.32.(1)**	**Creativity and innovation. The student develops products and generates new understanding by extending existing knowledge. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.32.(1)(D)	Create algorithms for the solution of various problems.

TEKS	**§126.32.**	**Fundamentals of Computer Science (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.32.(4)**	**Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.32.(4)(D)	Read and define a problem's description, purpose, and goals.

TEKS	**§126.33.**	**Computer Science I (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.33.(2)**	**Communication and collaboration. The student communicates and collaborates with peers to contribute to his or her own learning and the learning of others. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.33.(2)(D)	Write programs with proper programming style to enhance the readability and functionality of the code by using meaningful descriptive identifiers, internal comments, white space, spacing, indentation, and a standardized program style.

TEKS	**§126.33.**	**Computer Science I (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.33.(4)**	**Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.33.(4)(A)	Use program design problem-solving strategies to create program solutions.
GRADE LEVEL EXPECTATION	§126.33.(4)(B)	Define and specify the purpose and goals of solving a problem.
GRADE LEVEL EXPECTATION	§126.33.(4)(C)	Identify the subtasks needed to solve a problem.
GRADE LEVEL EXPECTATION	§126.33.(4)(D)	Identify the data types and objects needed to solve a problem.
GRADE LEVEL EXPECTATION	§126.33.(4)(E)	Identify reusable components from existing code.
GRADE LEVEL EXPECTATION	§126.33.(4)(F)	Design a solution to a problem.
GRADE LEVEL EXPECTATION	§126.33.(4)(G)	Code a solution from a program design.

GRADE LEVEL EXPECTATION	§126.33. (4)(H)	Identify and debug errors.
GRADE LEVEL EXPECTATION	§126.33. (4)(I)	Test program solutions with appropriate valid and invalid test data for correctness.
GRADE LEVEL EXPECTATION	§126.33. (4)(J)	Debug and solve problems using error messages, reference materials, language documentation, and effective strategies.
GRADE LEVEL EXPECTATION	§126.33. (4)(K)	Explore common algorithms, including finding greatest common divisor, finding the biggest number out of three, finding primes, making change, and finding the average.
GRADE LEVEL EXPECTATION	§126.33. (4)(L)	Analyze and modify existing code to improve the underlying algorithm.
GRADE LEVEL EXPECTATION	§126.33. (4)(M)	Create program solutions that exhibit robust behavior by understanding, avoiding, and preventing runtime errors, including division by zero and type mismatch.
GRADE LEVEL EXPECTATION	§126.33. (4)(N)	Select the most appropriate algorithm for a defined problem.
GRADE LEVEL EXPECTATION	§126.33. (4)(O)	Demonstrate proficiency in the use of the arithmetic operators to create mathematical expressions, including addition, subtraction, multiplication, real division, integer division, and modulus division.
GRADE LEVEL EXPECTATION	§126.33. (4)(P)	Create program solutions to problems using available mathematics libraries, including absolute value, round, power, square, and square root.
GRADE LEVEL EXPECTATION	§126.33. (4)(Q)	Develop program solutions that use assignment.
GRADE LEVEL EXPECTATION	§126.33. (4)(R)	Develop sequential algorithms to solve non-branching and non-iterative problems.
GRADE LEVEL EXPECTATION	§126.33. (4)(S)	Develop algorithms to decision-making problems using branching control statements.
GRADE LEVEL EXPECTATION	§126.33. (4)(T)	Develop iterative algorithms and code programs to solve practical problems.
GRADE LEVEL EXPECTATION	§126.33. (4)(U)	Demonstrate proficiency in the use of the relational operators.
GRADE LEVEL EXPECTATION	§126.33. (4)(V)	Demonstrate proficiency in the use of the logical operators.
GRADE LEVEL EXPECTATION	§126.33. (4)(W)	Generate and use random numbers.
TEKS	**§126.34.**	**Computer Science II (One Credit)**
STUDENT EXPECTATION	**§126.34 .(1)**	**Creativity and innovation. The student develops products and generates new understandings by extending existing knowledge. The student is expected to:**

GRADE LEVEL EXPECTATION	§126.34. (1)(G)	Choose, identify, and use the appropriate abstract data type, advanced data structure, and supporting algorithms to properly represent the data in a program problem solution.
TEKS	**§126.34.**	**Computer Science II (One Credit)**
STUDENT EXPECTATION	**§126.34 .(2)**	**Communication and collaboration. The student communicates and collaborates with peers to contribute to his or her own learning and the learning of others. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.34. (2)(D)	Write programs and communicate with proper programming style to enhance the readability and functionality of the code by using meaningful descriptive identifiers, internal comments, white space, indentation, and a standardized program style.
TEKS	**§126.34.**	**Computer Science II (One Credit)**
STUDENT EXPECTATION	**§126.34 .(4)**	**Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.34. (4)(G)	Design, construct, evaluate, and compare search algorithms, including linear searching and binary searching.
GRADE LEVEL EXPECTATION	§126.34. (4)(H)	Identify, describe, design, create, evaluate, and compare standard sorting algorithms, including selection sort, bubble sort, insertion sort, and merge sort.
GRADE LEVEL EXPECTATION	§126.34. (4)(I)	Measure time/space efficiency of various sorting algorithms.
GRADE LEVEL EXPECTATION	§126.34. (4)(J)	Compare and contrast search and sort algorithms, including linear, quadratic, and recursive strategies, for time/space efficiency.
GRADE LEVEL EXPECTATION	§126.34. (4)(K)	Analyze algorithms using "big-O" notation for best, average, and worst-case data patterns.
GRADE LEVEL EXPECTATION	§126.34. (4)(L)	Develop algorithms to solve various problems, including factoring, summing a series, finding the roots of a quadratic equation, and generating Fibonacci numbers.
GRADE LEVEL EXPECTATION	§126.34. (4)(O)	Compare and contrast algorithm efficiency by using informal runtime comparisons, exact calculation of statement execution counts, and theoretical efficiency values using "big-O" notation, including worst-case, best-case, and average-case time/space analysis.
TEKS	**§126.35.**	**Computer Science III (One Credit)**
STUDENT EXPECTATION	**§126.35. (1)**	**Creativity and innovation. The student develops products and generates new understandings by extending existing knowledge. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.35. (1)(F)	Identify, describe, design, create, evaluate, and compare standard sorting algorithms that perform sorting operations on data structures, including quick sort and heap sort.
TEKS	**§126.35.**	**Computer Science III (One Credit)**
STUDENT EXPECTATION	**§126.35. (3)**	**Research and information fluency. The student locates, analyzes, processes, and organizes data. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.35. (3)(J)	Write and modify text file data.
TEKS	**§126.35.**	**Computer Science III (One Credit)**

STUDENT EXPECTATION	**§126.35. (4)**	**Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.35. (4)(A)	Develop choice algorithms using selection control statements, including break, label, and continue.
GRADE LEVEL EXPECTATION	§126.35. (4)(I)	Explore common algorithms, including matrix addition and multiplication, fractals, Towers of Hanoi, and magic square.
TEKS	**§126.40.**	**Robotics Programming and Design (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.40 .(1)**	**Creativity and innovation. The student develops products and generates new understanding by extending existing knowledge. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.40. (1)(C)	Use the design process to construct a robot.
GRADE LEVEL EXPECTATION	§126.40. (1)(D)	Refine the design of a robot.
GRADE LEVEL EXPECTATION	§126.40. (1)(E)	Build robots of simple, moderate, and advanced complexity.
GRADE LEVEL EXPECTATION	§126.40. (1)(F)	Improve a robot design to meet a specified need.
TEKS	**§126.40.**	**Robotics Programming and Design (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.40 .(2)**	**Communication and collaboration. The student communicates and collaborates with peers to contribute to his or her own learning and the learning of others. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.40. (2)(A)	Demonstrate an understanding of and implement design teams.
GRADE LEVEL EXPECTATION	§126.40. (2)(B)	Use design teams to solve problems.
GRADE LEVEL EXPECTATION	§126.40. (2)(C)	Serve as a team leader and a team member.
GRADE LEVEL EXPECTATION	§126.40. (2)(D)	Describe a problem and identify design specifications.
GRADE LEVEL EXPECTATION	§126.40. (2)(E)	Design a solution to a problem and share a solution through various media.
GRADE LEVEL EXPECTATION	§126.40. (2)(F)	Document prototypes, adjustments, and corrections in the design process.
GRADE LEVEL EXPECTATION	§126.40. (2)(G)	Document a final design and solution.
GRADE LEVEL EXPECTATION	§126.40. (2)(H)	Present a final design, testing results, and solution.

TEKS	§126.40.	Robotics Programming and Design (One-Half to One Credit)
STUDENT EXPECTATION	§126.40.(3)	Research and information fluency. The student locates, analyzes, processes, and organizes data. The student is expected to:
GRADE LEVEL EXPECTATION	§126.40.(3)(A)	Test and evaluate a robot design.
GRADE LEVEL EXPECTATION	§126.40.(3)(B)	Implement position tracking to complete assigned robot tasks.
GRADE LEVEL EXPECTATION	§126.40.(3)(C)	Develop solution systems and implement systems analysis.
GRADE LEVEL EXPECTATION	§126.40.(3)(D)	Modify a robot to respond to a change in specifications.
GRADE LEVEL EXPECTATION	§126.40.(3)(E)	Implement a system to identify and track all components of a robot.

TEKS	§126.40.	Robotics Programming and Design (One-Half to One Credit)
STUDENT EXPECTATION	§126.40.(4)	Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:
GRADE LEVEL EXPECTATION	§126.40.(4)(G)	Apply decision-making strategies when developing solutions.

TEKS	§126.40.	Robotics Programming and Design (One-Half to One Credit)
STUDENT EXPECTATION	§126.40.(6)	Technology operations and concepts. The student understands technology concepts, systems, and operations as they apply to computer science. The student is expected to:
GRADE LEVEL EXPECTATION	§126.40.(6)(C)	Use software applications to simulate robotic behavior, present design concepts, and test solution strategies.
GRADE LEVEL EXPECTATION	§126.40.(6)(T)	Troubleshoot and maintain robotic systems and subsystems.

TEKS	§126.45.	Digital Video and Audio Design (One Credit)
STUDENT EXPECTATION	§126.45.(4)	Creativity and innovation. The student understands design systems. The student is expected to analyze and summarize the history and evolution of audio and video production fields.

TEKS	§126.46.	Web Communications (One-Half Credit)
STUDENT EXPECTATION	§126.46.(2)	Communication and collaboration. The student uses digital technology to work collaboratively toward his or her own learning and the learning of others. The student is expected to:
GRADE LEVEL EXPECTATION	§126.46.(2)(D)	Solve problems using critical-thinking strategies.

TEKS	§126.48.	Web Game Development (One Credit)
STUDENT EXPECTATION	§126.48.(6)	Technology operations and concepts. The student demonstrates a sound understanding of technology concepts, systems, and operations. The student is expected to:

GRADE LEVEL EXPECTATION	**§126.48 .(6)(B)**	**Create a fully functional online game that includes:**
INDICATOR	§126.48. (6)(B) (iii)	Physics, including center of mass, collision detection, lighting, shading, perspective, anatomy, motion blur, lens flare, and reflections.
TEKS	**§126.49.**	**Independent Study in Technology Applications (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.49 .(1)**	**Creativity and innovation. The student demonstrates creative thinking, constructs knowledge, and develops innovative products and processes using technology. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.49. (1)(H)	Identify and solve problems, individually and with input from peers and professionals, using research methods and advanced creativity and innovation skills used in a selected profession or discipline.
TEKS	**§126.49.**	**Independent Study in Technology Applications (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.49 .(2)**	**Communication and collaboration. The student uses digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning experience of others. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.49. (2)(G)	Collaborate with others to identify a problem to be solved, hypotheses, and strategies to accomplish a task.
TEKS	**§126.49.**	**Independent Study in Technology Applications (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.49 .(4)**	**Critical thinking, problem solving, and decision making. The student uses critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.49. (4)(C)	Demonstrate creative-thinking and problem-solving skills.
TEKS	**§126.50.**	**Independent Study in Evolving/Emerging Technologies (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.50. (1)**	**Creativity and innovation. The student demonstrates creative thinking, constructs knowledge, and develops innovative products and processes using technology. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.50. (1)(H)	Identify and solve problems, individually and with input from peers and professionals, using research methods and advanced creativity and innovation skills used in a selected profession or discipline.
TEKS	**§126.50.**	**Independent Study in Evolving/Emerging Technologies (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.50. (4)**	**Critical thinking, problem solving, and decision making. The student uses critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.50. (4)(C)	Demonstrate creative-thinking and problem-solving skills.

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

TEKS	**§126.36.**	**Digital Forensics (one credit), Adopted 2019**
STUDENT EXPECTATION	**§126.36. (1)**	**Employability Skills. The student identifies necessary skills for career development and employment opportunities. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.36. (1)(H)	solve problems and think critically.
TEKS	**§126.51.**	**Foundations of Cybersecurity (One Credit), Adopted 2019**

STUDENT EXPECTATION	**§126.51. (1)**	**Employability skills. The student demonstrates necessary skills for career development and successful completion of course outcomes. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.51. (1)(C)	solve problems and think critically;

TEKS	**§126.52.**	**Cybersecurity Capstone (One Credit), Adopted 2019**
STUDENT EXPECTATION	**§126.52. (1)**	**Employability skills. The student demonstrates necessary skills for career development and successful completion of course outcomes. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.52. (1)(C)	solve problems and think critically;

Texas Essential Knowledge and Skills (TEKS)

Technology Education

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

TEKS	**§126.32.**	**Fundamentals of Computer Science (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.32. (1)**	**Creativity and innovation. The student develops products and generates new understanding by extending existing knowledge. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.32. (1)(D)	Create algorithms for the solution of various problems.

TEKS	**§126.32.**	**Fundamentals of Computer Science (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.32. (4)**	**Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.32. (4)(D)	Read and define a problem's description, purpose, and goals.

TEKS	**§126.33.**	**Computer Science I (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.33. (2)**	**Communication and collaboration. The student communicates and collaborates with peers to contribute to his or her own learning and the learning of others. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.33. (2)(D)	Write programs with proper programming style to enhance the readability and functionality of the code by using meaningful descriptive identifiers, internal comments, white space, spacing, indentation, and a standardized program style.

TEKS	**§126.33.**	**Computer Science I (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.33. (4)**	**Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.33. (4)(A)	Use program design problem-solving strategies to create program solutions.
GRADE LEVEL EXPECTATION	§126.33. (4)(B)	Define and specify the purpose and goals of solving a problem.
GRADE LEVEL EXPECTATION	§126.33. (4)(C)	Identify the subtasks needed to solve a problem.

GRADE LEVEL EXPECTATION	§126.33. (4)(D)	Identify the data types and objects needed to solve a problem.
GRADE LEVEL EXPECTATION	§126.33. (4)(E)	Identify reusable components from existing code.
GRADE LEVEL EXPECTATION	§126.33. (4)(F)	Design a solution to a problem.
GRADE LEVEL EXPECTATION	§126.33. (4)(G)	Code a solution from a program design.
GRADE LEVEL EXPECTATION	§126.33. (4)(H)	Identify and debug errors.
GRADE LEVEL EXPECTATION	§126.33. (4)(I)	Test program solutions with appropriate valid and invalid test data for correctness.
GRADE LEVEL EXPECTATION	§126.33. (4)(J)	Debug and solve problems using error messages, reference materials, language documentation, and effective strategies.
GRADE LEVEL EXPECTATION	§126.33. (4)(K)	Explore common algorithms, including finding greatest common divisor, finding the biggest number out of three, finding primes, making change, and finding the average.
GRADE LEVEL EXPECTATION	§126.33. (4)(L)	Analyze and modify existing code to improve the underlying algorithm.
GRADE LEVEL EXPECTATION	§126.33. (4)(M)	Create program solutions that exhibit robust behavior by understanding, avoiding, and preventing runtime errors, including division by zero and type mismatch.
GRADE LEVEL EXPECTATION	§126.33. (4)(N)	Select the most appropriate algorithm for a defined problem.
GRADE LEVEL EXPECTATION	§126.33. (4)(O)	Demonstrate proficiency in the use of the arithmetic operators to create mathematical expressions, including addition, subtraction, multiplication, real division, integer division, and modulus division.
GRADE LEVEL EXPECTATION	§126.33. (4)(P)	Create program solutions to problems using available mathematics libraries, including absolute value, round, power, square, and square root.
GRADE LEVEL EXPECTATION	§126.33. (4)(Q)	Develop program solutions that use assignment.
GRADE LEVEL EXPECTATION	§126.33. (4)(R)	Develop sequential algorithms to solve non-branching and non-iterative problems.
GRADE LEVEL EXPECTATION	§126.33. (4)(S)	Develop algorithms to decision-making problems using branching control statements.
GRADE LEVEL EXPECTATION	§126.33. (4)(T)	Develop iterative algorithms and code programs to solve practical problems.

GRADE LEVEL EXPECTATION	§126.33. (4)(U)	Demonstrate proficiency in the use of the relational operators.
GRADE LEVEL EXPECTATION	§126.33. (4)(V)	Demonstrate proficiency in the use of the logical operators.
GRADE LEVEL EXPECTATION	§126.33. (4)(W)	Generate and use random numbers.
TEKS	**§126.34.**	**Computer Science II (One Credit)**
STUDENT EXPECTATION	**§126.34 .(1)**	**Creativity and innovation. The student develops products and generates new understandings by extending existing knowledge. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.34. (1)(G)	Choose, identify, and use the appropriate abstract data type, advanced data structure, and supporting algorithms to properly represent the data in a program problem solution.
TEKS	**§126.34.**	**Computer Science II (One Credit)**
STUDENT EXPECTATION	**§126.34 .(2)**	**Communication and collaboration. The student communicates and collaborates with peers to contribute to his or her own learning and the learning of others. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.34. (2)(D)	Write programs and communicate with proper programming style to enhance the readability and functionality of the code by using meaningful descriptive identifiers, internal comments, white space, indentation, and a standardized program style.
TEKS	**§126.34.**	**Computer Science II (One Credit)**
STUDENT EXPECTATION	**§126.34 .(4)**	**Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.34. (4)(G)	Design, construct, evaluate, and compare search algorithms, including linear searching and binary searching.
GRADE LEVEL EXPECTATION	§126.34. (4)(H)	Identify, describe, design, create, evaluate, and compare standard sorting algorithms, including selection sort, bubble sort, insertion sort, and merge sort.
GRADE LEVEL EXPECTATION	§126.34. (4)(I)	Measure time/space efficiency of various sorting algorithms.
GRADE LEVEL EXPECTATION	§126.34. (4)(J)	Compare and contrast search and sort algorithms, including linear, quadratic, and recursive strategies, for time/space efficiency.
GRADE LEVEL EXPECTATION	§126.34. (4)(K)	Analyze algorithms using "big-O" notation for best, average, and worst-case data patterns.
GRADE LEVEL EXPECTATION	§126.34. (4)(L)	Develop algorithms to solve various problems, including factoring, summing a series, finding the roots of a quadratic equation, and generating Fibonacci numbers.
GRADE LEVEL EXPECTATION	§126.34. (4)(O)	Compare and contrast algorithm efficiency by using informal runtime comparisons, exact calculation of statement execution counts, and theoretical efficiency values using "big-O" notation, including worst-case, best-case, and average-case time/space analysis.
TEKS	**§126.35.**	**Computer Science III (One Credit)**

STUDENT EXPECTATION	**§126.35. (1)**	**Creativity and innovation. The student develops products and generates new understandings by extending existing knowledge. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.35. (1)(F)	Identify, describe, design, create, evaluate, and compare standard sorting algorithms that perform sorting operations on data structures, including quick sort and heap sort.
TEKS	**§126.35.**	**Computer Science III (One Credit)**
STUDENT EXPECTATION	**§126.35. (3)**	**Research and information fluency. The student locates, analyzes, processes, and organizes data. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.35. (3)(J)	Write and modify text file data.
TEKS	**§126.35.**	**Computer Science III (One Credit)**
STUDENT EXPECTATION	**§126.35. (4)**	**Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.35. (4)(A)	Develop choice algorithms using selection control statements, including break, label, and continue.
GRADE LEVEL EXPECTATION	§126.35. (4)(I)	Explore common algorithms, including matrix addition and multiplication, fractals, Towers of Hanoi, and magic square.
TEKS	**§126.40.**	**Robotics Programming and Design (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.40 .(1)**	**Creativity and innovation. The student develops products and generates new understanding by extending existing knowledge. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.40. (1)(C)	Use the design process to construct a robot.
GRADE LEVEL EXPECTATION	§126.40. (1)(D)	Refine the design of a robot.
GRADE LEVEL EXPECTATION	§126.40. (1)(E)	Build robots of simple, moderate, and advanced complexity.
GRADE LEVEL EXPECTATION	§126.40. (1)(F)	Improve a robot design to meet a specified need.
TEKS	**§126.40.**	**Robotics Programming and Design (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.40 .(2)**	**Communication and collaboration. The student communicates and collaborates with peers to contribute to his or her own learning and the learning of others. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.40. (2)(A)	Demonstrate an understanding of and implement design teams.
GRADE LEVEL EXPECTATION	§126.40. (2)(B)	Use design teams to solve problems.
GRADE LEVEL EXPECTATION	§126.40. (2)(C)	Serve as a team leader and a team member.

GRADE LEVEL EXPECTATION	§126.40. (2)(D)	Describe a problem and identify design specifications.
GRADE LEVEL EXPECTATION	§126.40. (2)(E)	Design a solution to a problem and share a solution through various media.
GRADE LEVEL EXPECTATION	§126.40. (2)(F)	Document prototypes, adjustments, and corrections in the design process.
GRADE LEVEL EXPECTATION	§126.40. (2)(G)	Document a final design and solution.
GRADE LEVEL EXPECTATION	§126.40. (2)(H)	Present a final design, testing results, and solution.
TEKS	**§126.40.**	**Robotics Programming and Design (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.40 .(3)**	**Research and information fluency. The student locates, analyzes, processes, and organizes data. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.40. (3)(A)	Test and evaluate a robot design.
GRADE LEVEL EXPECTATION	§126.40. (3)(B)	Implement position tracking to complete assigned robot tasks.
GRADE LEVEL EXPECTATION	§126.40. (3)(C)	Develop solution systems and implement systems analysis.
GRADE LEVEL EXPECTATION	§126.40. (3)(D)	Modify a robot to respond to a change in specifications.
GRADE LEVEL EXPECTATION	§126.40. (3)(E)	Implement a system to identify and track all components of a robot.
TEKS	**§126.40.**	**Robotics Programming and Design (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.40 .(4)**	**Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.40. (4)(G)	Apply decision-making strategies when developing solutions.
TEKS	**§126.40.**	**Robotics Programming and Design (One-Half to One Credit)**
STUDENT EXPECTATION	**§126.40 .(6)**	**Technology operations and concepts. The student understands technology concepts, systems, and operations as they apply to computer science. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.40. (6)(C)	Use software applications to simulate robotic behavior, present design concepts, and test solution strategies.
GRADE LEVEL EXPECTATION	§126.40. (6)(T)	Troubleshoot and maintain robotic systems and subsystems.

TEKS	§126.45.	Digital Video and Audio Design (One Credit)
STUDENT EXPECTATION	§126.45.(4)	Creativity and innovation. The student understands design systems. The student is expected to analyze and summarize the history and evolution of audio and video production fields.

TEKS	§126.46.	Web Communications (One-Half Credit)
STUDENT EXPECTATION	**§126.46.(2)**	**Communication and collaboration. The student uses digital technology to work collaboratively toward his or her own learning and the learning of others. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.46.(2)(D)	Solve problems using critical-thinking strategies.

TEKS	§126.48.	Web Game Development (One Credit)
STUDENT EXPECTATION	**§126.48.(6)**	**Technology operations and concepts. The student demonstrates a sound understanding of technology concepts, systems, and operations. The student is expected to:**
GRADE LEVEL EXPECTATION	**§126.48.(6)(B)**	**Create a fully functional online game that includes:**
INDICATOR	§126.48.(6)(B) (iii)	Physics, including center of mass, collision detection, lighting, shading, perspective, anatomy, motion blur, lens flare, and reflections.

TEKS	§126.49.	Independent Study in Technology Applications (One-Half to One Credit)
STUDENT EXPECTATION	**§126.49.(1)**	**Creativity and innovation. The student demonstrates creative thinking, constructs knowledge, and develops innovative products and processes using technology. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.49.(1)(H)	Identify and solve problems, individually and with input from peers and professionals, using research methods and advanced creativity and innovation skills used in a selected profession or discipline.

TEKS	§126.49.	Independent Study in Technology Applications (One-Half to One Credit)
STUDENT EXPECTATION	**§126.49.(2)**	**Communication and collaboration. The student uses digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning experience of others. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.49.(2)(G)	Collaborate with others to identify a problem to be solved, hypotheses, and strategies to accomplish a task.

TEKS	§126.49.	Independent Study in Technology Applications (One-Half to One Credit)
STUDENT EXPECTATION	**§126.49.(4)**	**Critical thinking, problem solving, and decision making. The student uses critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.49.(4)(C)	Demonstrate creative-thinking and problem-solving skills.

TEKS	§126.50.	Independent Study in Evolving/Emerging Technologies (One-Half to One Credit)
STUDENT EXPECTATION	**§126.50.(1)**	**Creativity and innovation. The student demonstrates creative thinking, constructs knowledge, and develops innovative products and processes using technology. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.50.(1)(H)	Identify and solve problems, individually and with input from peers and professionals, using research methods and advanced creativity and innovation skills used in a selected profession or discipline.

TEKS	§126.50.	Independent Study in Evolving/Emerging Technologies (One-Half to One Credit)

STUDENT EXPECTATION	**§126.50. (4)**	**Critical thinking, problem solving, and decision making. The student uses critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.50. (4)(C)	Demonstrate creative-thinking and problem-solving skills.

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

TEKS	**§126.36.**	**Digital Forensics (one credit), Adopted 2019**
STUDENT EXPECTATION	**§126.36. (1)**	**Employability Skills. The student identifies necessary skills for career development and employment opportunities. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.36. (1)(H)	solve problems and think critically.

TEKS	**§126.51.**	**Foundations of Cybersecurity (One Credit), Adopted 2019**
STUDENT EXPECTATION	**§126.51. (1)**	**Employability skills. The student demonstrates necessary skills for career development and successful completion of course outcomes. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.51. (1)(C)	solve problems and think critically;

TEKS	**§126.52.**	**Cybersecurity Capstone (One Credit), Adopted 2019**
STUDENT EXPECTATION	**§126.52. (1)**	**Employability skills. The student demonstrates necessary skills for career development and successful completion of course outcomes. The student is expected to:**
GRADE LEVEL EXPECTATION	§126.52. (1)(C)	solve problems and think critically;

Utah Core Standards

Mathematics

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

STANDARD / AREA OF LEARNING	**UT.SI.**	**SECONDARY MATHEMATICS I**
OBJECTIVE / STRAND	**SI.MP.**	**MATHEMATICAL PRACTICES (MP)**
INDICATOR / CLUSTER	SI.MP.1.	Make sense of problems and persevere in solving them.
INDICATOR / CLUSTER	SI.MP.2.	Reason abstractly and quantitatively.
INDICATOR / CLUSTER	SI.MP.3.	Construct viable arguments and critique the reasoning of others.
INDICATOR / CLUSTER	SI.MP.4.	Model with mathematics.
INDICATOR / CLUSTER	SI.MP.6.	Attend to precision.

INDICATOR / CLUSTER	SI.MP.7.	Look for and make use of structure.
INDICATOR / CLUSTER	SI.MP.8.	Look for and express regularity in repeated reasoning.

STANDARD / AREA OF LEARNING	**UT.SI.**	**SECONDARY MATHEMATICS I**
OBJECTIVE / STRAND	**SI.F.IF.**	**FUNCTIONS—Interpreting Linear and Exponential Functions (F.IF)**
INDICATOR / CLUSTER		**Understand the concept of a linear or exponential function and use function notation. Recognize arithmetic and geometric sequences as examples of linear and exponential functions (Standards F.IF.1–3). Interpret linear or exponential functions that arise in applications in terms of a context (Standards F.IF.4–6). Analyze linear or exponential functions using different representations (Standards F.IF.7,9).**
EXPECTATION / STANDARD	SI.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.

STANDARD / AREA OF LEARNING	**UT.SI.**	**SECONDARY MATHEMATICS I**
OBJECTIVE / STRAND	**SI.S.ID.**	**STATISTICS AND PROBABILITY—Interpreting Categorical and Quantitative Data (S.ID)**
INDICATOR / CLUSTER		**Summarize, represent, and interpret data on a single count or measurement variable (Standards S.ID.1–3). Summarize, represent, and interpret data on two categorical and quantitative variables (Standard S.ID.6). Interpret linear models building on students' work with linear relationships, and introduce the correlation coefficient (Standards S.ID.7–9).**
EXPECTATION / STANDARD	SI.S.ID.2.	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

STANDARD / AREA OF LEARNING	**UT.SII.**	**SECONDARY MATHEMATICS II**
OBJECTIVE / STRAND	**SII.MP.**	**MATHEMATICAL PRACTICES (MP)**
INDICATOR / CLUSTER	SII.MP.1.	Make sense of problems and persevere in solving them.
INDICATOR / CLUSTER	SII.MP.2.	Reason abstractly and quantitatively.
INDICATOR / CLUSTER	SII.MP.3.	Construct viable arguments and critique the reasoning of others.
INDICATOR / CLUSTER	SII.MP.4.	Model with mathematics.
INDICATOR / CLUSTER	SII.MP.6.	Attend to precision
INDICATOR / CLUSTER	SII.MP.7.	Look for and make use of structure.

INDICATOR / CLUSTER	SII.MP.8.	Look for and express regularity in repeated reasoning.

STANDARD / AREA OF LEARNING	**UT.SII.**	**SECONDARY MATHEMATICS II**
OBJECTIVE / STRAND	**SII.F.IF.**	**FUNCTIONS—Interpret Functions (F.IF)**
INDICATOR / CLUSTER		**Interpret quadratic functions that arise in applications in terms of a context (Standards F.IF.4–6). Analyze functions using different representations (Standards F.IF.7–9).**
EXPECTATION / STANDARD	SII.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.

STANDARD / AREA OF LEARNING	**UT.SIII.**	**SECONDARY MATHEMATICS III**
OBJECTIVE / STRAND	**SIII.MP.**	**MATHEMATICAL PRACTICES (MP)**
INDICATOR / CLUSTER		**The Standards for Mathematical Practice in Secondary Mathematics III describe mathematical habits of mind that teachers should seek to develop in their students. Students become mathematically proficient in engaging with mathematical content and concepts as they learn, experience, and apply these skills and attitudes (Standards MP.1–8).**
EXPECTATION / STANDARD	SIII.MP.1.	Make sense of problems and persevere in solving them.
EXPECTATION / STANDARD	SIII.MP.2.	Reason abstractly and quantitatively
EXPECTATION / STANDARD	SIII.MP.3.	Construct viable arguments and critique the reasoning of others.
EXPECTATION / STANDARD	SIII.MP.4.	Model with mathematics.
EXPECTATION / STANDARD	SIII.MP.6.	Attend to precision.
EXPECTATION / STANDARD	SIII.MP.7.	Look for and make use of structure.
EXPECTATION / STANDARD	SIII.MP.8.	Look for and express regularity in repeated reasoning.

STANDARD / AREA OF LEARNING	**UT.SIII.**	**SECONDARY MATHEMATICS III**
OBJECTIVE / STRAND	**SIII.F.IF.**	**FUNCTIONS—Interpreting Functions (F.IF)**
INDICATOR / CLUSTER		**Interpret functions that arise in applications in terms of a context. Analyze functions using different representations.**
EXPECTATION / STANDARD	SIII.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.

STANDARD / AREA OF LEARNING	UT.P.	PRECALCULUS
OBJECTIVE / STRAND	**P.MP.**	**MATHEMATICAL PRACTICES (P.MP)**
INDICATOR / CLUSTER	P.MP.1.	Make sense of problems and persevere in solving them.
INDICATOR / CLUSTER	P.MP.2.	Reason abstractly and quantitatively.
INDICATOR / CLUSTER	P.MP.3.	Construct viable arguments and critique the reasoning of others.
INDICATOR / CLUSTER	P.MP.4.	Model with mathematics.
INDICATOR / CLUSTER	P.MP.6.	Attend to precision.
INDICATOR / CLUSTER	P.MP.7.	Look for and make use of structure.
INDICATOR / CLUSTER	P.MP.8.	Look for and express regularity in repeated reasoning.

Utah Core Standards

Mathematics

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

STANDARD / AREA OF LEARNING	UT.SI.	SECONDARY MATHEMATICS I
OBJECTIVE / STRAND	**SI.MP.**	**MATHEMATICAL PRACTICES (MP)**
INDICATOR / CLUSTER	SI.MP.1.	Make sense of problems and persevere in solving them.
INDICATOR / CLUSTER	SI.MP.2.	Reason abstractly and quantitatively.
INDICATOR / CLUSTER	SI.MP.3.	Construct viable arguments and critique the reasoning of others.
INDICATOR / CLUSTER	SI.MP.4.	Model with mathematics.
INDICATOR / CLUSTER	SI.MP.6.	Attend to precision.
INDICATOR / CLUSTER	SI.MP.7.	Look for and make use of structure.

INDICATOR / CLUSTER	SI.MP.8.	Look for and express regularity in repeated reasoning.

STANDARD / AREA OF LEARNING	**UT.SI.**	**SECONDARY MATHEMATICS I**
OBJECTIVE / STRAND	**SI.F.IF.**	**FUNCTIONS—Interpreting Linear and Exponential Functions (F.IF)**
INDICATOR / CLUSTER		**Understand the concept of a linear or exponential function and use function notation. Recognize arithmetic and geometric sequences as examples of linear and exponential functions (Standards F.IF.1–3). Interpret linear or exponential functions that arise in applications in terms of a context (Standards F.IF.4–6). Analyze linear or exponential functions using different representations (Standards F.IF.7,9).**
EXPECTATION / STANDARD	SI.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.

STANDARD / AREA OF LEARNING	**UT.SI.**	**SECONDARY MATHEMATICS I**
OBJECTIVE / STRAND	**SI.S.ID.**	**STATISTICS AND PROBABILITY—Interpreting Categorical and Quantitative Data (S.ID)**
INDICATOR / CLUSTER		**Summarize, represent, and interpret data on a single count or measurement variable (Standards S.ID.1–3). Summarize, represent, and interpret data on two categorical and quantitative variables (Standard S.ID.6). Interpret linear models building on students' work with linear relationships, and introduce the correlation coefficient (Standards S.ID.7–9).**
EXPECTATION / STANDARD	SI.S.ID.2.	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

STANDARD / AREA OF LEARNING	**UT.SII.**	**SECONDARY MATHEMATICS II**
OBJECTIVE / STRAND	**SII.MP.**	**MATHEMATICAL PRACTICES (MP)**
INDICATOR / CLUSTER	SII.MP.1.	Make sense of problems and persevere in solving them.
INDICATOR / CLUSTER	SII.MP.2.	Reason abstractly and quantitatively.
INDICATOR / CLUSTER	SII.MP.3.	Construct viable arguments and critique the reasoning of others.
INDICATOR / CLUSTER	SII.MP.4.	Model with mathematics.
INDICATOR / CLUSTER	SII.MP.6.	Attend to precision
INDICATOR / CLUSTER	SII.MP.7.	Look for and make use of structure.
INDICATOR / CLUSTER	SII.MP.8.	Look for and express regularity in repeated reasoning.

STANDARD / AREA OF LEARNING	**UT.SII.**	**SECONDARY MATHEMATICS II**
OBJECTIVE / STRAND	**SII.F.IF.**	**FUNCTIONS—Interpret Functions (F.IF)**
INDICATOR / CLUSTER		**Interpret quadratic functions that arise in applications in terms of a context (Standards F.IF.4–6). Analyze functions using different representations (Standards F.IF.7–9).**
EXPECTATION / STANDARD	SII.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.

STANDARD / AREA OF LEARNING	**UT.SIII.**	**SECONDARY MATHEMATICS III**
OBJECTIVE / STRAND	**SIII.MP.**	**MATHEMATICAL PRACTICES (MP)**
INDICATOR / CLUSTER		**The Standards for Mathematical Practice in Secondary Mathematics III describe mathematical habits of mind that teachers should seek to develop in their students. Students become mathematically proficient in engaging with mathematical content and concepts as they learn, experience, and apply these skills and attitudes (Standards MP.1–8).**
EXPECTATION / STANDARD	SIII.MP.1.	Make sense of problems and persevere in solving them.
EXPECTATION / STANDARD	SIII.MP.2.	Reason abstractly and quantitatively
EXPECTATION / STANDARD	SIII.MP.3.	Construct viable arguments and critique the reasoning of others.
EXPECTATION / STANDARD	SIII.MP.4.	Model with mathematics.
EXPECTATION / STANDARD	SIII.MP.6.	Attend to precision.
EXPECTATION / STANDARD	SIII.MP.7.	Look for and make use of structure.
EXPECTATION / STANDARD	SIII.MP.8.	Look for and express regularity in repeated reasoning.

STANDARD / AREA OF LEARNING	**UT.SIII.**	**SECONDARY MATHEMATICS III**
OBJECTIVE / STRAND	**SIII.F.IF.**	**FUNCTIONS—Interpreting Functions (F.IF)**
INDICATOR / CLUSTER		**Interpret functions that arise in applications in terms of a context. Analyze functions using different representations.**
EXPECTATION / STANDARD	SIII.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.

STANDARD / AREA OF LEARNING	UT.P.	PRECALCULUS
OBJECTIVE / STRAND	**P.MP.**	**MATHEMATICAL PRACTICES (P.MP)**
INDICATOR / CLUSTER	P.MP.1.	Make sense of problems and persevere in solving them.
INDICATOR / CLUSTER	P.MP.2.	Reason abstractly and quantitatively.
INDICATOR / CLUSTER	P.MP.3.	Construct viable arguments and critique the reasoning of others.
INDICATOR / CLUSTER	P.MP.4.	Model with mathematics.
INDICATOR / CLUSTER	P.MP.6.	Attend to precision.
INDICATOR / CLUSTER	P.MP.7.	Look for and make use of structure.
INDICATOR / CLUSTER	P.MP.8.	Look for and express regularity in repeated reasoning.

Utah Core Standards

Science

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

STANDARD / AREA OF LEARNING		SEEd - Biology (2019)
OBJECTIVE / STRAND	**Strand BIO.1:**	**INTERACTIONS WITH ORGANISMS AND THE ENVIRONMENT**
INDICATOR / CLUSTER		**The cycling of matter and flow of energy are part of a complex system of interactions within an ecosystem. Through these interactions, an ecosystem can sustain relatively stable numbers and types of organisms. A stable ecosystem is capable of recovering from moderate biological and physical changes. Extreme changes may have significant impact on an ecosystem's carrying capacity and biodiversity, altering the ecosystem. Human activities can lead to significant impacts on an ecosystem.**
EXPECTATION / STANDARD	Standard BIO.1.2.	Develop and use a model to explain cycling of matter and flow of energy among organisms in an ecosystem. Emphasize the movement of matter and energy through the different living organisms in an ecosystem. Examples of models could include food chains, food webs, energy pyramids or pyramids of biomass. (LS2.B)
EXPECTATION / STANDARD	Standard BIO.1.3.	Analyze and interpret data to determine the effects of photosynthesis and cellular respiration on the scale and proportion of carbon reservoirs in the carbon cycle. Emphasize the cycling of carbon through the biosphere, atmosphere, hydrosphere, and geosphere and how changes to various reservoirs impact ecosystems. Examples of changes to the scale and proportion of reservoirs could include deforestation, fossil fuel combustion, or ocean uptake of carbon dioxide. (PS3.D, LS1.C, LS2.B)
EXPECTATION / STANDARD	Standard BIO.1.5.	Design a solution that reduces the impact caused by human activities on the environment and biodiversity. Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data to make improvements from iteratively testing solutions, and optimize a solution. Examples of human activities could include building dams, pollution, deforestation, or introduction of invasive species. (LS2.C, LS4.D, ETS1.A, ETS1.B, ETS1.C)

STANDARD / AREA OF LEARNING		**SEEd - Biology (2019)**
OBJECTIVE / STRAND	**Strand BIO.2:**	**STRUCTURE AND FUNCTION OF LIFE**
INDICATOR / CLUSTER		**Living cells are composed of chemical elements and molecules that form macromolecules. The macromolecules in a cell function to carry out important reactions that allow cycling of matter and flow of energy within and between organisms. All organisms are made of one or more cells. The structure and function of a cell determines the cell's role in an organism. Multicellular organisms have systems of tissues and organs that work together to meet the needs of the whole organism. Cells grow, divide, and function in order to accomplish essential life processes. Feedback systems help organisms maintain homeostasis.**
EXPECTATION / STANDARD	Standard BIO.2.3.	Develop and use a model to illustrate the cycling of matter and flow of energy through living things by the processes of photosynthesis and cellular respiration. Emphasize how the products of one reaction are the reactants of the other and how the energy transfers in these reactions. (PS3.D, LS1.C, LS2.B)

STANDARD / AREA OF LEARNING		**SEEd - Chemistry (2019)**
OBJECTIVE / STRAND	**Strand CHEM.3:**	**STABILITY AND CHANGE IN CHEMICAL SYSTEMS**
INDICATOR / CLUSTER		**Conservation of matter describes the cycling of matter and the use of resources. In both chemical and physical changes, the total number of each type of atom is conserved. When substances are combined, they may interact with each other to form a solution. The proportion of substances in a solution can be represented with concentration. In a chemical change, the atoms are rearranged by breaking and forming bonds to create different molecules, which may have different properties. Chemical processes can be understood in terms of the collisions of molecules and the rearrangements of atoms. The rate at which chemical processes occur can be modified. In many situations, a dynamic and condition-dependent balance between a reaction and the reverse reaction determines the numbers of all types of molecules present. Chemists can control and design chemical systems to create desirable results, although sometimes there are also unintended consequences.**
EXPECTATION / STANDARD	Standard CHEM.3.8.	Obtain, evaluate, and communicate information regarding the effects of designed chemicals in a complex real-world system. Emphasize the role of chemistry in solving problems, while acknowledging unintended consequences. Examples could include ozone depletion and restoration, DDT, development of medicines, the preservation of historical artifacts, or use of bisphenol-A in plastic manufacturing. (PS1.A)

STANDARD / AREA OF LEARNING		**SEEd - Earth and Space Science (2019)**
OBJECTIVE / STRAND	**Strand ESS.3:**	**SYSTEM INTERACTIONS: ATMOSPHERE, HYDROSPHERE, AND GEOSPHERE**
INDICATOR / CLUSTER		**The abundance of liquid water on Earth's surface and its unique properties are central to the planet's dynamics and system interactions. The foundation for Earth's global weather and climate systems is electromagnetic radiation from the Sun. The ocean exerts a major influence on weather and climate by absorbing energy from the Sun, releasing it over time, and globally redistributing it through ocean currents. Changes in the atmosphere due to human activity increase carbon dioxide concentrations and thus affect climate. Current scientific models predict that future average global temperatures will continue to rise, although regional climate changes will be complex and varied.**
EXPECTATION / STANDARD	Standard ESS.3.3.	Construct an explanation for how energy from the Sun drives atmospheric processes and how atmospheric currents transport matter and transfer energy. Emphasize how energy from the Sun is reflected, absorbed, or scattered; how the greenhouse effect contributes to atmospheric energy; and how uneven heating of Earth's atmosphere combined with the Coriolis effect creates an atmospheric circulation system. (PS3.A, ESS1.B, ESS2.A, ESS2.D)
EXPECTATION / STANDARD	Standard ESS.3.5.	Develop and use a quantitative model to describe the cycling of carbon among Earth's systems. Emphasize each of Earth's systems (hydrosphere, atmosphere, geosphere, and biosphere) and how the movement of carbon from one system to another can result in changes to the system(s). Examples could include more carbon absorbed in the oceans leading to ocean acidification or more carbon present in the atmosphere leading to a stronger greenhouse effect. (LS2.B, ESS2.D, ESS3.D)

STANDARD / AREA OF LEARNING		**SEEd - Earth and Space Science (2019)**
OBJECTIVE / STRAND	**Strand ESS.4:**	**STABILITY AND CHANGE IN NATURAL RESOURCES**
INDICATOR / CLUSTER		**Humans depend on Earth's systems for many different resources, including air, water, minerals, metals, and energy. Resource availability has guided the development of human society and is constantly changing due to societal needs. Natural hazards and other geologic events have shaped the course of human history. The sustainability of human societies, and the biodiversity that supports them, requires responsible management of natural resources. Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that reduce ecosystem degradation. They also evaluate solutions to resolve complex global and localized problems that contain inherent social, cultural, and environmental impacts in an effort to improve the quality of life for all.**
EXPECTATION / STANDARD	Standard ESS.4.1.	Construct an explanation for how the availability of natural resources, the occurrence of natural hazards, and changes in climate affect human activity. Examples of natural resources could include access to fresh water, clean air, or regions of fertile soils. Examples of factors that affect human activity could include that rising sea levels cause humans to move farther from the coast or that humans build railroads to transport mineral resources from one location to another. (ESS3.A, ESS3.B)
EXPECTATION / STANDARD	Standard ESS.4.2.	Use computational thinking to explain the relationships between the sustainability of natural resources and biodiversity within Earth systems. Emphasize the importance of responsible stewardship of Earth's resources. Examples of factors related to sustainability could include costs of resource extraction, per-capita consumption, waste management, agricultural efficiency, or levels of conservation. Examples of natural resources could include minerals, water, or energy resources. (ESS3.A)
EXPECTATION / STANDARD	Standard ESS.4.3.	Evaluate design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales. Define the problem, identify criteria and constraints, analyze available data on proposed solutions, and determine an optimal solution. Emphasize the conservation, recycling, and reuse of resources where possible and minimizing impact where it is not possible. Examples of large-scale solutions could include developing best practices for agricultural soil use or mining and production of conventional, unconventional, or renewable energy resources. Examples of small-scale solutions could include mulching lawn clippings or adding biomass to gardens. (ESS3.A, ETS1.A, ETS1.B, ETS1.C)
EXPECTATION / STANDARD	Standard ESS.4.4.	Evaluate design solutions for a major global or local environmental problem based on one of Earth's systems. Define the problem, identify criteria and constraints, analyze available data on proposed solutions, and determine an optimal solution. Examples of major global or local problems could include water pollution or availability, air pollution, deforestation, or energy production. (ESS3.C, ETS1.A, ETS1.B, ETS1.C)
STANDARD / AREA OF LEARNING		**SEEd - Physics (2019)**
OBJECTIVE / STRAND	**Strand PHYS.4:**	**WAVES**
INDICATOR / CLUSTER		**Waves transfer energy through oscillations of fields or matter. The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it passes. Waves produce interference as they overlap but they emerge unaffected by each other. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features. Electromagnetic radiation can be modeled as a wave of changing electric and magnetic fields or as particles called photons. When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy. Because waves depend upon the properties of fields and the predictable transformation of energy, they can be used to interpret the nature of matter and its energy. Waves are utilized to transmit information both in analog and digital forms.**
EXPECTATION / STANDARD	Standard PHYS.4.4.	Ask questions and construct an explanation about the stability of digital transmission and storage of information and their impacts on society. Emphasize the stability of digital signals and the discrete nature of information transmission. Examples of stability and instability could include that digital information can be stored in computer memory, is transferred easily, copied and shared rapidly can be easily deleted, has limited fidelity based on sampling rates, or is vulnerable to security breaches and theft. (PS4.A)

STANDARD / AREA OF LEARNING		**Reading Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Key Ideas and Details**
INDICATOR / CLUSTER	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 / CLUSTER	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 / AREA OF LEARNING		**Reading Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Craft and Structure**
INDICATOR / CLUSTER	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 / CLUSTER	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 / AREA OF LEARNING		**Reading Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Integration of Knowledge and Ideas**
INDICATOR / CLUSTER	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 / AREA OF LEARNING		**Reading Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Range of Reading and Level of Text Complexity**
INDICATOR / CLUSTER	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 / AREA OF LEARNING		**Writing Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Text Types and Purposes**
INDICATOR / CLUSTER	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION / STANDARD	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 / AREA OF LEARNING		**Writing Standards for Literacy in Science and Technical Subjects**

OBJECTIVE / STRAND		**Production and Distribution of Writing**
INDICATOR / CLUSTER	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
INDICATOR / CLUSTER	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.

Utah Core Standards

Science

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

STANDARD / AREA OF LEARNING		**SEEd - Biology (2019)**
OBJECTIVE / STRAND	**Strand BIO.1:**	**INTERACTIONS WITH ORGANISMS AND THE ENVIRONMENT**
INDICATOR / CLUSTER		**The cycling of matter and flow of energy are part of a complex system of interactions within an ecosystem. Through these interactions, an ecosystem can sustain relatively stable numbers and types of organisms. A stable ecosystem is capable of recovering from moderate biological and physical changes. Extreme changes may have significant impact on an ecosystem's carrying capacity and biodiversity, altering the ecosystem. Human activities can lead to significant impacts on an ecosystem.**
EXPECTATION / STANDARD	Standard BIO.1.2.	Develop and use a model to explain cycling of matter and flow of energy among organisms in an ecosystem. Emphasize the movement of matter and energy through the different living organisms in an ecosystem. Examples of models could include food chains, food webs, energy pyramids or pyramids of biomass. (LS2.B)
EXPECTATION / STANDARD	Standard BIO.1.3.	Analyze and interpret data to determine the effects of photosynthesis and cellular respiration on the scale and proportion of carbon reservoirs in the carbon cycle. Emphasize the cycling of carbon through the biosphere, atmosphere, hydrosphere, and geosphere and how changes to various reservoirs impact ecosystems. Examples of changes to the scale and proportion of reservoirs could include deforestation, fossil fuel combustion, or ocean uptake of carbon dioxide. (PS3.D, LS1.C, LS2.B)
EXPECTATION / STANDARD	Standard BIO.1.5.	Design a solution that reduces the impact caused by human activities on the environment and biodiversity. Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data to make improvements from iteratively testing solutions, and optimize a solution. Examples of human activities could include building dams, pollution, deforestation, or introduction of invasive species. (LS2.C, LS4.D, ETS1.A, ETS1.B, ETS1.C)
STANDARD / AREA OF LEARNING		**SEEd - Biology (2019)**
OBJECTIVE / STRAND	**Strand BIO.2:**	**STRUCTURE AND FUNCTION OF LIFE**
INDICATOR / CLUSTER		**Living cells are composed of chemical elements and molecules that form macromolecules. The macromolecules in a cell function to carry out important reactions that allow cycling of matter and flow of energy within and between organisms. All organisms are made of one or more cells. The structure and function of a cell determines the cell's role in an organism. Multicellular organisms have systems of tissues and organs that work together to meet the needs of the whole organism. Cells grow, divide, and function in order to accomplish essential life processes. Feedback systems help organisms maintain homeostasis.**
EXPECTATION / STANDARD	Standard BIO.2.3.	Develop and use a model to illustrate the cycling of matter and flow of energy through living things by the processes of photosynthesis and cellular respiration. Emphasize how the products of one reaction are the reactants of the other and how the energy transfers in these reactions. (PS3.D, LS1.C, LS2.B)
STANDARD / AREA OF LEARNING		**SEEd - Chemistry (2019)**

OBJECTIVE / STRAND	**Strand CHEM.3:**	**STABILITY AND CHANGE IN CHEMICAL SYSTEMS**
INDICATOR / CLUSTER		**Conservation of matter describes the cycling of matter and the use of resources. In both chemical and physical changes, the total number of each type of atom is conserved. When substances are combined, they may interact with each other to form a solution. The proportion of substances in a solution can be represented with concentration. In a chemical change, the atoms are rearranged by breaking and forming bonds to create different molecules, which may have different properties. Chemical processes can be understood in terms of the collisions of molecules and the rearrangements of atoms. The rate at which chemical processes occur can be modified. In many situations, a dynamic and condition-dependent balance between a reaction and the reverse reaction determines the numbers of all types of molecules present. Chemists can control and design chemical systems to create desirable results, although sometimes there are also unintended consequences.**
EXPECTATION / STANDARD	Standard CHEM.3.8.	Obtain, evaluate, and communicate information regarding the effects of designed chemicals in a complex real-world system. Emphasize the role of chemistry in solving problems, while acknowledging unintended consequences. Examples could include ozone depletion and restoration, DDT, development of medicines, the preservation of historical artifacts, or use of bisphenol-A in plastic manufacturing. (PS1.A)

STANDARD / AREA OF LEARNING		**SEEd - Earth and Space Science (2019)**
OBJECTIVE / STRAND	**Strand ESS.3:**	**SYSTEM INTERACTIONS: ATMOSPHERE, HYDROSPHERE, AND GEOSPHERE**
INDICATOR / CLUSTER		**The abundance of liquid water on Earth's surface and its unique properties are central to the planet's dynamics and system interactions. The foundation for Earth's global weather and climate systems is electromagnetic radiation from the Sun. The ocean exerts a major influence on weather and climate by absorbing energy from the Sun, releasing it over time, and globally redistributing it through ocean currents. Changes in the atmosphere due to human activity increase carbon dioxide concentrations and thus affect climate. Current scientific models predict that future average global temperatures will continue to rise, although regional climate changes will be complex and varied.**
EXPECTATION / STANDARD	Standard ESS.3.3.	Construct an explanation for how energy from the Sun drives atmospheric processes and how atmospheric currents transport matter and transfer energy. Emphasize how energy from the Sun is reflected, absorbed, or scattered; how the greenhouse effect contributes to atmospheric energy; and how uneven heating of Earth's atmosphere combined with the Coriolis effect creates an atmospheric circulation system. (PS3.A, ESS1.B, ESS2.A, ESS2.D)
EXPECTATION / STANDARD	Standard ESS.3.5.	Develop and use a quantitative model to describe the cycling of carbon among Earth's systems. Emphasize each of Earth's systems (hydrosphere, atmosphere, geosphere, and biosphere) and how the movement of carbon from one system to another can result in changes to the system(s). Examples could include more carbon absorbed in the oceans leading to ocean acidification or more carbon present in the atmosphere leading to a stronger greenhouse effect. (LS2.B, ESS2.D, ESS3.D)

STANDARD / AREA OF LEARNING		**SEEd - Earth and Space Science (2019)**
OBJECTIVE / STRAND	**Strand ESS.4:**	**STABILITY AND CHANGE IN NATURAL RESOURCES**
INDICATOR / CLUSTER		**Humans depend on Earth's systems for many different resources, including air, water, minerals, metals, and energy. Resource availability has guided the development of human society and is constantly changing due to societal needs. Natural hazards and other geologic events have shaped the course of human history. The sustainability of human societies, and the biodiversity that supports them, requires responsible management of natural resources. Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that reduce ecosystem degradation. They also evaluate solutions to resolve complex global and localized problems that contain inherent social, cultural, and environmental impacts in an effort to improve the quality of life for all.**
EXPECTATION / STANDARD	Standard ESS.4.1.	Construct an explanation for how the availability of natural resources, the occurrence of natural hazards, and changes in climate affect human activity. Examples of natural resources could include access to fresh water, clean air, or regions of fertile soils. Examples of factors that affect human activity could include that rising sea levels cause humans to move farther from the coast or that humans build railroads to transport mineral resources from one location to another. (ESS3.A, ESS3.B)

EXPECTATION / STANDARD	Standard ESS.4.2.	Use computational thinking to explain the relationships between the sustainability of natural resources and biodiversity within Earth systems. Emphasize the importance of responsible stewardship of Earth's resources. Examples of factors related to sustainability could include costs of resource extraction, per-capita consumption, waste management, agricultural efficiency, or levels of conservation. Examples of natural resources could include minerals, water, or energy resources. (ESS3.A)
EXPECTATION / STANDARD	Standard ESS.4.3.	Evaluate design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales. Define the problem, identify criteria and constraints, analyze available data on proposed solutions, and determine an optimal solution. Emphasize the conservation, recycling, and reuse of resources where possible and minimizing impact where it is not possible. Examples of large-scale solutions could include developing best practices for agricultural soil use or mining and production of conventional, unconventional, or renewable energy resources. Examples of small-scale solutions could include mulching lawn clippings or adding biomass to gardens. (ESS3.A, ETS1.A, ETS1.B, ETS1.C)
EXPECTATION / STANDARD	Standard ESS.4.4.	Evaluate design solutions for a major global or local environmental problem based on one of Earth's systems. Define the problem, identify criteria and constraints, analyze available data on proposed solutions, and determine an optimal solution. Examples of major global or local problems could include water pollution or availability, air pollution, deforestation, or energy production. (ESS3.C, ETS1.A, ETS1.B, ETS1.C)

STANDARD / AREA OF LEARNING		**SEEd - Physics (2019)**
OBJECTIVE / STRAND	**Strand PHYS.4:**	**WAVES**
INDICATOR / CLUSTER		**Waves transfer energy through oscillations of fields or matter. The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it passes. Waves produce interference as they overlap but they emerge unaffected by each other. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features. Electromagnetic radiation can be modeled as a wave of changing electric and magnetic fields or as particles called photons. When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy. Because waves depend upon the properties of fields and the predictable transformation of energy, they can be used to interpret the nature of matter and its energy. Waves are utilized to transmit information both in analog and digital forms.**
EXPECTATION / STANDARD	Standard PHYS.4.4.	Ask questions and construct an explanation about the stability of digital transmission and storage of information and their impacts on society. Emphasize the stability of digital signals and the discrete nature of information transmission. Examples of stability and instability could include that digital information can be stored in computer memory, is transferred easily, copied and shared rapidly can be easily deleted, has limited fidelity based on sampling rates, or is vulnerable to security breaches and theft. (PS4.A)

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

STANDARD / AREA OF LEARNING		**Reading Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Key Ideas and Details**
INDICATOR / CLUSTER	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 / CLUSTER	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 / AREA OF LEARNING		**Reading Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Craft and Structure**

INDICATOR / CLUSTER	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 / CLUSTER	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 / AREA OF LEARNING		**Reading Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Integration of Knowledge and Ideas**
INDICATOR / CLUSTER	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 / AREA OF LEARNING		**Reading Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Range of Reading and Level of Text Complexity**
INDICATOR / CLUSTER	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 / AREA OF LEARNING		**Writing Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Text Types and Purposes**
INDICATOR / CLUSTER	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION / STANDARD	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 / AREA OF LEARNING		**Writing Standards for Literacy in Science and Technical Subjects**
OBJECTIVE / STRAND		**Production and Distribution of Writing**
INDICATOR / CLUSTER	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
INDICATOR / CLUSTER	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.

Utah Core Standards

Technology Education

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

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Concepts**

INDICATOR / CLUSTER		**Data and Analysis (DA):**
EXPECTATION / STANDARD		Computing systems exist to process data. The amount of digital data generated in the world is rapidly expanding, and the need to process data effectively is increasingly important. Data is collected and stored so it can be analyzed to better understand the world and make more accurate predictions.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Concepts**
INDICATOR / CLUSTER		**Algorithms and Programming (AP):**
EXPECTATION / STANDARD		An algorithm is a sequence of steps designed to accomplish a specific task. Algorithms are translated into programs, or code, to provide instructions for computing devices. Algorithms and programming control all computing systems, empowering people to communicate with the world in new ways and solve compelling problems. The development process to create meaningful and efficient programs involves choosing which information to use and how to process and store it, breaking apart large problems into smaller ones, recombining existing solutions, and analyzing different solutions.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Practices**
INDICATOR / CLUSTER	**Practice 1:**	**Fostering an Inclusive Computing Culture**
EXPECTATION / STANDARD		**By the end of Grade 12, students should be able to:**
INDICATOR	1	Include the unique perspectives of others and reflect on one's own perspectives when designing and developing computational products.
INDICATOR	2	Address the needs of diverse end users during the design process to produce artifacts with broad accessibility and usability.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Practices**
INDICATOR / CLUSTER	**Practice 2:**	**Collaborating Around Computing**
EXPECTATION / STANDARD		**By the end of Grade 12, students should be able to:**
INDICATOR	2	Create team norms, expectations, and equitable workloads to increase efficiency and effectiveness.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Practices**

INDICATOR / CLUSTER	**Practice 3:**	**Recognizing and Defining Computational Problems**
EXPECTATION / STANDARD		**By the end of Grade 12, students should be able to:**
INDICATOR	2	Decompose complex real-world problems into manageable subproblems that could integrate existing solutions or procedures.
INDICATOR	3	Evaluate whether it is appropriate and feasible to solve a problem computationally.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Practices**
INDICATOR / CLUSTER	**Practice 4:**	**Developing and Using Abstractions**
EXPECTATION / STANDARD		**By the end of Grade 12, students should be able to:**
INDICATOR	3	Create modules and develop points of interaction that can apply to multiple situations and reduce complexity.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Practices**
INDICATOR / CLUSTER	**Practice 5:**	**Creating Computational Artifacts**
EXPECTATION / STANDARD		**By the end of Grade 12, students should be able to:**
INDICATOR	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.
INDICATOR	2	Create a computational artifact for practical intent, personal expression, or to address a societal issue.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Practices**
INDICATOR / CLUSTER	**Practice 6:**	**Testing and Refining Computational Artifacts**
EXPECTATION / STANDARD		**By the end of Grade 12, students should be able to:**
INDICATOR	1	Systematically test computational artifacts by considering all scenarios and using test cases.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Computing Systems (CS):**

INDICATOR / CLUSTER	**Standard 9/10.CS.3.**	**Develop guidelines that communicate systematic troubleshooting strategies that others can use to identify and fix errors. (Practice 6. Testing and Refining Computational Artifacts.)**
EXPECTATION / STANDARD		Students will develop strategies for troubleshooting and fixing problems and/or errors in a system. Examples of complex troubleshooting strategies include resolving connectivity problems, adjusting system configurations and settings, ensuring hardware and software compatibility, and transferring data from one device to another. Students could create a flow chart, a job aid for a help desk employee, or an expert system. For example, students will design a solution to a space exploration challenge by breaking it down into smaller, more manageable problems that can be solved through the structure and function of a device. Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data to make improvements from iteratively testing solutions, and optimize a solution. Examples of problems could include, cosmic radiation exposure, transportation on other planets or moons, or supplying energy to space travelers.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Algorithms and Programming (AP):**
INDICATOR / CLUSTER	**Standard 9/10.AP.1.**	**Design algorithms to solve computational problems using a combination of original and existing algorithms (Practice 3. Recognizing and Defining Computational Problems; Practice 4: Developing and Using Abstractions)**
EXPECTATION / STANDARD		Students will create algorithms that combine existing algorithms with their original program to complete a certain task. For example, students could use the formula for energy of motion to construct a device that converts one form of energy into another form of energy to solve a complex real-life problem.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Algorithms and Programming (AP):**
INDICATOR / CLUSTER	**Standard 9/10.AP.3.**	**Decompose problems into multiple smaller problems through systematic analysis, using constructs (such as procedures, modules, functions, methods, and/or classes). (Practice 3. Recognizing and Defining Computational Problems)**
EXPECTATION / STANDARD		Students will break down a big or complex problem and split it into smaller, easier-to-manage components. For example, students will find roots of polynomials by factoring them into smaller components and then solving for each factor.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Algorithms and Programming (AP):**
INDICATOR / CLUSTER	**Standard 9/10.AP.4.**	**Create computational artifacts using modular design. (Practice 5: Creating Computational Artifacts)**
EXPECTATION / STANDARD		Students will create a computational artifact to solve a complex problem by breaking down the problems into smaller, easier-to-manage components. For example, students can solve a complex math problem using the order of operations.
STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**

OBJECTIVE / STRAND		**Algorithms and Programming (AP):**
INDICATOR / CLUSTER	**Standard 9/10.AP.7.**	**Iteratively evaluate and refine a computational artifact to enhance its performance, reliability, usability, and accessibility. (Practice 6: Testing and Refining Computational Artifacts)**

EXPECTATION / STANDARD

Students will evaluate how computational artifacts can be developed, tested, and edited repeatedly to improve performance, ease of use, reliability, and/or accessibility. For example, students will use the scientific method to design an air powered rocket to land hit a target from a specific distance. This could also be a great opportunity to introduce Moore's Law.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Algorithms and Programming (AP):**
INDICATOR / CLUSTER	**Standard 9/10.AP.8.**	**Design and develop computational artifacts using collaborative tools. (Practice 2: Collaborating Around Computing; Practice 7: Communicating About Computing)**

EXPECTATION / STANDARD

Students will use collaborative tools to design and develop computational artifacts as a team. For example, students can collaborate on a presentation using cloud-based applications (Office 365, Google suite, etc.) to complete the design and development process of a project.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Algorithms and Programming (AP):**
INDICATOR / CLUSTER	**Standard 9/10.AP.9.**	**Create documentation (pseudocode) that communicates the design of the solution to a complex problem using text, graphics, and/or demonstrations. (Practice 7: Communicating About Computing)**

EXPECTATION / STANDARD

Students will design solutions to problems and document these solutions—using pseudocode, flowcharts, and other means--so that they can be implemented by either the student or someone else. During and after implementation, comments and additional documentation can facilitate future maintenance of that process. For example, students will create an outline for an essay before starting on the rough draft.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Impacts of Computing (IC):**
INDICATOR / CLUSTER	**Standard 9/10.IC.3.**	**Identify solutions to problems in other content areas using established algorithms. (Practice 1: Fostering an Inclusive Computing Culture; Practice 2: Collaborating Around Computing)**

EXPECTATION / STANDARD

Students will develop solutions to problems that can relate to other subject areas. They will create and analyze a step-by-step process and apply it to a problem relevant to cross-curricular subjects. For example, students can examine the steps involved in solving a quadratic equation.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Concepts**
INDICATOR / CLUSTER		**Data and Analysis (DA):**
EXPECTATION / STANDARD		Computing systems exist to process data. The amount of digital data generated in the world is rapidly expanding, and the need to process data effectively is increasingly important. Data is collected and stored so it can be analyzed to better understand the world and make more accurate predictions.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Concepts**
INDICATOR / CLUSTER		**Algorithms and Programming (AP):**
EXPECTATION / STANDARD		An algorithm is a sequence of steps designed to accomplish a specific task. Algorithms are translated into programs, or code, to provide instructions for computing devices. Algorithms and programming control all computing systems, empowering people to communicate with the world in new ways and solve compelling problems. The development process to create meaningful and efficient programs involves choosing which information to use and how to process and store it, breaking apart large problems into smaller ones, recombining existing solutions, and analyzing different solutions.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Practices**
INDICATOR / CLUSTER	**Practice 1:**	**Fostering an Inclusive Computing Culture**
EXPECTATION / STANDARD		**By the end of Grade 12, students should be able to:**
INDICATOR	1	Include the unique perspectives of others and reflect on one's own perspectives when designing and developing computational products.
INDICATOR	2	Address the needs of diverse end users during the design process to produce artifacts with broad accessibility and usability.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Core Practices**
INDICATOR / CLUSTER	**Practice 2:**	**Collaborating Around Computing**
EXPECTATION / STANDARD		**By the end of Grade 12, students should be able to:**
INDICATOR	2	Create team norms, expectations, and equitable workloads to increase efficiency and effectiveness.

STANDARD / AREA OF LEARNING		Utah 6-12 Computer Science Standards
OBJECTIVE / STRAND		Core Practices
INDICATOR / CLUSTER	Practice 3:	Recognizing and Defining Computational Problems
EXPECTATION / STANDARD		By the end of Grade 12, students should be able to:
INDICATOR	2	Decompose complex real-world problems into manageable subproblems that could integrate existing solutions or procedures.
INDICATOR	3	Evaluate whether it is appropriate and feasible to solve a problem computationally.

STANDARD / AREA OF LEARNING		Utah 6-12 Computer Science Standards
OBJECTIVE / STRAND		Core Practices
INDICATOR / CLUSTER	Practice 4:	Developing and Using Abstractions
EXPECTATION / STANDARD		By the end of Grade 12, students should be able to:
INDICATOR	3	Create modules and develop points of interaction that can apply to multiple situations and reduce complexity.

STANDARD / AREA OF LEARNING		Utah 6-12 Computer Science Standards
OBJECTIVE / STRAND		Core Practices
INDICATOR / CLUSTER	Practice 5:	Creating Computational Artifacts
EXPECTATION / STANDARD		By the end of Grade 12, students should be able to:
INDICATOR	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.
INDICATOR	2	Create a computational artifact for practical intent, personal expression, or to address a societal issue.

STANDARD / AREA OF LEARNING		Utah 6-12 Computer Science Standards
OBJECTIVE / STRAND		Core Practices
INDICATOR / CLUSTER	Practice 6:	Testing and Refining Computational Artifacts
EXPECTATION / STANDARD		By the end of Grade 12, students should be able to:
INDICATOR	1	Systematically test computational artifacts by considering all scenarios and using test cases.

STANDARD / AREA OF LEARNING		Utah 6-12 Computer Science Standards
OBJECTIVE / STRAND		Computing Systems (CS):
INDICATOR / CLUSTER	Standard 9/10.CS.3.	Develop guidelines that communicate systematic troubleshooting strategies that others can use to identify and fix errors. (Practice 6. Testing and Refining Computational Artifacts.)

EXPECTATION / STANDARD	Students will develop strategies for troubleshooting and fixing problems and/or errors in a system. Examples of complex troubleshooting strategies include resolving connectivity problems, adjusting system configurations and settings, ensuring hardware and software compatibility, and transferring data from one device to another. Students could create a flow chart, a job aid for a help desk employee, or an expert system. For example, students will design a solution to a space exploration challenge by breaking it down into smaller, more manageable problems that can be solved through the structure and function of a device. Define the problem, identify criteria and constraints, develop possible solutions using models, analyze data to make improvements from iteratively testing solutions, and optimize a solution. Examples of problems could include, cosmic radiation exposure, transportation on other planets or moons, or supplying energy to space travelers.

STANDARD / AREA OF LEARNING		Utah 6-12 Computer Science Standards
OBJECTIVE / STRAND		Algorithms and Programming (AP):
INDICATOR / CLUSTER	Standard 9/10.AP.1.	Design algorithms to solve computational problems using a combination of original and existing algorithms (Practice 3. Recognizing and Defining Computational Problems; Practice 4: Developing and Using Abstractions)

EXPECTATION / STANDARD	Students will create algorithms that combine existing algorithms with their original program to complete a certain task. For example, students could use the formula for energy of motion to construct a device that converts one form of energy into another form of energy to solve a complex real-life problem.

STANDARD / AREA OF LEARNING		Utah 6-12 Computer Science Standards
OBJECTIVE / STRAND		Algorithms and Programming (AP):
INDICATOR / CLUSTER	Standard 9/10.AP.3.	Decompose problems into multiple smaller problems through systematic analysis, using constructs (such as procedures, modules, functions, methods, and/or classes). (Practice 3. Recognizing and Defining Computational Problems)

EXPECTATION / STANDARD	Students will break down a big or complex problem and split it into smaller, easier-to-manage components. For example, students will find roots of polynomials by factoring them into smaller components and then solving for each factor.

STANDARD / AREA OF LEARNING		Utah 6-12 Computer Science Standards
OBJECTIVE / STRAND		Algorithms and Programming (AP):
INDICATOR / CLUSTER	Standard 9/10.AP.4.	Create computational artifacts using modular design. (Practice 5: Creating Computational Artifacts)

EXPECTATION / STANDARD		Students will create a computational artifact to solve a complex problem by breaking down the problems into smaller, easier-to-manage components. For example, students can solve a complex math problem using the order of operations.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Algorithms and Programming (AP):**
INDICATOR / CLUSTER	**Standard 9/10.AP.7.**	**Iteratively evaluate and refine a computational artifact to enhance its performance, reliability, usability, and accessibility. (Practice 6: Testing and Refining Computational Artifacts)**

EXPECTATION / STANDARD		Students will evaluate how computational artifacts can be developed, tested, and edited repeatedly to improve performance, ease of use, reliability, and/or accessibility. For example, students will use the scientific method to design an air powered rocket to land hit a target from a specific distance. This could also be a great opportunity to introduce Moore's Law.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Algorithms and Programming (AP):**
INDICATOR / CLUSTER	**Standard 9/10.AP.8.**	**Design and develop computational artifacts using collaborative tools. (Practice 2: Collaborating Around Computing; Practice 7: Communicating About Computing)**

EXPECTATION / STANDARD		Students will use collaborative tools to design and develop computational artifacts as a team. For example, students can collaborate on a presentation using cloud-based applications (Office 365, Google suite, etc.) to complete the design and development process of a project.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Algorithms and Programming (AP):**
INDICATOR / CLUSTER	**Standard 9/10.AP.9.**	**Create documentation (pseudocode) that communicates the design of the solution to a complex problem using text, graphics, and/or demonstrations. (Practice 7: Communicating About Computing)**

EXPECTATION / STANDARD		Students will design solutions to problems and document these solutions—using pseudocode, flowcharts, and other means--so that they can be implemented by either the student or someone else. During and after implementation, comments and additional documentation can facilitate future maintenance of that process. For example, students will create an outline for an essay before starting on the rough draft.

STANDARD / AREA OF LEARNING		**Utah 6-12 Computer Science Standards**
OBJECTIVE / STRAND		**Impacts of Computing (IC):**
INDICATOR / CLUSTER	**Standard 9/10.IC.3.**	**Identify solutions to problems in other content areas using established algorithms. (Practice 1: Fostering an Inclusive Computing Culture; Practice 2: Collaborating Around Computing)**

EXPECTATION / STANDARD		Students will develop solutions to problems that can relate to other subject areas. They will create and analyze a step-by-step process and apply it to a problem relevant to cross-curricular subjects. For example, students can examine the steps involved in solving a quadratic equation.

Vermont Content Standards

Mathematics

Grade **9** - Adopted: **2010 (CCSS)**

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

STANDARD / STRAND	VT.F.	Functions
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**F-IF.**	**Interpreting Functions**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.

Vermont Content Standards

Mathematics

Grade **10** - Adopted: **2010 (CCSS)**

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

STANDARD / STRAND	VT.F.	Functions
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**F-IF.**	**Interpreting Functions**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.

Vermont Content Standards

Science

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

STANDARD / STRAND	VT.HS-PS.	PHYSICAL SCIENCE
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.

STANDARD / STRAND	VT.HS-LS.	LIFE SCIENCE
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.

STANDARD / STRAND	VT.HS-LS.	LIFE SCIENCE
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.

STANDARD / STRAND	VT.HS-ESS.	EARTH AND SPACE SCIENCE

ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-ESS2.**	**Earth's Systems**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.
STANDARD / STRAND	**VT.HS-ESS.**	**EARTH AND SPACE SCIENCE**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-ESS3.**	**Earth and Human Activity**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.
STANDARD / STRAND	**VT.HS-ETS.**	**ENGINEERING DESIGN**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-ETS1.**	**Engineering Design**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.

STANDARD / STRAND	**VT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Key Ideas and Details**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	RST.9-10.2.	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	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 / STRAND	**VT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Craft and Structure**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	RST.9-10.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	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 / STRAND	**VT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Integration of Knowledge and Ideas**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	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 / STRAND	**VT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	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 / STRAND	**VT.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	**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.

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

Vermont Content Standards

Science

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

STANDARD / STRAND	**VT.HS-PS.**	**PHYSICAL SCIENCE**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.

STANDARD / STRAND	**VT.HS-LS.**	**LIFE SCIENCE**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.
STANDARD / STRAND	**VT.HS-LS.**	**LIFE SCIENCE**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.
STANDARD / STRAND	**VT.HS-ESS.**	**EARTH AND SPACE SCIENCE**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-ESS2.**	**Earth's Systems**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.
STANDARD / STRAND	**VT.HS-ESS.**	**EARTH AND SPACE SCIENCE**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-ESS3.**	**Earth and Human Activity**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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.
STANDARD / STRAND	**VT.HS-ETS.**	**ENGINEERING DESIGN**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	**HS-ETS1.**	**Engineering Design**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL		**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**

STANDARD / STRAND	**VT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Key Ideas and Details**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	RST.9-10.2.	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	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 / STRAND	**VT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Craft and Structure**

GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	RST.9-10.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	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 / STRAND	**VT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Integration of Knowledge and Ideas**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	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 / STRAND	**VT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	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 / STRAND	**VT.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	**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.
STANDARD / STRAND	**VT.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
ESSENTIAL KNOWLEDGE AND SKILL / STANDARD		**Production and Distribution of Writing**
GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

GRADE LEVEL EXPECTATION / KNOWLEDGE AND SKILL	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.

Vermont Content Standards

Technology Education

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

STANDARD / STRAND	**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 KNOWLEDGE AND SKILL / STANDARD	ISTE-S.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.
STANDARD / STRAND	**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 KNOWLEDGE AND SKILL / STANDARD	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 KNOWLEDGE AND SKILL / STANDARD	ISTE-S.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
STANDARD / STRAND	**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 KNOWLEDGE AND SKILL / STANDARD	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 KNOWLEDGE AND SKILL / STANDARD	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 KNOWLEDGE AND SKILL / STANDARD	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.

Vermont Content Standards

Technology Education

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

STANDARD / STRAND	**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 KNOWLEDGE AND SKILL / STANDARD	ISTE-S.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.
STANDARD / STRAND	**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 KNOWLEDGE AND SKILL / STANDARD	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 KNOWLEDGE AND SKILL / STANDARD	ISTE-S.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
STANDARD / STRAND	**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 KNOWLEDGE AND SKILL / STANDARD	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.
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ESSENTIAL KNOWLEDGE AND SKILL / STANDARD	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.

Virginia Standards of Learning

Mathematics

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

STRAND / TOPIC	**VA.A.**	**Algebra I**
STANDARD / STRAND		**Functions**
INDICATOR / STANDARD	**A.7.**	**The student will investigate and analyze linear and quadratic function families and their characteristics both algebraically and graphically, including**
INDICATOR	A.7.f.	Connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs.
STRAND / TOPIC	**VA.AFDA.**	**Algebra, Functions, and Data Analysis**
STANDARD / STRAND		**Algebra and Functions**
INDICATOR / STANDARD	**AFDA.1.**	**The student will investigate and analyze linear, quadratic, exponential, and logarithmic function families and their characteristics. Key concepts include**

INDICATOR	AFDA.1.g.	Connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs.

STRAND / TOPIC	**VA.AFDA.**	**Algebra, Functions, and Data Analysis**
STANDARD / STRAND		**Algebra and Functions**
INDICATOR / STANDARD	AFDA.4.	The student will use multiple representations of functions for analysis, interpretation, and prediction.

STRAND / TOPIC	**VA.AII.**	**Algebra II**
STANDARD / STRAND		**Functions**
INDICATOR / STANDARD	**AII.7.**	**The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include**
INDICATOR	AII.7.g.	Connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs.

STRAND / TOPIC	**VA.PS.**	**Probability and Statistics**
STANDARD / STRAND		**Descriptive Statistics**
INDICATOR / STANDARD	PS.2.	The student will analyze numerical characteristics of univariate data sets to describe patterns and departures from patterns, using mean, median, mode, variance, standard deviation, interquartile range, range, and outliers.

STRAND / TOPIC	**VA.PS.**	**Probability and Statistics**
STANDARD / STRAND		**Probability**
INDICATOR / STANDARD	PS.15.	The student will identify random variables as independent or dependent and determine the mean and standard deviations for random variables and sums and differences of independent random variables.

Virginia Standards of Learning

Mathematics

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

STRAND / TOPIC	**VA.A.**	**Algebra I**
STANDARD / STRAND		**Functions**
INDICATOR / STANDARD	**A.7.**	**The student will investigate and analyze linear and quadratic function families and their characteristics both algebraically and graphically, including**
INDICATOR	A.7.f.	Connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs.

STRAND / TOPIC	**VA.AFDA.**	**Algebra, Functions, and Data Analysis**

STANDARD / STRAND		**Algebra and Functions**
INDICATOR / STANDARD	**AFDA.1.**	**The student will investigate and analyze linear, quadratic, exponential, and logarithmic function families and their characteristics. Key concepts include**
INDICATOR	AFDA.1.g.	Connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs.

STRAND / TOPIC	**VA.AFDA.**	**Algebra, Functions, and Data Analysis**
STANDARD / STRAND		**Algebra and Functions**
INDICATOR / STANDARD	AFDA.4.	The student will use multiple representations of functions for analysis, interpretation, and prediction.

STRAND / TOPIC	**VA.AII.**	**Algebra II**
STANDARD / STRAND		**Functions**
INDICATOR / STANDARD	**AII.7.**	**The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include**
INDICATOR	AII.7.g.	Connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs.

STRAND / TOPIC	**VA.PS.**	**Probability and Statistics**
STANDARD / STRAND		**Descriptive Statistics**
INDICATOR / STANDARD	PS.2.	The student will analyze numerical characteristics of univariate data sets to describe patterns and departures from patterns, using mean, median, mode, variance, standard deviation, interquartile range, range, and outliers.

STRAND / TOPIC	**VA.PS.**	**Probability and Statistics**
STANDARD / STRAND		**Probability**
INDICATOR / STANDARD	PS.15.	The student will identify random variables as independent or dependent and determine the mean and standard deviations for random variables and sums and differences of independent random variables.

Virginia Standards of Learning

Science

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

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.b.**	**planning and carrying out investigations**
INDICATOR	BIO.1.b.2.	plan and conduct investigations or test design solutions in a safe and ethical manner including considerations of environmental, social, and personal effects

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.c.**	**interpreting, analyzing, and evaluating data**
INDICATOR	BIO.1.c.3.	use data in building and revising models, supporting an explanation for phenomena, or testing solutions to problems
INDICATOR	BIO.1.c.4.	analyze data using tools, technologies, and/or models to make valid and reliable scientific claims or determine an optimal design solution

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.d.**	**constructing and critiquing conclusions and explanations**
INDICATOR	BIO.1.d.3.	apply scientific ideas, principles, and/or evidence to provide an explanation of phenomena and design solutions
INDICATOR	BIO.1.d.4.	compare and evaluate competing arguments or design solutions in light of currently accepted explanations and new scientific evidence

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.e.**	**developing and using models**
INDICATOR	BIO.1.e.1.	evaluate the merits and limitations of models
INDICATOR	BIO.1.e.2.	develop, revise, and/or use models based on evidence to illustrate or predict relationships
INDICATOR	BIO.1.e.3.	develop and/or use models to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.f.**	**obtaining, evaluating, and communicating information**
INDICATOR	BIO.1.f.3.	communicate scientific and/or technical information about phenomena in multiple formats

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.8.**	**The student will investigate and understand that there are dynamic equilibria within populations, communities, and ecosystems. Key ideas include:**

INDICATOR / STANDARD	BIO.8.b.	nutrients cycle with energy flow through ecosystems;
INDICATOR / STANDARD	BIO.8.d.	natural events and human activities influence local and global ecosystems and may affect the flora and fauna of Virginia.
STRAND / TOPIC		**Earth Science**
STANDARD / STRAND	**ES.6.**	**The student will investigate and understand that resource use is complex. Key ideas include:**
INDICATOR / STANDARD	ES.6.a.	global resource use has environmental liabilities and benefits;
INDICATOR / STANDARD	ES.6.c.	use of Virginia resources has an effect on the environment and the economy;
STRAND / TOPIC		**Earth Science**
STANDARD / STRAND	**ES.11.**	**The student will investigate and understand that the atmosphere is a complex, dynamic system and is subject to long-and short-term variations. Key ideas include:**
INDICATOR / STANDARD	ES.11.b.	biologic and geologic interactions over long and short time spans change the atmospheric composition;
INDICATOR / STANDARD	ES.11.c.	natural events and human actions may stress atmospheric regulation mechanisms;
INDICATOR / STANDARD	ES.11.d.	human actions, including economic and policy decisions, affect the atmosphere.
STRAND / TOPIC		**Earth Science**
STANDARD / STRAND	**ES.12.**	**The student will investigate and understand that Earth's weather and climate are the result of the interaction of the sun's energy with the atmosphere, oceans, and the land. Key ideas include:**
INDICATOR / STANDARD	ES.12.e.	changes in the atmosphere and the oceans due to natural and human activity affect global climate.

Virginia Standards of Learning

Science

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

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.b.**	**planning and carrying out investigations**
INDICATOR	BIO.1.b.2.	plan and conduct investigations or test design solutions in a safe and ethical manner including considerations of environmental, social, and personal effects

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.c.**	**interpreting, analyzing, and evaluating data**
INDICATOR	BIO.1.c.3.	use data in building and revising models, supporting an explanation for phenomena, or testing solutions to problems
INDICATOR	BIO.1.c.4.	analyze data using tools, technologies, and/or models to make valid and reliable scientific claims or determine an optimal design solution

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.d.**	**constructing and critiquing conclusions and explanations**
INDICATOR	BIO.1.d.3.	apply scientific ideas, principles, and/or evidence to provide an explanation of phenomena and design solutions
INDICATOR	BIO.1.d.4.	compare and evaluate competing arguments or design solutions in light of currently accepted explanations and new scientific evidence

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.e.**	**developing and using models**
INDICATOR	BIO.1.e.1.	evaluate the merits and limitations of models
INDICATOR	BIO.1.e.2.	develop, revise, and/or use models based on evidence to illustrate or predict relationships
INDICATOR	BIO.1.e.3.	develop and/or use models to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.1.**	**The student will demonstrate an understanding of scientific and engineering practices by:**
INDICATOR / STANDARD	**BIO.1.f.**	**obtaining, evaluating, and communicating information**
INDICATOR	BIO.1.f.3.	communicate scientific and/or technical information about phenomena in multiple formats

STRAND / TOPIC		**Biology**
STANDARD / STRAND	**BIO.8.**	**The student will investigate and understand that there are dynamic equilibria within populations, communities, and ecosystems. Key ideas include:**

INDICATOR / STANDARD	BIO.8.b.	nutrients cycle with energy flow through ecosystems;
INDICATOR / STANDARD	BIO.8.d.	natural events and human activities influence local and global ecosystems and may affect the flora and fauna of Virginia.
STRAND / TOPIC		**Earth Science**
STANDARD / STRAND	**ES.6.**	**The student will investigate and understand that resource use is complex. Key ideas include:**
INDICATOR / STANDARD	ES.6.a.	global resource use has environmental liabilities and benefits;
INDICATOR / STANDARD	ES.6.c.	use of Virginia resources has an effect on the environment and the economy;
STRAND / TOPIC		**Earth Science**
STANDARD / STRAND	**ES.11.**	**The student will investigate and understand that the atmosphere is a complex, dynamic system and is subject to long-and short-term variations. Key ideas include:**
INDICATOR / STANDARD	ES.11.b.	biologic and geologic interactions over long and short time spans change the atmospheric composition;
INDICATOR / STANDARD	ES.11.c.	natural events and human actions may stress atmospheric regulation mechanisms;
INDICATOR / STANDARD	ES.11.d.	human actions, including economic and policy decisions, affect the atmosphere.
STRAND / TOPIC		**Earth Science**
STANDARD / STRAND	**ES.12.**	**The student will investigate and understand that Earth's weather and climate are the result of the interaction of the sun's energy with the atmosphere, oceans, and the land. Key ideas include:**
INDICATOR / STANDARD	ES.12.e.	changes in the atmosphere and the oceans due to natural and human activity affect global climate.

Virginia Standards of Learning

Technology Education

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

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.CSF.**	**Computer Science Foundations**
INDICATOR / STANDARD		**Algorithms and Programming**
INDICATOR	CSF.14.	The student will design and iteratively develop programs for practical intent or personal expression, incorporating feedback from users.

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.CSF.**	**Computer Science Foundations**
INDICATOR / STANDARD		**Algorithms and Programming**
INDICATOR	**CSF.15.**	**The student will design and implement algorithms using**
PROGRESS INDICATOR	CSF.15.a.	Sequencing of instructions.

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.CSF.**	**Computer Science Foundations**
INDICATOR / STANDARD		**Algorithms and Programming**
INDICATOR	CSF.20.	The student will apply simple algorithms to a collection of data.

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.PRG.**	**Computer Science Programming**
INDICATOR / STANDARD		**Cybersecurity**
INDICATOR	PRG.1.	The student will describe and use best practices of program development that make some common flaws less likely and explain how this improves computer security.

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.PRG.**	**Computer Science Programming**
INDICATOR / STANDARD		**Algorithms and Programming**
INDICATOR	PRG.17.	The student will adapt classic algorithms for use in a particular context and analyze them for effectiveness and efficiency.

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

STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**KC.**	**Knowledge Constructor (KC)**
INDICATOR / STANDARD		**Students critically curate a variety of digital resources using appropriate technologies, including assistive technologies, to construct knowledge, produce creative digital works, and make meaningful learning experiences for themselves and others.**
INDICATOR	**KC.D.**	**Actively explore real-world issues and problems, develop ideas and theories, and pursue answers and solutions.**
PROGRESS INDICATOR	KC.D.h.	Students use knowledge, information skills, and digital resources and tools to engage in public conversation and/or debate real-world issues.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**ID.**	**Innovative Designer (ID)**
INDICATOR / STANDARD		**Students use a variety of technologies, including assistive technologies, within a design process to identify and solve problems by creating new, useful or imaginative solutions or iterations.**
INDICATOR	**ID.A.**	**Know and use appropriate technologies in a purposeful design process for generating ideas, testing theories, creating innovative digital works, or solving authentic problems.**
PROGRESS INDICATOR	ID.A.h.	Students autonomously select and use appropriate technologies in a design process to generate ideas, create, document, test, revise, and present innovative products or solve authentic problems.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**ID.**	**Innovative Designer (ID)**
INDICATOR / STANDARD		**Students use a variety of technologies, including assistive technologies, within a design process to identify and solve problems by creating new, useful or imaginative solutions or iterations.**
INDICATOR	**ID.B.**	**Select and use appropriate technologies to plan and manage a design process that considers design constraints and calculated risks.**
PROGRESS INDICATOR	ID.B.h.	Students autonomously select and use appropriate technologies to plan and manage a design process that identifies design constraints and trade-offs and weighs risks.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**ID.**	**Innovative Designer (ID)**
INDICATOR / STANDARD		**Students use a variety of technologies, including assistive technologies, within a design process to identify and solve problems by creating new, useful or imaginative solutions or iterations.**
INDICATOR	**ID.C.**	**Use appropriate technologies to develop, test, and refine prototypes as part of a cyclical design process.**
PROGRESS INDICATOR	ID.C.h.	Students autonomously select and use appropriate technologies in a cyclical design process to develop, test, and refine prototypes understanding the role of trial and error and setbacks as potential opportunities for improvement.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**ID.**	**Innovative Designer (ID)**
INDICATOR / STANDARD		**Students use a variety of technologies, including assistive technologies, within a design process to identify and solve problems by creating new, useful or imaginative solutions or iterations.**
INDICATOR	**ID.D.**	**Exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.**
PROGRESS INDICATOR	ID.D.h.	Students autonomously demonstrate an ability to persevere through difficulties and ambiguity in solving open-ended problems.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**CT.**	**Computational Thinker (CT)**

INDICATOR / STANDARD		**Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods, including those that leverage assistive technologies, to develop and test solutions.**
INDICATOR	**CT.A.**	**Formulate problem definitions suited for technology-assisted methods such as data analysis, modeling and algorithmic thinking in exploring and finding solutions.**
PROGRESS INDICATOR	CT.A.h.	Students demonstrate how to identify, explore, and solve a real-world problem using technology-assisted methods such as data analysis, modeling, or algorithmic thinking.

STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**CT.**	**Computational Thinker (CT)**
INDICATOR / STANDARD		**Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods, including those that leverage assistive technologies, to develop and test solutions.**
INDICATOR	**CT.B.**	**Collect data or identify relevant data sets, use appropriate technologies to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.**
PROGRESS INDICATOR	CT.B.h.	Students use appropriate technologies to collect, organize, interpret, and analyze data sets to predict outcomes, draw conclusions, solve problems, and make evidence-based decisions.

STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**CT.**	**Computational Thinker (CT)**
INDICATOR / STANDARD		**Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods, including those that leverage assistive technologies, to develop and test solutions.**
INDICATOR	**CT.C.**	**Break problems into component parts, extract key information, and develop descriptive models, using technologies when appropriate, to understand complex systems or facilitate problem-solving.**
PROGRESS INDICATOR	CT.C.h.	Students evaluate a task in terms of sub problems needed and make changes to address issues or changing task needs using technologies, when appropriate.

STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**CC.**	**Creative Communicator (CC)**
INDICATOR / STANDARD		**Students communicate clearly and express themselves creatively for a variety of purposes using appropriate technologies (including assistive technologies), styles, formats, and digital media appropriate to their goals.**
INDICATOR	**CC.B.**	**Create original works or responsibly repurpose or remix digital resources into new creations.**
PROGRESS INDICATOR	CC.B.h.	Students use multiple appropriate technologies to create new digital work or repurpose/remix other digital work into new digital works to support a point of view.

STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**GC.**	**Global Collaborator (GC)**
INDICATOR / STANDARD		**Students use appropriate technologies, including assistive technologies, to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.**
INDICATOR	**GC.D.**	**Explore local and global issues and use collaborative technologies to work with others to investigate solutions.**

PROGRESS INDICATOR	GC.D.h.	Students use collaborative technologies to understand problems, investigate, and develop solutions related to local and global issues, and advocate for implementation of solutions.

Virginia Standards of Learning
Technology Education
Grade **10** - Adopted: **2017**

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.CSF.**	**Computer Science Foundations**
INDICATOR / STANDARD		**Algorithms and Programming**
INDICATOR	CSF.14.	The student will design and iteratively develop programs for practical intent or personal expression, incorporating feedback from users.

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.CSF.**	**Computer Science Foundations**
INDICATOR / STANDARD		**Algorithms and Programming**
INDICATOR	**CSF.15.**	**The student will design and implement algorithms using**
PROGRESS INDICATOR	CSF.15.a.	Sequencing of instructions.

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.CSF.**	**Computer Science Foundations**
INDICATOR / STANDARD		**Algorithms and Programming**
INDICATOR	CSF.20.	The student will apply simple algorithms to a collection of data.

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.PRG.**	**Computer Science Programming**
INDICATOR / STANDARD		**Cybersecurity**
INDICATOR	PRG.1.	The student will describe and use best practices of program development that make some common flaws less likely and explain how this improves computer security.

STRAND / TOPIC	**VA.CS.**	**Computer Science**
STANDARD / STRAND	**CS.PRG.**	**Computer Science Programming**
INDICATOR / STANDARD		**Algorithms and Programming**

INDICATOR	PRG.17.	The student will adapt classic algorithms for use in a particular context and analyze them for effectiveness and efficiency.

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

STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**KC.**	**Knowledge Constructor (KC)**
INDICATOR / STANDARD		**Students critically curate a variety of digital resources using appropriate technologies, including assistive technologies, to construct knowledge, produce creative digital works, and make meaningful learning experiences for themselves and others.**
INDICATOR	**KC.D.**	**Actively explore real-world issues and problems, develop ideas and theories, and pursue answers and solutions.**
PROGRESS INDICATOR	KC.D.h.	Students use knowledge, information skills, and digital resources and tools to engage in public conversation and/or debate real-world issues.

STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**ID.**	**Innovative Designer (ID)**
INDICATOR / STANDARD		**Students use a variety of technologies, including assistive technologies, within a design process to identify and solve problems by creating new, useful or imaginative solutions or iterations.**
INDICATOR	**ID.A.**	**Know and use appropriate technologies in a purposeful design process for generating ideas, testing theories, creating innovative digital works, or solving authentic problems.**
PROGRESS INDICATOR	ID.A.h.	Students autonomously select and use appropriate technologies in a design process to generate ideas, create, document, test, revise, and present innovative products or solve authentic problems.

STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**ID.**	**Innovative Designer (ID)**
INDICATOR / STANDARD		**Students use a variety of technologies, including assistive technologies, within a design process to identify and solve problems by creating new, useful or imaginative solutions or iterations.**
INDICATOR	**ID.B.**	**Select and use appropriate technologies to plan and manage a design process that considers design constraints and calculated risks.**
PROGRESS INDICATOR	ID.B.h.	Students autonomously select and use appropriate technologies to plan and manage a design process that identifies design constraints and trade-offs and weighs risks.

STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**ID.**	**Innovative Designer (ID)**
INDICATOR / STANDARD		**Students use a variety of technologies, including assistive technologies, within a design process to identify and solve problems by creating new, useful or imaginative solutions or iterations.**
INDICATOR	**ID.C.**	**Use appropriate technologies to develop, test, and refine prototypes as part of a cyclical design process.**
PROGRESS INDICATOR	ID.C.h.	Students autonomously select and use appropriate technologies in a cyclical design process to develop, test, and refine prototypes understanding the role of trial and error and setbacks as potential opportunities for improvement.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**ID.**	**Innovative Designer (ID)**
INDICATOR / STANDARD		**Students use a variety of technologies, including assistive technologies, within a design process to identify and solve problems by creating new, useful or imaginative solutions or iterations.**
INDICATOR	**ID.D.**	**Exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.**
PROGRESS INDICATOR	ID.D.h.	Students autonomously demonstrate an ability to persevere through difficulties and ambiguity in solving open-ended problems.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**CT.**	**Computational Thinker (CT)**
INDICATOR / STANDARD		**Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods, including those that leverage assistive technologies, to develop and test solutions.**
INDICATOR	**CT.A.**	**Formulate problem definitions suited for technology-assisted methods such as data analysis, modeling and algorithmic thinking in exploring and finding solutions.**
PROGRESS INDICATOR	CT.A.h.	Students demonstrate how to identify, explore, and solve a real-world problem using technology-assisted methods such as data analysis, modeling, or algorithmic thinking.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**CT.**	**Computational Thinker (CT)**
INDICATOR / STANDARD		**Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods, including those that leverage assistive technologies, to develop and test solutions.**
INDICATOR	**CT.B.**	**Collect data or identify relevant data sets, use appropriate technologies to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.**
PROGRESS INDICATOR	CT.B.h.	Students use appropriate technologies to collect, organize, interpret, and analyze data sets to predict outcomes, draw conclusions, solve problems, and make evidence-based decisions.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**CT.**	**Computational Thinker (CT)**
INDICATOR / STANDARD		**Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods, including those that leverage assistive technologies, to develop and test solutions.**
INDICATOR	**CT.C.**	**Break problems into component parts, extract key information, and develop descriptive models, using technologies when appropriate, to understand complex systems or facilitate problem-solving.**
PROGRESS INDICATOR	CT.C.h.	Students evaluate a task in terms of sub problems needed and make changes to address issues or changing task needs using technologies, when appropriate.

STRAND / TOPIC		Digital Learning Integration Standards of Learning for Virginia Public Schools
STANDARD / STRAND	**CC.**	**Creative Communicator (CC)**

INDICATOR / STANDARD		**Students communicate clearly and express themselves creatively for a variety of purposes using appropriate technologies (including assistive technologies), styles, formats, and digital media appropriate to their goals.**
INDICATOR	**CC.B.**	**Create original works or responsibly repurpose or remix digital resources into new creations.**
PROGRESS INDICATOR	CC.B.h.	Students use multiple appropriate technologies to create new digital work or repurpose/remix other digital work into new digital works to support a point of view.
STRAND / TOPIC		**Digital Learning Integration Standards of Learning for Virginia Public Schools**
STANDARD / STRAND	**GC.**	**Global Collaborator (GC)**
INDICATOR / STANDARD		**Students use appropriate technologies, including assistive technologies, to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.**
INDICATOR	**GC.D.**	**Explore local and global issues and use collaborative technologies to work with others to investigate solutions.**
PROGRESS INDICATOR	GC.D.h.	Students use collaborative technologies to understand problems, investigate, and develop solutions related to local and global issues, and advocate for implementation of solutions.

Washington DC Academic Standards

Mathematics

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

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

CONTENT STANDARD / STRAND / DISCIPLINE	DC.CC.F.	Functions
STANDARD / ESSENTIAL SKILL	F-IF.	Interpreting Functions
STUDENT EXPECTATION / ESSENTIAL SKILL		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.

Washington DC Academic Standards

Mathematics

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

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

CONTENT STANDARD / STRAND / DISCIPLINE	DC.CC.F.	Functions
STANDARD / ESSENTIAL SKILL	F-IF.	Interpreting Functions

STUDENT EXPECTATION / ESSENTIAL SKILL		**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.

Washington DC Academic Standards

Science

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

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

CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-LS.**	**LIFE SCIENCE**
STANDARD / ESSENTIAL SKILL	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
STUDENT EXPECTATION / ESSENTIAL SKILL		**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.

CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-LS.**	**LIFE SCIENCE**
STANDARD / ESSENTIAL SKILL	**HS-LS4.**	**Biological Evolution: Unity and Diversity**

STUDENT EXPECTATION / ESSENTIAL SKILL		**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.
CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STANDARD / ESSENTIAL SKILL	**HS-ESS2.**	**Earth's Systems**
STUDENT EXPECTATION / ESSENTIAL SKILL		**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.
CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STANDARD / ESSENTIAL SKILL	**HS-ESS3.**	**Earth and Human Activity**
STUDENT EXPECTATION / ESSENTIAL SKILL		**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.
CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-ETS.**	**ENGINEERING DESIGN**
STANDARD / ESSENTIAL SKILL	**HS-ETS1.**	**Engineering Design**

STUDENT EXPECTATION / ESSENTIAL SKILL		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.

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

CONTENT STANDARD / STRAND / DISCIPLINE	DC.9-10.RST.	Reading Standards for Literacy in Science and Technical Subjects
STANDARD / ESSENTIAL SKILL		Key Ideas and Details
STUDENT EXPECTATION / ESSENTIAL SKILL	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.
STUDENT EXPECTATION / ESSENTIAL SKILL	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 STANDARD / STRAND / DISCIPLINE	DC.9-10.RST.	Reading Standards for Literacy in Science and Technical Subjects
STANDARD / ESSENTIAL SKILL		Craft and Structure
STUDENT EXPECTATION / ESSENTIAL SKILL	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.
STUDENT EXPECTATION / ESSENTIAL SKILL	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 STANDARD / STRAND / DISCIPLINE	DC.9-10.RST.	Reading Standards for Literacy in Science and Technical Subjects
STANDARD / ESSENTIAL SKILL		Integration of Knowledge and Ideas

STUDENT EXPECTATION / ESSENTIAL SKILL	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 STANDARD / STRAND / DISCIPLINE	**DC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD / ESSENTIAL SKILL		**Range of Reading and Level of Text Complexity**

STUDENT EXPECTATION / ESSENTIAL SKILL	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 STANDARD / STRAND / DISCIPLINE	**DC.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
STANDARD / ESSENTIAL SKILL		**Text Types and Purposes**
STUDENT EXPECTATION / ESSENTIAL SKILL	**9-10.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**

EXPECTATION	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 STANDARD / STRAND / DISCIPLINE	**DC.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
STANDARD / ESSENTIAL SKILL		**Production and Distribution of Writing**

STUDENT EXPECTATION / ESSENTIAL SKILL	9-10.WHST.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

STUDENT EXPECTATION / ESSENTIAL SKILL	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.

Washington DC Academic Standards

Science

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

CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-PS.**	**PHYSICAL SCIENCE**

STANDARD / ESSENTIAL SKILL	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
STUDENT EXPECTATION / ESSENTIAL SKILL		**Students who demonstrate understanding can:**
EXPECTATION	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-LS.**	**LIFE SCIENCE**
STANDARD / ESSENTIAL SKILL	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
STUDENT EXPECTATION / ESSENTIAL SKILL		**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.
CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-LS.**	**LIFE SCIENCE**
STANDARD / ESSENTIAL SKILL	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
STUDENT EXPECTATION / ESSENTIAL SKILL		**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.
CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STANDARD / ESSENTIAL SKILL	**HS-ESS2.**	**Earth's Systems**

STUDENT EXPECTATION / ESSENTIAL SKILL		**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.
CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-ESS.**	**EARTH AND SPACE SCIENCE**
STANDARD / ESSENTIAL SKILL	**HS-ESS3.**	**Earth and Human Activity**
STUDENT EXPECTATION / ESSENTIAL SKILL		**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.
CONTENT STANDARD / STRAND / DISCIPLINE	**DC.HS-ETS.**	**ENGINEERING DESIGN**
STANDARD / ESSENTIAL SKILL	**HS-ETS1.**	**Engineering Design**
STUDENT EXPECTATION / ESSENTIAL SKILL		**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.

CONTENT STANDARD / STRAND / DISCIPLINE	**DC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD / ESSENTIAL SKILL		**Key Ideas and Details**
STUDENT EXPECTATION / ESSENTIAL SKILL	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.
STUDENT EXPECTATION / ESSENTIAL SKILL	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 STANDARD / STRAND / DISCIPLINE	**DC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD / ESSENTIAL SKILL		**Craft and Structure**
STUDENT EXPECTATION / ESSENTIAL SKILL	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.
STUDENT EXPECTATION / ESSENTIAL SKILL	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 STANDARD / STRAND / DISCIPLINE	**DC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD / ESSENTIAL SKILL		**Integration of Knowledge and Ideas**
STUDENT EXPECTATION / ESSENTIAL SKILL	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 STANDARD / STRAND / DISCIPLINE	**DC.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD / ESSENTIAL SKILL		**Range of Reading and Level of Text Complexity**

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

Washington State K-12 Learning Standards and Guidelines

Mathematics

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

EALR	**WA.MP.**	**Mathematical Practices**
BIG IDEA / CORE CONTENT	MP.1.	Make sense of problems and persevere in solving them.
BIG IDEA / CORE CONTENT	MP.2.	Reason abstractly and quantitatively.
BIG IDEA / CORE CONTENT	MP.3.	Construct viable arguments and critique the reasoning of others.

BIG IDEA / CORE CONTENT	MP.4.	Model with mathematics.
BIG IDEA / CORE CONTENT	MP.6.	Attend to precision.
BIG IDEA / CORE CONTENT	MP.7.	Look for and make use of structure.
BIG IDEA / CORE CONTENT	MP.8.	Look for and express regularity in repeated reasoning.

EALR	WA.F.	Functions
BIG IDEA / CORE CONTENT	**F-IF.**	**Interpreting Functions**
CORE CONTENT / CONTENT STANDARD		**Interpret functions that arise in applications in terms of the context.**
CONTENT STANDARD / PERFORMANCE 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.

Washington State K-12 Learning Standards and Guidelines

Mathematics

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

EALR	WA.MP.	Mathematical Practices
BIG IDEA / CORE CONTENT	MP.1.	Make sense of problems and persevere in solving them.
BIG IDEA / CORE CONTENT	MP.2.	Reason abstractly and quantitatively.
BIG IDEA / CORE CONTENT	MP.3.	Construct viable arguments and critique the reasoning of others.
BIG IDEA / CORE CONTENT	MP.4.	Model with mathematics.
BIG IDEA / CORE CONTENT	MP.6.	Attend to precision.

BIG IDEA / CORE CONTENT	MP.7.	Look for and make use of structure.
BIG IDEA / CORE CONTENT	MP.8.	Look for and express regularity in repeated reasoning.

EALR	WA.F.	Functions
BIG IDEA / CORE CONTENT	**F-IF.**	**Interpreting Functions**
CORE CONTENT / CONTENT STANDARD		**Interpret functions that arise in applications in terms of the context.**
CONTENT STANDARD / PERFORMANCE 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.

Washington State K-12 Learning Standards and Guidelines

Science

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

EALR	WA.HS-PS.	PHYSICAL SCIENCE
BIG IDEA / CORE CONTENT	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

EALR	WA.HS-LS.	LIFE SCIENCE
BIG IDEA / CORE CONTENT	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE 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.

CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

EALR	**WA.HS-LS.**	**LIFE SCIENCE**
BIG IDEA / CORE CONTENT	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

EALR	**WA.HS-ESS.**	**EARTH AND SPACE SCIENCE**
BIG IDEA / CORE CONTENT	**HS-ESS2.**	**Earth's Systems**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

EALR	**WA.HS-ESS.**	**EARTH AND SPACE SCIENCE**
BIG IDEA / CORE CONTENT	**HS-ESS3.**	**Earth and Human Activity**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**

CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
CONTENT STANDARD / PERFORMANCE 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.

EALR	**WA.HS-ETS.**	**ENGINEERING DESIGN**
BIG IDEA / CORE CONTENT	**HS-ETS1.**	**Engineering Design**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE 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**

EALR	**WA.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BIG IDEA / CORE CONTENT		**Key Ideas and Details**
CORE CONTENT / CONTENT STANDARD	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.

CORE CONTENT / CONTENT STANDARD	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.

EALR	WA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
BIG IDEA / CORE CONTENT		Craft and Structure
CORE CONTENT / CONTENT STANDARD	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.
CORE CONTENT / CONTENT STANDARD	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).

EALR	WA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
BIG IDEA / CORE CONTENT		Integration of Knowledge and Ideas
CORE CONTENT / CONTENT STANDARD	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.

EALR	WA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
BIG IDEA / CORE CONTENT		Range of Reading and Level of Text Complexity
CORE CONTENT / CONTENT STANDARD	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.

EALR	WA.WHST.9-10.	Writing Standards for Literacy in Science and Technical Subjects
BIG IDEA / CORE CONTENT		Text Types and Purposes
CORE CONTENT / CONTENT STANDARD	WHST.9-10.2.	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
CONTENT STANDARD / PERFORMANCE 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.

EALR	WA.WHST.9-10.	Writing Standards for Literacy in Science and Technical Subjects
BIG IDEA / CORE CONTENT		**Production and Distribution of Writing**
CORE CONTENT / CONTENT STANDARD	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CORE CONTENT / CONTENT STANDARD	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.

Washington State K-12 Learning Standards and Guidelines

Science

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

EALR	WA.HS-PS.	PHYSICAL SCIENCE
BIG IDEA / CORE CONTENT	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

EALR	WA.HS-LS.	LIFE SCIENCE
BIG IDEA / CORE CONTENT	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
CONTENT STANDARD / PERFORMANCE 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.

CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

EALR	WA.HS-LS.	LIFE SCIENCE
BIG IDEA / CORE CONTENT	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

EALR	WA.HS-ESS.	EARTH AND SPACE SCIENCE
BIG IDEA / CORE CONTENT	**HS-ESS2.**	**Earth's Systems**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

EALR	WA.HS-ESS.	EARTH AND SPACE SCIENCE
BIG IDEA / CORE CONTENT	**HS-ESS3.**	**Earth and Human Activity**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

CONTENT STANDARD / PERFORMANCE EXPECTATION	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
CONTENT STANDARD / PERFORMANCE 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.

EALR	**WA.HS-ETS.**	**ENGINEERING DESIGN**
BIG IDEA / CORE CONTENT	**HS-ETS1.**	**Engineering Design**
CORE CONTENT / CONTENT STANDARD		**Students who demonstrate understanding can:**
CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE 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.
CONTENT STANDARD / PERFORMANCE 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**

EALR	**WA.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BIG IDEA / CORE CONTENT		**Key Ideas and Details**
CORE CONTENT / CONTENT STANDARD	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.
CORE CONTENT / CONTENT STANDARD	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.

EALR	**WA.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BIG IDEA / CORE CONTENT		**Craft and Structure**

CORE CONTENT / CONTENT STANDARD	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.
CORE CONTENT / CONTENT STANDARD	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).
EALR	**WA.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BIG IDEA / CORE CONTENT		**Integration of Knowledge and Ideas**
CORE CONTENT / CONTENT STANDARD	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.
EALR	**WA.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BIG IDEA / CORE CONTENT		**Range of Reading and Level of Text Complexity**
CORE CONTENT / CONTENT STANDARD	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.
EALR	**WA.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
BIG IDEA / CORE CONTENT		**Text Types and Purposes**
CORE CONTENT / CONTENT STANDARD	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
CONTENT STANDARD / PERFORMANCE 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.
EALR	**WA.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
BIG IDEA / CORE CONTENT		**Production and Distribution of Writing**
CORE CONTENT / CONTENT STANDARD	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CORE CONTENT / CONTENT STANDARD	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.

Washington State K-12 Learning Standards and Guidelines

Technology Education

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

EALR	WA.ET.9-12.	Educational Technology Learning Standards
BIG IDEA / CORE CONTENT	**9-12.3.**	**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.**
CORE CONTENT / CONTENT STANDARD	9-12.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

EALR	WA.ET.9-12.	Educational Technology Learning Standards
BIG IDEA / CORE CONTENT	**9-12.4.**	**Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
CORE CONTENT / CONTENT STANDARD	9-12.4.a.	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
CORE CONTENT / CONTENT STANDARD	9-12.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

EALR	WA.ET.9-12.	Educational Technology Learning Standards
BIG IDEA / CORE CONTENT	**9-12.5.**	**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.**
CORE CONTENT / CONTENT STANDARD	9-12.5.a.	Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
CORE CONTENT / CONTENT STANDARD	9-12.5.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.
CORE CONTENT / CONTENT STANDARD	9-12.5.c.	Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

CORE CONTENT / CONTENT STANDARD	9-12.5.d.	Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

EALR		Computer Science
BIG IDEA / CORE CONTENT		**Level 3A: 9-10**
CORE CONTENT / CONTENT STANDARD	**3A-AP.**	**Algorithms and Programming**
CONTENT STANDARD / PERFORMANCE EXPECTATION	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. (P. 5.2)
CONTENT STANDARD / PERFORMANCE EXPECTATION	3A-AP-16.	Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions. (P. 5.2)

EALR		Computer Science
BIG IDEA / CORE CONTENT		**Level 3A: 9-10**
CORE CONTENT / CONTENT STANDARD	**3A-IC.**	**Impacts of Computing**
CONTENT STANDARD / PERFORMANCE EXPECTATION	3A-IC-25.	Test and refine computational artifacts to reduce bias and equity deficits. (P. 1.2)
CONTENT STANDARD / PERFORMANCE EXPECTATION	3A-IC-26.	Demonstrate ways a given algorithm applies to problems across disciplines. (P. 3.1)

Washington State K-12 Learning Standards and Guidelines

Technology Education

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

EALR	WA.ET.9-12.	Educational Technology Learning Standards
BIG IDEA / CORE CONTENT	**9-12.3.**	**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.**
CORE CONTENT / CONTENT STANDARD	9-12.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

EALR	WA.ET.9-12.	Educational Technology Learning Standards
BIG IDEA / CORE CONTENT	**9-12.4.**	**Innovative Designer - Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
CORE CONTENT / CONTENT STANDARD	9-12.4.a.	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
CORE CONTENT / CONTENT STANDARD	9-12.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

EALR	WA.ET.9-12.	Educational Technology Learning Standards
BIG IDEA / CORE CONTENT	**9-12.5.**	**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.**
CORE CONTENT / CONTENT STANDARD	9-12.5.a.	Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
CORE CONTENT / CONTENT STANDARD	9-12.5.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.
CORE CONTENT / CONTENT STANDARD	9-12.5.c.	Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
CORE CONTENT / CONTENT STANDARD	9-12.5.d.	Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

EALR		Computer Science
BIG IDEA / CORE CONTENT		**Level 3A: 9-10**
CORE CONTENT / CONTENT STANDARD	**3A-AP.**	**Algorithms and Programming**
CONTENT STANDARD / PERFORMANCE EXPECTATION	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. (P. 5.2)

CONTENT STANDARD / PERFORMANCE EXPECTATION	3A-AP-16.	Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions. (P. 5.2)

EALR		**Computer Science**
BIG IDEA / CORE CONTENT		**Level 3A: 9-10**
CORE CONTENT / CONTENT STANDARD	**3A-IC.**	**Impacts of Computing**
CONTENT STANDARD / PERFORMANCE EXPECTATION	3A-IC-25.	Test and refine computational artifacts to reduce bias and equity deficits. (P. 1.2)
CONTENT STANDARD / PERFORMANCE EXPECTATION	3A-IC-26.	Demonstrate ways a given algorithm applies to problems across disciplines. (P. 3.1)

West Virginia College and Career Readiness Standards

Mathematics

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

CONTENT STANDARD / COURSE	WV.M.MHM.	Mathematical Habits of Mind
CONTENT STANDARD / OBJECTIVE	MHM1.	Make sense of problems and persevere in solving them.
CONTENT STANDARD / OBJECTIVE	MHM2.	Reason abstractly and quantitatively.
CONTENT STANDARD / OBJECTIVE	MHM3.	Construct viable arguments and critique the reasoning of others.
CONTENT STANDARD / OBJECTIVE	MHM4.	Model with mathematics.
CONTENT STANDARD / OBJECTIVE	MHM6.	Attend to precision.
CONTENT STANDARD / OBJECTIVE	MHM7.	Look for and make use of structure.

CONTENT STANDARD / OBJECTIVE	MHM8.	Look for and express regularity in repeated reasoning.

CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.1HS.17.	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.

CONTENT STANDARD / COURSE	**WV.M.2HS.**	**High School Mathematics II**
CONTENT STANDARD / OBJECTIVE		**Quadratic Functions and Modeling**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.2HS.9.	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.

CONTENT STANDARD / COURSE	**WV.M.3HSLA.**	**High School Mathematics III LA**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.3HSLA.37.	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.

CONTENT STANDARD / COURSE	**WV.M.3HSTR.**	**High School Mathematics III TR (Technical Readiness)**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.3HSTR.37.	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.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**

CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.A1HS.23.	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.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Quadratic Functions and Modeling**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.A1HS.53.	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.

CONTENT STANDARD / COURSE	**WV.M.A2HS.**	**High School Algebra II**
CONTENT STANDARD / OBJECTIVE		**Modeling with Functions**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.A2HS.29.	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. Note: Emphasize the selection of a model function based on behavior of data and context.

West Virginia College and Career Readiness Standards

Mathematics

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

CONTENT STANDARD / COURSE	**WV.M.MHM.**	**Mathematical Habits of Mind**
CONTENT STANDARD / OBJECTIVE	MHM1.	Make sense of problems and persevere in solving them.
CONTENT STANDARD / OBJECTIVE	MHM2.	Reason abstractly and quantitatively.
CONTENT STANDARD / OBJECTIVE	MHM3.	Construct viable arguments and critique the reasoning of others.
CONTENT STANDARD / OBJECTIVE	MHM4.	Model with mathematics.

CONTENT STANDARD / OBJECTIVE	MHM6.	Attend to precision.
CONTENT STANDARD / OBJECTIVE	MHM7.	Look for and make use of structure.
CONTENT STANDARD / OBJECTIVE	MHM8.	Look for and express regularity in repeated reasoning.

CONTENT STANDARD / COURSE	**WV.M.1HS.**	**High School Mathematics I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.1HS.17.	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.

CONTENT STANDARD / COURSE	**WV.M.2HS.**	**High School Mathematics II**
CONTENT STANDARD / OBJECTIVE		**Quadratic Functions and Modeling**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.2HS.9.	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.

CONTENT STANDARD / COURSE	**WV.M.3HSLA.**	**High School Mathematics III LA**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**
GRADE LEVEL EXPECTATION	M.3HSLA.37.	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.

CONTENT STANDARD / COURSE	**WV.M.3HSTR.**	**High School Mathematics III TR (Technical Readiness)**
CONTENT STANDARD / OBJECTIVE		**Mathematical Modeling**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**

GRADE LEVEL EXPECTATION	M.3HSTR.37.	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.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Linear and Exponential Relationships**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**

GRADE LEVEL EXPECTATION	M.A1HS.23.	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.

CONTENT STANDARD / COURSE	**WV.M.A1HS.**	**High School Algebra I**
CONTENT STANDARD / OBJECTIVE		**Quadratic Functions and Modeling**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**

GRADE LEVEL EXPECTATION	M.A1HS.53.	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.

CONTENT STANDARD / COURSE	**WV.M.A2HS.**	**High School Algebra II**
CONTENT STANDARD / OBJECTIVE		**Modeling with Functions**
OBJECTIVE / EXPECTATION		**Interpret functions that arise in applications in terms of a context.**

GRADE LEVEL EXPECTATION	M.A2HS.29.	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. Note: Emphasize the selection of a model function based on behavior of data and context.

West Virginia College and Career Readiness Standards

Science

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

CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Practices of Scientists and Engineers**

GRADE LEVEL EXPECTATION		Developing and using models

GRADE LEVEL EXPECTATION		Constructing explanations and designing solutions
GRADE LEVEL EXPECTATION		Obtaining, evaluating, and communicating information
CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Science Connecting Concepts**
GRADE LEVEL EXPECTATION		Investigating and explaining cause and effect
CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Science Literacy**
GRADE LEVEL EXPECTATION		Reading with understanding articles about science in the popular press and engaging in social conversation about the validity of the conclusions
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Earth's Systems**
OBJECTIVE / EXPECTATION	**S.ESS.8.**	**Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.**
GRADE LEVEL EXPECTATION	**S.ESS.8.2.**	**examples could include:**
INDICATOR	S.ESS.8.2.b.	greenhouse gasses
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Earth's Systems**
OBJECTIVE / EXPECTATION	**S.ESS.11.1.**	**Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.**
GRADE LEVEL EXPECTATION	S.ESS.11.1.	biogeochemical cycles

GRADE LEVEL EXPECTATION	S.ESS.11.2.	carbon cycle
GRADE LEVEL EXPECTATION	S.ESS.11.3.	carbon reservoirs
GRADE LEVEL EXPECTATION	S.ESS.11.4.	carbon budget.
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Weather and Climate**
OBJECTIVE / EXPECTATION	**S.ESS.13.**	**Use a model to describe how variations in the flow of energy into and out of Earth systems result in changes in climate.**
GRADE LEVEL EXPECTATION	S.ESS.13.1.	changes in climate
GRADE LEVEL EXPECTATION	S.ESS.13.6.	atmospheric composition.
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.16.**	**Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.**
GRADE LEVEL EXPECTATION	S.ESS.16.1.	conservation, reuse, recycling
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.17.**	**Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.**
GRADE LEVEL EXPECTATION	S.ESS.17.3.	consumption
GRADE LEVEL EXPECTATION	S.ESS.17.4.	new technology development.
CONTENT STANDARD / COURSE		**Earth and Space Science**

CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.18.**	**Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.**
GRADE LEVEL EXPECTATION	**S.ESS.18.1.**	**data examples include:**
INDICATOR	S.ESS.18.1.b.	changes in biodiversity
INDICATOR	S.ESS.18.1.c.	land use via aerial or satellite imaging
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.19.**	**Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.**
GRADE LEVEL EXPECTATION	S.ESS.19.3.	cryosphere
GRADE LEVEL EXPECTATION	S.ESS.19.5.	biosphere
GRADE LEVEL EXPECTATION	S.ESS.19.6.	connection between carbon dioxide concentrations and photosynthetic biomass
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	**S.ESS.20.**	**Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. In reference to:**
INDICATOR	S.ESS.20.1.	natural disasters
INDICATOR	S.ESS.20.3.	resources
INDICATOR	S.ESS.20.4.	climate change.
CONTENT STANDARD / COURSE		**Biology**

CONTENT STANDARD / OBJECTIVE		**Biology/Life Science**
OBJECTIVE / EXPECTATION		**Matter and Energy in Organisms and Ecosystems**
GRADE LEVEL EXPECTATION	S.B.9.	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		**Biology**
CONTENT STANDARD / OBJECTIVE		**Biology/Life Science**
OBJECTIVE / EXPECTATION		**Interdependent Relationships in Ecosystems**
GRADE LEVEL EXPECTATION	S.B.11.	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	S.B.13.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
GRADE LEVEL EXPECTATION	S.B.14.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
CONTENT STANDARD / COURSE		**Biology**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.B.23.	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	S.B.24.	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	S.B.25.	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 LEVEL EXPECTATION	S.B.26.	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 / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**

OBJECTIVE / EXPECTATION	**S.ENV.1.**	**Compare and contrast the rate elements cycle through the ecosphere, describing natural and human influences on reaction rates:**
GRADE LEVEL EXPECTATION	S.ENV.1.1.	carbon

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	S.ENV.2.	Explain how the chemical components of biological and physical processes fit in the overall process of biogeochemical cycling such as photosynthesis, respiration, nitrogen fixation, or decomposition.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.6.**	**Explain how technology has influenced the sustainability of natural resources over time:**
GRADE LEVEL EXPECTATION	S.ENV.6.1.	forestry practices

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.9.**	**Evaluate the leading causes of species decline and premature extinction:**
GRADE LEVEL EXPECTATION	S.ENV.9.1.	habitat destruction and degradation
GRADE LEVEL EXPECTATION	S.ENV.9.4.	human population growth

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	S.ENV.10.	Analyze biological diversity as it relates to the stability of an ecosystem.

CONTENT STANDARD / COURSE		**Environmental Science**

CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.11.**	**Relate habitat changes to plant and animal populations and climate influences:**
GRADE LEVEL EXPECTATION	S.ENV.11.1.	variations in habitat size
GRADE LEVEL EXPECTATION	S.ENV.11.2.	fragmentation
GRADE LEVEL EXPECTATION	S.ENV.11.4.	albedo
GRADE LEVEL EXPECTATION	S.ENV.11.5.	surface temperature.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	S.ENV.17.	Debate climate change as it relates to natural forces, greenhouse gases, human changes in atmospheric concentrations of greenhouse gases, and relevant laws and treaties.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.26.**	**Research and describe how communities have restored or protected ecosystems:**
GRADE LEVEL EXPECTATION	S.ENV.26.1.	remediation
GRADE LEVEL EXPECTATION	S.ENV.26.2.	mitigation
GRADE LEVEL EXPECTATION	S.ENV.26.3.	rehabilitation
GRADE LEVEL EXPECTATION	S.ENV.26.4.	reclamation
GRADE LEVEL EXPECTATION	S.ENV.26.5.	preservation.

CONTENT STANDARD / COURSE		**Environmental Science**

CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.ENV.28.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

CONTENT STANDARD / COURSE		**Forensic Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.FS.21.	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	S.FS.22.	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.

CONTENT STANDARD / COURSE		**Human Anatomy and Physiology**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.HAP.26.	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	S.HAP.27.	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.

West Virginia College and Career Readiness Standards

Science

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

CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Practices of Scientists and Engineers**
GRADE LEVEL EXPECTATION		Developing and using models

GRADE LEVEL EXPECTATION		Constructing explanations and designing solutions
GRADE LEVEL EXPECTATION		Obtaining, evaluating, and communicating information
CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Science Connecting Concepts**
GRADE LEVEL EXPECTATION		Investigating and explaining cause and effect
CONTENT STANDARD / COURSE		**Science Indicators Grades 9-12**
CONTENT STANDARD / OBJECTIVE		**College- and Career-Readiness Indicators for Science**
OBJECTIVE / EXPECTATION		**Science Literacy**
GRADE LEVEL EXPECTATION		Reading with understanding articles about science in the popular press and engaging in social conversation about the validity of the conclusions
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Earth's Systems**
OBJECTIVE / EXPECTATION	**S.ESS.8.**	**Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.**
GRADE LEVEL EXPECTATION	**S.ESS.8.2.**	**examples could include:**
INDICATOR	S.ESS.8.2.b.	greenhouse gasses
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Earth's Systems**
OBJECTIVE / EXPECTATION	**S.ESS.11.1.**	**Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.**
GRADE LEVEL EXPECTATION	S.ESS.11.1.	biogeochemical cycles

GRADE LEVEL EXPECTATION	S.ESS.11.2.	carbon cycle
GRADE LEVEL EXPECTATION	S.ESS.11.3.	carbon reservoirs
GRADE LEVEL EXPECTATION	S.ESS.11.4.	carbon budget.
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Weather and Climate**
OBJECTIVE / EXPECTATION	**S.ESS.13.**	**Use a model to describe how variations in the flow of energy into and out of Earth systems result in changes in climate.**
GRADE LEVEL EXPECTATION	S.ESS.13.1.	changes in climate
GRADE LEVEL EXPECTATION	S.ESS.13.6.	atmospheric composition.
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.16.**	**Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.**
GRADE LEVEL EXPECTATION	S.ESS.16.1.	conservation, reuse, recycling
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.17.**	**Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.**
GRADE LEVEL EXPECTATION	S.ESS.17.3.	consumption
GRADE LEVEL EXPECTATION	S.ESS.17.4.	new technology development.
CONTENT STANDARD / COURSE		**Earth and Space Science**

CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.18.**	**Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.**
GRADE LEVEL EXPECTATION	**S.ESS.18.1.**	**data examples include:**
INDICATOR	S.ESS.18.1.b.	changes in biodiversity
INDICATOR	S.ESS.18.1.c.	land use via aerial or satellite imaging
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Human Sustainability**
OBJECTIVE / EXPECTATION	**S.ESS.19.**	**Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.**
GRADE LEVEL EXPECTATION	S.ESS.19.3.	cryosphere
GRADE LEVEL EXPECTATION	S.ESS.19.5.	biosphere
GRADE LEVEL EXPECTATION	S.ESS.19.6.	connection between carbon dioxide concentrations and photosynthetic biomass
CONTENT STANDARD / COURSE		**Earth and Space Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	**S.ESS.20.**	**Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. In reference to:**
INDICATOR	S.ESS.20.1.	natural disasters
INDICATOR	S.ESS.20.3.	resources
INDICATOR	S.ESS.20.4.	climate change.
CONTENT STANDARD / COURSE		**Biology**

CONTENT STANDARD / OBJECTIVE		**Biology/Life Science**
OBJECTIVE / EXPECTATION		**Matter and Energy in Organisms and Ecosystems**
GRADE LEVEL EXPECTATION	S.B.9.	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		**Biology**
CONTENT STANDARD / OBJECTIVE		**Biology/Life Science**
OBJECTIVE / EXPECTATION		**Interdependent Relationships in Ecosystems**
GRADE LEVEL EXPECTATION	S.B.11.	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	S.B.13.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
GRADE LEVEL EXPECTATION	S.B.14.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
CONTENT STANDARD / COURSE		**Biology**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.B.23.	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	S.B.24.	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	S.B.25.	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 LEVEL EXPECTATION	S.B.26.	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 / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**

OBJECTIVE / EXPECTATION	**S.ENV.1.**	**Compare and contrast the rate elements cycle through the ecosphere, describing natural and human influences on reaction rates:**
GRADE LEVEL EXPECTATION	S.ENV.1.1.	carbon

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	S.ENV.2.	Explain how the chemical components of biological and physical processes fit in the overall process of biogeochemical cycling such as photosynthesis, respiration, nitrogen fixation, or decomposition.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.6.**	**Explain how technology has influenced the sustainability of natural resources over time:**
GRADE LEVEL EXPECTATION	S.ENV.6.1.	forestry practices

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.9.**	**Evaluate the leading causes of species decline and premature extinction:**
GRADE LEVEL EXPECTATION	S.ENV.9.1.	habitat destruction and degradation
GRADE LEVEL EXPECTATION	S.ENV.9.4.	human population growth

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	S.ENV.10.	Analyze biological diversity as it relates to the stability of an ecosystem.

CONTENT STANDARD / COURSE		**Environmental Science**

CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.11.**	**Relate habitat changes to plant and animal populations and climate influences:**
GRADE LEVEL EXPECTATION	S.ENV.11.1.	variations in habitat size
GRADE LEVEL EXPECTATION	S.ENV.11.2.	fragmentation
GRADE LEVEL EXPECTATION	S.ENV.11.4.	albedo
GRADE LEVEL EXPECTATION	S.ENV.11.5.	surface temperature.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	S.ENV.17.	Debate climate change as it relates to natural forces, greenhouse gases, human changes in atmospheric concentrations of greenhouse gases, and relevant laws and treaties.

CONTENT STANDARD / COURSE		**Environmental Science**
CONTENT STANDARD / OBJECTIVE		**Environmental Science/Life Science, Earth and Space Science, and Physical Science Domains**
OBJECTIVE / EXPECTATION	**S.ENV.26.**	**Research and describe how communities have restored or protected ecosystems:**
GRADE LEVEL EXPECTATION	S.ENV.26.1.	remediation
GRADE LEVEL EXPECTATION	S.ENV.26.2.	mitigation
GRADE LEVEL EXPECTATION	S.ENV.26.3.	rehabilitation
GRADE LEVEL EXPECTATION	S.ENV.26.4.	reclamation
GRADE LEVEL EXPECTATION	S.ENV.26.5.	preservation.

CONTENT STANDARD / COURSE		**Environmental Science**

CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.ENV.28.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

CONTENT STANDARD / COURSE		**Forensic Science**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.FS.21.	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	S.FS.22.	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.

CONTENT STANDARD / COURSE		**Human Anatomy and Physiology**
CONTENT STANDARD / OBJECTIVE		**Engineering, Technology, and Applications of Science**
OBJECTIVE / EXPECTATION		**Engineering Design**
GRADE LEVEL EXPECTATION	S.HAP.26.	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	S.HAP.27.	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.

West Virginia College and Career Readiness Standards

Technology Education

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

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science 9-12**
OBJECTIVE / EXPECTATION		**Data and Information**
GRADE LEVEL EXPECTATION	CS.9-12.7.	Create computational models for simulating real-world system.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science 9-12**
OBJECTIVE / EXPECTATION		**Impacts of Computing**
GRADE LEVEL EXPECTATION	CS.9-12.13.	Test and refine computational artifacts to reduce bias and equity deficits.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science in the Modern World**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION	CS.MW.3.	Explain how sequence, selection, iteration, and recursion are building blocks of algorithms.
GRADE LEVEL EXPECTATION	CS.MW.8.	Use modeling and simulation to represent and understand natural phenomena.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science in the Modern World**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.MW.22.	Describe a variety of programming languages available to solve problems and develop systems.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science & Mathematics**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION		**Connect the development cycle of algorithm construction to problem-solving.**
INDICATOR	CS.M.9.	Create systems of equations based on real-world situations.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**

CONTENT STANDARD / OBJECTIVE		**Computer Science & Mathematics**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION		**Create and evaluate algorithms to solve problems.**
INDICATOR	CS.M.11.	Utilize modeling and simulation techniques to represent and understand natural phenomena.
INDICATOR	CS.M.13.	Manipulate formulas and equations and apply them to algorithm development.
INDICATOR	CS.M.15.	Write algorithms to solve mathematical problems using formulas, equations, and functions.
INDICATOR	CS.M.16.	Implement conditional statements that include if/then, if/then/else, case statements, and Boolean logic, in the design of algorithms.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION	CS.GIS.1.	Demonstrate an understanding of the basics of cartography.
GRADE LEVEL EXPECTATION	CS.GIS.2.	Demonstrate a basic proficiency in map reading; an understanding of scale; an understanding of the power of analysis; and an understanding of the history of map creation and use.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.GIS.9.	Use a web-based GIS to answer questions about the earth and the environment.
GRADE LEVEL EXPECTATION	CS.GIS.10.	Demonstrate basic proficiency in map creation, including adding layers, adding additional data, changing data symbology, configuring pop-up, saving and sharing maps.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**

GRADE LEVEL EXPECTATION	**CS.GIS.11.**	**Use geospatial technology to explore and investigate environmental problems such as:**
INDICATOR	CS.GIS.11.a.	resource management
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	**CS.GIS.12.**	**Use geospatial technology to explore and investigate rural and urban issues such as:**
INDICATOR	CS.GIS.12.a.	urban planning
INDICATOR	CS.GIS.12.b.	transportation
INDICATOR	CS.GIS.12.c.	logistics
INDICATOR	CS.GIS.12.d.	emergency planning to calculate emergency response times in the event of a natural disaster.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.GIS.13.	Explore uses of geospatial technology by law enforcement to map, visualize, and analyze crime incident patterns.
GRADE LEVEL EXPECTATION	CS.GIS.14.	Use geospatial technology to explore and investigate business problems related to asset management.
GRADE LEVEL EXPECTATION	CS.GIS.15.	Use geospatial technology to explore and investigate problems related to medical geography and epidemiology.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Impacts of Computing**

GRADE LEVEL EXPECTATION	CS.GIS.19.	Use geospatial technology to explore and investigate the history of cartography.

West Virginia College and Career Readiness Standards

Technology Education

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

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science 9-12**
OBJECTIVE / EXPECTATION		**Data and Information**
GRADE LEVEL EXPECTATION	CS.9-12.7.	Create computational models for simulating real-world system.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science 9-12**
OBJECTIVE / EXPECTATION		**Impacts of Computing**
GRADE LEVEL EXPECTATION	CS.9-12.13.	Test and refine computational artifacts to reduce bias and equity deficits.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science in the Modern World**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION	CS.MW.3.	Explain how sequence, selection, iteration, and recursion are building blocks of algorithms.
GRADE LEVEL EXPECTATION	CS.MW.8.	Use modeling and simulation to represent and understand natural phenomena.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science in the Modern World**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.MW.22.	Describe a variety of programming languages available to solve problems and develop systems.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science & Mathematics**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION		**Connect the development cycle of algorithm construction to problem-solving.**
INDICATOR	CS.M.9.	Create systems of equations based on real-world situations.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Computer Science & Mathematics**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION		**Create and evaluate algorithms to solve problems.**
INDICATOR	CS.M.11.	Utilize modeling and simulation techniques to represent and understand natural phenomena.
INDICATOR	CS.M.13.	Manipulate formulas and equations and apply them to algorithm development.
INDICATOR	CS.M.15.	Write algorithms to solve mathematical problems using formulas, equations, and functions.
INDICATOR	CS.M.16.	Implement conditional statements that include if/then, if/then/else, case statements, and Boolean logic, in the design of algorithms.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Computer Systems and Computational Thinking**
GRADE LEVEL EXPECTATION	CS.GIS.1.	Demonstrate an understanding of the basics of cartography.
GRADE LEVEL EXPECTATION	CS.GIS.2.	Demonstrate a basic proficiency in map reading; an understanding of scale; an understanding of the power of analysis; and an understanding of the history of map creation and use.

CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**

OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	CS.GIS.9.	Use a web-based GIS to answer questions about the earth and the environment.
GRADE LEVEL EXPECTATION	CS.GIS.10.	Demonstrate basic proficiency in map creation, including adding layers, adding additional data, changing data symbology, configuring pop-up, saving and sharing maps.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	**CS.GIS.11.**	**Use geospatial technology to explore and investigate environmental problems such as:**
INDICATOR	CS.GIS.11.a.	resource management
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**
GRADE LEVEL EXPECTATION	**CS.GIS.12.**	**Use geospatial technology to explore and investigate rural and urban issues such as:**
INDICATOR	CS.GIS.12.a.	urban planning
INDICATOR	CS.GIS.12.b.	transportation
INDICATOR	CS.GIS.12.c.	logistics
INDICATOR	CS.GIS.12.d.	emergency planning to calculate emergency response times in the event of a natural disaster.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Programming and Algorithms**

GRADE LEVEL EXPECTATION	CS.GIS.13.	Explore uses of geospatial technology by law enforcement to map, visualize, and analyze crime incident patterns.
GRADE LEVEL EXPECTATION	CS.GIS.14.	Use geospatial technology to explore and investigate business problems related to asset management.
GRADE LEVEL EXPECTATION	CS.GIS.15.	Use geospatial technology to explore and investigate problems related to medical geography and epidemiology.
CONTENT STANDARD / COURSE	**2520.14.**	**West Virginia College- and Career-Readiness Standards for Technology and Computer Science**
CONTENT STANDARD / OBJECTIVE		**Introduction to Geographic Information Systems**
OBJECTIVE / EXPECTATION		**Impacts of Computing**
GRADE LEVEL EXPECTATION	CS.GIS.19.	Use geospatial technology to explore and investigate the history of cartography.

Wisconsin Academic Standards

Mathematics

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

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

DOMAIN		Functions
CONTENT STANDARD	**M.F.IF.**	**Interpreting Functions (F-IF)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**M.F.IF.B.**	**Interpret functions that arise in applications in terms of context. (M)**
DESCRIPTOR / FOCUS AREA	M.F.IF.B.6.	Calculate and interpret the average rate of change of a linear or nonlinear function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Wisconsin Academic Standards

Mathematics

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

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

DOMAIN		Functions
CONTENT STANDARD	**M.F.IF.**	**Interpreting Functions (F-IF)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**M.F.IF.B.**	**Interpret functions that arise in applications in terms of context. (M)**
DESCRIPTOR / FOCUS AREA	M.F.IF.B.6.	Calculate and interpret the average rate of change of a linear or nonlinear function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Wisconsin Academic Standards

Science

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

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.CC.**	**Crosscutting Concepts (CC)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.CC4.**	**Students use science and engineering practices, disciplinary core ideas, and an understanding of systems and models to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA		**Systems and System Models**
LEARNING CONTINUUM	SCI.CC4.h.	Students investigate or analyze a system by defining its boundaries and initial conditions, as well as its inputs and outputs. They use models (e.g., physical, mathematical, computer models) to simulate the flow of energy, matter, and interactions within and between systems at different scales. They also use models and simulations to predict the behavior of a system, and recognize that these predictions have limited precision and reliability due to the assumptions and approximations inherent in the models. They also design systems to do specific tasks.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP2.**	**Students develop and use models, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP2.A.**	**Developing Models – Students use, synthesize, and develop models to predict and show relationships among variables and between systems and their components in the natural and designed world. This includes the following:**
LEARNING CONTINUUM	SCI.SEP2.A.h.1.	Evaluate merits and limitations of two different models of the same proposed tool, process, mechanism, or system in order to select or revise a model that best fits the evidence or design criteria.
LEARNING CONTINUUM	SCI.SEP2.A.h.2.	Design a test of a model to ascertain its reliability.
LEARNING CONTINUUM	SCI.SEP2.A.h.3.	Develop, revise, and use models based on evidence to illustrate and predict the relationships between systems or between components of a system.
LEARNING CONTINUUM	SCI.SEP2.A.h.4.	Develop and use multiple types of models to provide mechanistic accounts and predict phenomena. Move flexibly between these model types based on merits and limitations.
LEARNING CONTINUUM	SCI.SEP2.A.h.5.	Develop a complex model that allows for manipulation and testing of a proposed process or system.
LEARNING CONTINUUM	SCI.SEP2.A.h.6.	Develop and use a model (including mathematical and computational) to generate data to support explanations, predict phenomena, analyze systems, and solve problems.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP3.**	**Students plan and carry out investigations, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**

DESCRIPTOR / FOCUS AREA	**SCI.SEP 3.A.**	**Planning and Conducting Investigations – Students plan and carry out investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models: This includes the following:**
LEARNING CONTINUUM	SCI.SEP3 .A.h.4.	Select appropriate tools to collect, record, analyze, and evaluate data.
LEARNING CONTINUUM	SCI.SEP3 .A.h.6.	Manipulate variables and collect data about a complex model of a proposed process or system to identify failure points, or to improve performance relative to criteria for success.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 5.**	**Students use mathematics and computational thinking, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 5.A.**	**Qualitative and Quantitative Data – Students use algebraic thinking and analysis, a range of linear and nonlinear functions (including trigonometric functions, exponentials, and logarithms), and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. This includes the following:**
LEARNING CONTINUUM	SCI.SEP 5.A.h.2.	Create and/or revise a computational model or simulation of a phenomenon, designed device, process, or system.
LEARNING CONTINUUM	SCI.SEP 5.A.h.3.	Use mathematical, computational, and algorithmic representations of phenomena or design solutions to describe and support claims and explanations.
LEARNING CONTINUUM	SCI.SEP 5.A.h.5.	Use simple limit cases to test mathematical expressions, computer programs, algorithms, or simulations of a process or system to see if a model “makes sense” by comparing the outcomes with what is known about the real world.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 6.**	**Students construct explanations and design solutions, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 6.A.**	**Construct an Explanation – Students create explanations that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. This includes the following:**
LEARNING CONTINUUM	SCI.SEP 6.A.h.1.	Make quantitative and qualitative claims regarding the relationship between dependent and independent variables.
LEARNING CONTINUUM	SCI.SEP 6.A.h.2.	Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources, including students’ own investigations, models, theories, simulations, and peer review. Explanations should reflect the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
LEARNING CONTINUUM	SCI.SEP 6.A.h.3.	Apply scientific ideas, principles, and evidence to provide an explanation of phenomena taking into account possible, unanticipated effects.
LEARNING CONTINUUM	SCI.SEP 6.A.h.4.	Apply scientific reasoning, theory, and models to link evidence to the claim and to assess the extent to which the reasoning and data support the explanation.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 6.**	**Students construct explanations and design solutions, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 6.B.**	**Design Solutions – Students create designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. This includes the following:**
LEARNING CONTINUUM	SCI.SEP 6.B.h.1.	Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, and prioritized criteria. Consider trade-offs.
LEARNING CONTINUUM	SCI.SEP 6.B.h.2.	Apply scientific ideas, principles, and evidence to solve design problems, taking into account possible unanticipated effects.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 8.**	**Students will obtain, evaluate and communicate information, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 8.A.**	**Obtain, Evaluate, and Communicate Information – Students evaluate the validity and reliability of claims, methods, and designs. This includes the following:**
LEARNING CONTINUUM	SCI.SEP 8.A.h.1.	Critically read scientific literature adapted for classroom use to determine the central ideas or conclusions, and to obtain scientific and technical information. Summarize complex evidence, concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
LEARNING CONTINUUM	SCI.SEP 8.A.h.5.	Communicate scientific and technical information in multiple formats, including orally, graphically, textually, and mathematically. Examples of information could include ideas about phenomena or the design and performance of a proposed process or system.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.LS.**	**Disciplinary Core Idea: Life Science (LS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.LS2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the interactions, energy, and dynamics within ecosystems to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.LS2. B.**	**Cycles of Matter and Energy Transfer in Ecosystems**
LEARNING CONTINUUM	SCI.LS2. B.h.	Photosynthesis and cellular respiration provide most of the energy for life processes. Only a fraction of matter consumed at the lower level of a food web is transferred up, resulting in fewer organisms at higher levels. At each link in an ecosystem, elements are combined in different ways, and matter and energy are conserved. Photosynthesis and cellular respiration are key components of the global carbon cycle.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.LS.**	**Disciplinary Core Idea: Life Science (LS)**

PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.LS2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the interactions, energy, and dynamics within ecosystems to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.LS2.C.**	**Ecosystem Dynamics, Functioning, and Resilience**
LEARNING CONTINUUM	SCI.LS2.C.h.	If a biological or physical disturbance to an ecosystem occurs, including one induced by human activity, the ecosystem may return to its more or less original state or become a very different ecosystem, depending on the complex set of interactions within the ecosystem.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.LS.**	**Disciplinary Core Idea: Life Science (LS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.LS4.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of biological evolution to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.LS4.D.**	**Biodiversity and Humans**
LEARNING CONTINUUM	SCI.LS4.D.h.	Biodiversity is increased by formation of new species and reduced by extinction. Humans depend on biodiversity but also have adverse impacts on it. Sustaining biodiversity is essential to supporting life on Earth.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ESS.**	**Disciplinary Core Idea: Earth and Space Sciences (ESS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ESS2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of Earth's systems to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ESS2.D.**	**Weather and Climate**
LEARNING CONTINUUM	SCI.ESS2.D.h.	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ESS.**	**Disciplinary Core Idea: Earth and Space Sciences (ESS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ESS3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the Earth and human activity to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ESS3.A.**	**Natural Resources**
LEARNING CONTINUUM	SCI.ESS3.A.h.	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ESS.**	**Disciplinary Core Idea: Earth and Space Sciences (ESS)**

PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ESS 3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the Earth and human activity to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ESS 3.C.**	**Human Impacts on Earth Systems**
LEARNING CONTINUUM	SCI.ESS3 .C.h.	Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ETS .**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS 1.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of engineering design to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS 1.B.**	**Developing Possible Solutions**
LEARNING CONTINUUM	SCI.ETS1 .B.h.1.	When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.
LEARNING CONTINUUM	SCI.ETS1 .B.h.2.	Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical. They are also useful in making a persuasive presentation to a client about how a given design will meet his or her needs.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ETS .**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS 2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the links among Engineering, Technology, Science, and Society to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS 2.A.**	**Interdependence of Science, Engineering, and Technology**
LEARNING CONTINUUM	SCI.ETS2 .A.h.1.	Science and engineering complement each other in the cycle known as research and development (R&D).
LEARNING CONTINUUM	SCI.ETS2 .A.h.2.	Many research and development projects may involve scientists, engineers, and others with wide ranges of expertise.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ETS .**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS 2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the links among Engineering, Technology, Science, and Society to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS 2.B.**	**Influence of Engineering, Technology, and Science on Society and the Natural World**
LEARNING CONTINUUM	SCI.ETS2 .B.h.1.	Modern civilization depends on major technological systems, such as agriculture, health, water, energy, transportation, manufacturing, construction, and communications.

LEARNING CONTINUUM	SCI.ETS2.B.h.2.	Engineers continuously modify these systems to increase benefits while decreasing costs and risks.
LEARNING CONTINUUM	SCI.ETS2.B.h.3.	New technologies can have deep impacts on society and the environment, including some that were not anticipated.
LEARNING CONTINUUM	SCI.ETS2.B.h.4.	Analysis of costs and benefits is a critical aspect of decisions about technology.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.ETS.**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the nature of science and engineering to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS3.A.**	**Science and Engineering Are Human Endeavors**
LEARNING CONTINUUM	SCI.ETS3.A.h.4.	Scientists and engineers embrace skepticism and critique as a community. Deliberate deceit in science is rare and is likely exposed through the peer review process. When discovered, intellectual dishonesty is condemned by the scientific community.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.ETS.**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the nature of science and engineering to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS3.B.**	**Science and Engineering Are Unique Ways of Thinking with Different Purposes**
LEARNING CONTINUUM	SCI.ETS3.B.h.3.	Science and engineering innovations may raise ethical issues for which science and engineering, by themselves, do not provide answers and solutions.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.ETS.**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the nature of science and engineering to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS3.C.**	**Science and Engineering Use Multiple Approaches to Create New Knowledge and Solve Problems**
LEARNING CONTINUUM	SCI.ETS3.C.h.3.	Engineers use a variety of approaches, tools, and techniques to define problems and develop solutions to those problems. Successful engineering solutions meet stakeholder needs and safety requirements, and are economically viable. Trade-offs in design aspects balance competing demands.

Wisconsin Academic Standards

Science

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

DOMAIN	WI.SCI.	Science

CONTENT STANDARD	**SCI.CC.**	**Crosscutting Concepts (CC)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.CC4.**	**Students use science and engineering practices, disciplinary core ideas, and an understanding of systems and models to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA		**Systems and System Models**
LEARNING CONTINUUM	SCI.CC4.h.	Students investigate or analyze a system by defining its boundaries and initial conditions, as well as its inputs and outputs. They use models (e.g., physical, mathematical, computer models) to simulate the flow of energy, matter, and interactions within and between systems at different scales. They also use models and simulations to predict the behavior of a system, and recognize that these predictions have limited precision and reliability due to the assumptions and approximations inherent in the models. They also design systems to do specific tasks.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 2.**	**Students develop and use models, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 2.A.**	**Developing Models – Students use, synthesize, and develop models to predict and show relationships among variables and between systems and their components in the natural and designed world. This includes the following:**
LEARNING CONTINUUM	SCI.SEP2.A.h.1.	Evaluate merits and limitations of two different models of the same proposed tool, process, mechanism, or system in order to select or revise a model that best fits the evidence or design criteria.
LEARNING CONTINUUM	SCI.SEP2.A.h.2.	Design a test of a model to ascertain its reliability.
LEARNING CONTINUUM	SCI.SEP2.A.h.3.	Develop, revise, and use models based on evidence to illustrate and predict the relationships between systems or between components of a system.
LEARNING CONTINUUM	SCI.SEP2.A.h.4.	Develop and use multiple types of models to provide mechanistic accounts and predict phenomena. Move flexibly between these model types based on merits and limitations.
LEARNING CONTINUUM	SCI.SEP2.A.h.5.	Develop a complex model that allows for manipulation and testing of a proposed process or system.
LEARNING CONTINUUM	SCI.SEP2.A.h.6.	Develop and use a model (including mathematical and computational) to generate data to support explanations, predict phenomena, analyze systems, and solve problems.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 3.**	**Students plan and carry out investigations, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 3.A.**	**Planning and Conducting Investigations – Students plan and carry out investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models: This includes the following:**

LEARNING CONTINUUM	SCI.SEP3.A.h.4.	Select appropriate tools to collect, record, analyze, and evaluate data.
LEARNING CONTINUUM	SCI.SEP3.A.h.6.	Manipulate variables and collect data about a complex model of a proposed process or system to identify failure points, or to improve performance relative to criteria for success.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 5.**	**Students use mathematics and computational thinking, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 5.A.**	**Qualitative and Quantitative Data – Students use algebraic thinking and analysis, a range of linear and nonlinear functions (including trigonometric functions, exponentials, and logarithms), and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. This includes the following:**
LEARNING CONTINUUM	SCI.SEP 5.A.h.2.	Create and/or revise a computational model or simulation of a phenomenon, designed device, process, or system.
LEARNING CONTINUUM	SCI.SEP 5.A.h.3.	Use mathematical, computational, and algorithmic representations of phenomena or design solutions to describe and support claims and explanations.
LEARNING CONTINUUM	SCI.SEP 5.A.h.5.	Use simple limit cases to test mathematical expressions, computer programs, algorithms, or simulations of a process or system to see if a model “makes sense” by comparing the outcomes with what is known about the real world.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 6.**	**Students construct explanations and design solutions, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 6.A.**	**Construct an Explanation – Students create explanations that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. This includes the following:**
LEARNING CONTINUUM	SCI.SEP 6.A.h.1.	Make quantitative and qualitative claims regarding the relationship between dependent and independent variables.
LEARNING CONTINUUM	SCI.SEP 6.A.h.2.	Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources, including students’ own investigations, models, theories, simulations, and peer review. Explanations should reflect the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
LEARNING CONTINUUM	SCI.SEP 6.A.h.3.	Apply scientific ideas, principles, and evidence to provide an explanation of phenomena taking into account possible, unanticipated effects.
LEARNING CONTINUUM	SCI.SEP 6.A.h.4.	Apply scientific reasoning, theory, and models to link evidence to the claim and to assess the extent to which the reasoning and data support the explanation.

DOMAIN	**WI.SCI.**	**Science**

CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 6.**	**Students construct explanations and design solutions, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 6.B.**	**Design Solutions – Students create designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. This includes the following:**
LEARNING CONTINUUM	SCI.SEP 6.B.h.1.	Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, and prioritized criteria. Consider trade-offs.
LEARNING CONTINUUM	SCI.SEP 6.B.h.2.	Apply scientific ideas, principles, and evidence to solve design problems, taking into account possible unanticipated effects.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.SEP.**	**Science and Engineering Practices (SEP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.SEP 8.**	**Students will obtain, evaluate and communicate information, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.SEP 8.A.**	**Obtain, Evaluate, and Communicate Information – Students evaluate the validity and reliability of claims, methods, and designs. This includes the following:**
LEARNING CONTINUUM	SCI.SEP 8.A.h.1.	Critically read scientific literature adapted for classroom use to determine the central ideas or conclusions, and to obtain scientific and technical information. Summarize complex evidence, concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
LEARNING CONTINUUM	SCI.SEP 8.A.h.5.	Communicate scientific and technical information in multiple formats, including orally, graphically, textually, and mathematically. Examples of information could include ideas about phenomena or the design and performance of a proposed process or system.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.LS.**	**Disciplinary Core Idea: Life Science (LS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.LS2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the interactions, energy, and dynamics within ecosystems to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.LS2.B.**	**Cycles of Matter and Energy Transfer in Ecosystems**
LEARNING CONTINUUM	SCI.LS2.B.h.	Photosynthesis and cellular respiration provide most of the energy for life processes. Only a fraction of matter consumed at the lower level of a food web is transferred up, resulting in fewer organisms at higher levels. At each link in an ecosystem, elements are combined in different ways, and matter and energy are conserved. Photosynthesis and cellular respiration are key components of the global carbon cycle.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.LS.**	**Disciplinary Core Idea: Life Science (LS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.LS2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the interactions, energy, and dynamics within ecosystems to make sense of phenomena and solve problems.**

DESCRIPTOR / FOCUS AREA	**SCI.LS2.C.**	**Ecosystem Dynamics, Functioning, and Resilience**
LEARNING CONTINUUM	SCI.LS2.C.h.	If a biological or physical disturbance to an ecosystem occurs, including one induced by human activity, the ecosystem may return to its more or less original state or become a very different ecosystem, depending on the complex set of interactions within the ecosystem.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.LS.**	**Disciplinary Core Idea: Life Science (LS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.LS4.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of biological evolution to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.LS4.D.**	**Biodiversity and Humans**
LEARNING CONTINUUM	SCI.LS4.D.h.	Biodiversity is increased by formation of new species and reduced by extinction. Humans depend on biodiversity but also have adverse impacts on it. Sustaining biodiversity is essential to supporting life on Earth.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ESS.**	**Disciplinary Core Idea: Earth and Space Sciences (ESS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ESS2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of Earth's systems to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ESS2.D.**	**Weather and Climate**
LEARNING CONTINUUM	SCI.ESS2.D.h.	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ESS.**	**Disciplinary Core Idea: Earth and Space Sciences (ESS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ESS3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the Earth and human activity to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ESS3.A.**	**Natural Resources**
LEARNING CONTINUUM	SCI.ESS3.A.h.	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ESS.**	**Disciplinary Core Idea: Earth and Space Sciences (ESS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ESS3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the Earth and human activity to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ESS3.C.**	**Human Impacts on Earth Systems**

LEARNING CONTINUUM	SCI.ESS3.C.h.	Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.ETS.**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS1.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of engineering design to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS1.B.**	**Developing Possible Solutions**
LEARNING CONTINUUM	SCI.ETS1.B.h.1.	When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.
LEARNING CONTINUUM	SCI.ETS1.B.h.2.	Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical. They are also useful in making a persuasive presentation to a client about how a given design will meet his or her needs.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.ETS.**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the links among Engineering, Technology, Science, and Society to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS2.A.**	**Interdependence of Science, Engineering, and Technology**
LEARNING CONTINUUM	SCI.ETS2.A.h.1.	Science and engineering complement each other in the cycle known as research and development (R&D).
LEARNING CONTINUUM	SCI.ETS2.A.h.2.	Many research and development projects may involve scientists, engineers, and others with wide ranges of expertise.

DOMAIN	WI.SCI.	Science
CONTENT STANDARD	**SCI.ETS.**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS2.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the links among Engineering, Technology, Science, and Society to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS2.B.**	**Influence of Engineering, Technology, and Science on Society and the Natural World**
LEARNING CONTINUUM	SCI.ETS2.B.h.1.	Modern civilization depends on major technological systems, such as agriculture, health, water, energy, transportation, manufacturing, construction, and communications.
LEARNING CONTINUUM	SCI.ETS2.B.h.2.	Engineers continuously modify these systems to increase benefits while decreasing costs and risks.

LEARNING CONTINUUM	SCI.ETS2.B.h.3.	New technologies can have deep impacts on society and the environment, including some that were not anticipated.
LEARNING CONTINUUM	SCI.ETS2.B.h.4.	Analysis of costs and benefits is a critical aspect of decisions about technology.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ETS.**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the nature of science and engineering to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS3.A.**	**Science and Engineering Are Human Endeavors**
LEARNING CONTINUUM	SCI.ETS3.A.h.4.	Scientists and engineers embrace skepticism and critique as a community. Deliberate deceit in science is rare and is likely exposed through the peer review process. When discovered, intellectual dishonesty is condemned by the scientific community.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ETS.**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the nature of science and engineering to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS3.B.**	**Science and Engineering Are Unique Ways of Thinking with Different Purposes**
LEARNING CONTINUUM	SCI.ETS3.B.h.3.	Science and engineering innovations may raise ethical issues for which science and engineering, by themselves, do not provide answers and solutions.

DOMAIN	**WI.SCI.**	**Science**
CONTENT STANDARD	**SCI.ETS.**	**Disciplinary Core Idea: Engineering, Technology, and the Application of Science (ETS)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**SCI.ETS3.**	**Students use science and engineering practices, crosscutting concepts, and an understanding of the nature of science and engineering to make sense of phenomena and solve problems.**
DESCRIPTOR / FOCUS AREA	**SCI.ETS3.C.**	**Science and Engineering Use Multiple Approaches to Create New Knowledge and Solve Problems**
LEARNING CONTINUUM	SCI.ETS3.C.h.3.	Engineers use a variety of approaches, tools, and techniques to define problems and develop solutions to those problems. Successful engineering solutions meet stakeholder needs and safety requirements, and are economically viable. Trade-offs in design aspects balance competing demands.

Wisconsin Academic Standards

Technology Education

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

DOMAIN	**WI.CS.**	**Computer Science**
CONTENT STANDARD	**CS.AP.**	**Content Area: Algorithms and Programming (AP)**

PERFORMANCE STANDARD / LEARNING PRIORITY	**CS.AP1.**	**Students will recognize and define computational problems using algorithms and programming.**
DESCRIPTOR / FOCUS AREA	**CS.AP1.a.**	**Develop algorithms.**
LEARNING CONTINUUM	CS.AP1.a.8.h.	Analyze a problem, and then design and implement an algorithmic solution using sequence, selection and iteration.

DOMAIN	**WI.CS.**	**Computer Science**
CONTENT STANDARD	**CS.AP.**	**Content Area: Algorithms and Programming (AP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**CS.AP2.**	**Students will create computational artifacts using algorithms and programming.**
DESCRIPTOR / FOCUS AREA	**CS.AP2.a.**	**Develop and implement an artifact.**
LEARNING CONTINUUM	CS.AP2.a.11.h.	Integrate grade-level appropriate mathematical techniques, concepts, and processes in the creation of computational artifacts.

DOMAIN	**WI.CS.**	**Computer Science**
CONTENT STANDARD	**CS.AP.**	**Content Area: Algorithms and Programming (AP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**CS.AP3.**	**Students will communicate about computing ideas.**
DESCRIPTOR / FOCUS AREA	**CS.AP3.b.**	**Communicate about technical and social issues.**
LEARNING CONTINUUM	CS.AP3.b.9.h.	(+) Compare a variety of programming languages and identify features that make them useful for solving different types of problems and developing different kinds of systems (e.g., declarative, logic, parallel, functional, compiled, interpreted, real-time).

DOMAIN	**WI.CS.**	**Computer Science**
CONTENT STANDARD	**CS.AP.**	**Content Area: Algorithms and Programming (AP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**CS.AP4.**	**Students will develop and use abstractions.**
DESCRIPTOR / FOCUS AREA	**CS.AP4.a.**	**Create and use abstractions (representations) to solve complex computational problems.**
LEARNING CONTINUUM	CS.AP4.a.8.h.	(+) Critically analyze and evaluate classic algorithms (e.g., sorting, searching) and use in different contexts, adapting as appropriate.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.KC.**	**Content Area: Knowledge Constructor (KC)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.KC1.**	**Students critically curate a variety of digital tools and diverse resources.**

DESCRIPTOR / FOCUS AREA	**ITL.KC1.a.**	**Plan and employ effective research strategies.**
LEARNING CONTINUUM	ITL.KC1.a.12.h.	Utilize an inquiry-based process to deepen content knowledge, connect academic learning with the real world, pursue personal interests, and investigate opportunities for personal growth.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.KC.**	**Content Area: Knowledge Constructor (KC)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.KC1.**	**Students critically curate a variety of digital tools and diverse resources.**
DESCRIPTOR / FOCUS AREA	**ITL.KC1.b.**	**Evaluate the accuracy, perspective, credibility, and relevance of information, media, data or other resources.**
LEARNING CONTINUUM	ITL.KC1.b.8.h.	Select information that is related to a problem or question while using formats and genre most appropriate to the content. Establish criteria in judging the information in this process.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.KC.**	**Content Area: Knowledge Constructor (KC)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.KC2.**	**Students produce creative artifacts and make meaningful learning experiences from curated knowledge for themselves and others.**
DESCRIPTOR / FOCUS AREA	**ITL.KC2.b.**	**Build knowledge by actively exploring real-world issues and problems.**
LEARNING CONTINUUM	ITL.KC2.b.8.h.	Build knowledge by actively exploring real-world issues and problems, independently developing ideas and theories and pursuing answers and solutions.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.ID.**	**Content Area: Innovative Designer (ID)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.ID1.**	**Students use a variety of digital tools and resources to identify and solve authentic problems using design thinking.**
DESCRIPTOR / FOCUS AREA	**ITL.ID1.b.**	**Exhibit tolerance for ambiguity, perseverance and the capacity to work with authentic, open-ended problems.**
LEARNING CONTINUUM	ITL.ID1.b.4.h.	Apply abstract concepts to solve authentic, open-ended problems for a group of stakeholders.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.ID.**	**Content Area: Innovative Designer (ID)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.ID2.**	**Students use a variety of technologies within a design process to create new, useful, and imaginative solutions.**
DESCRIPTOR / FOCUS AREA	**ITL.ID2.b.**	**Select and use digital resources to plan and manage a design process that considers design constraints and calculated risks.**

LEARNING CONTINUUM	ITL.ID2.b.4.h.	Select and use digital resources to plan and manage a design process that considers design constraints and calculated risks as they apply to authentic problems.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.CT.**	**Content Area: Computational Thinker (CT)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.CT1.**	**Students develop and employ strategies for understanding and solving problems.**
DESCRIPTOR / FOCUS AREA	**ITL.CT1.a.**	**Identify, define, and interpret problems where digital tools can assist in finding solutions.**
LEARNING CONTINUUM	ITL.CT1.a.4.h.	Create and articulate a precise and thorough description of a problem designed to utilize digital tools, data analysis, abstract modeling, or algorithmic thinking to facilitate a solution.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.CT.**	**Content Area: Computational Thinker (CT)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.CT1.**	**Students develop and employ strategies for understanding and solving problems.**
DESCRIPTOR / FOCUS AREA	**ITL.CT1.c.**	**Break problems into smaller parts, identify key information, and develop descriptive models.**
LEARNING CONTINUUM	ITL.CT1.c.4.h.	Evaluate the problem solving process and algorithms of others, and synthesize this information to create the most effective and efficient way to solve an authentic problem.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.GC.**	**Content Area: Global Collaborator (GC)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.GC2.**	**Students use digital tools to connect with a global network of learners and engage with issues that impact local and global communities.**
DESCRIPTOR / FOCUS AREA	**ITL.GC2.b.**	**Explore local and global issues and use collaborative digital resources to investigate and develop solutions.**
LEARNING CONTINUUM	ITL.GC2.b.4.h.	Explore and analyze local and global issues and leverage collaborative digital tools to work with others to investigate, develop, and actualize solutions.

Wisconsin Academic Standards

Technology Education

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

DOMAIN	**WI.CS.**	**Computer Science**
CONTENT STANDARD	**CS.AP.**	**Content Area: Algorithms and Programming (AP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**CS.AP1.**	**Students will recognize and define computational problems using algorithms and programming.**
DESCRIPTOR / FOCUS AREA	**CS.AP1.a.**	**Develop algorithms.**

LEARNING CONTINUUM	CS.AP1.a.8.h.	Analyze a problem, and then design and implement an algorithmic solution using sequence, selection and iteration.

DOMAIN	**WI.CS.**	**Computer Science**
CONTENT STANDARD	**CS.AP.**	**Content Area: Algorithms and Programming (AP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**CS.AP2.**	**Students will create computational artifacts using algorithms and programming.**
DESCRIPTOR / FOCUS AREA	**CS.AP2.a.**	**Develop and implement an artifact.**
LEARNING CONTINUUM	CS.AP2.a.11.h.	Integrate grade-level appropriate mathematical techniques, concepts, and processes in the creation of computational artifacts.

DOMAIN	**WI.CS.**	**Computer Science**
CONTENT STANDARD	**CS.AP.**	**Content Area: Algorithms and Programming (AP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**CS.AP3.**	**Students will communicate about computing ideas.**
DESCRIPTOR / FOCUS AREA	**CS.AP3.b.**	**Communicate about technical and social issues.**
LEARNING CONTINUUM	CS.AP3.b.9.h.	(+) Compare a variety of programming languages and identify features that make them useful for solving different types of problems and developing different kinds of systems (e.g., declarative, logic, parallel, functional, compiled, interpreted, real-time).

DOMAIN	**WI.CS.**	**Computer Science**
CONTENT STANDARD	**CS.AP.**	**Content Area: Algorithms and Programming (AP)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**CS.AP4.**	**Students will develop and use abstractions.**
DESCRIPTOR / FOCUS AREA	**CS.AP4.a.**	**Create and use abstractions (representations) to solve complex computational problems.**
LEARNING CONTINUUM	CS.AP4.a.8.h.	(+) Critically analyze and evaluate classic algorithms (e.g., sorting, searching) and use in different contexts, adapting as appropriate.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.KC.**	**Content Area: Knowledge Constructor (KC)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.KC1.**	**Students critically curate a variety of digital tools and diverse resources.**
DESCRIPTOR / FOCUS AREA	**ITL.KC1.a.**	**Plan and employ effective research strategies.**
LEARNING CONTINUUM	ITL.KC1.a.12.h.	Utilize an inquiry-based process to deepen content knowledge, connect academic learning with the real world, pursue personal interests, and investigate opportunities for personal growth.

DOMAIN	WI.ITL.	Information and Technology Literacy
CONTENT STANDARD	ITL.KC.	Content Area: Knowledge Constructor (KC)
PERFORMANCE STANDARD / LEARNING PRIORITY	ITL.KC1.	Students critically curate a variety of digital tools and diverse resources.
DESCRIPTOR / FOCUS AREA	ITL.KC1.b.	Evaluate the accuracy, perspective, credibility, and relevance of information, media, data or other resources.
LEARNING CONTINUUM	ITL.KC1.b.8.h.	Select information that is related to a problem or question while using formats and genre most appropriate to the content. Establish criteria in judging the information in this process.

DOMAIN	WI.ITL.	Information and Technology Literacy
CONTENT STANDARD	ITL.KC.	Content Area: Knowledge Constructor (KC)
PERFORMANCE STANDARD / LEARNING PRIORITY	ITL.KC2.	Students produce creative artifacts and make meaningful learning experiences from curated knowledge for themselves and others.
DESCRIPTOR / FOCUS AREA	ITL.KC2.b.	Build knowledge by actively exploring real-world issues and problems.
LEARNING CONTINUUM	ITL.KC2.b.8.h.	Build knowledge by actively exploring real-world issues and problems, independently developing ideas and theories and pursuing answers and solutions.

DOMAIN	WI.ITL.	Information and Technology Literacy
CONTENT STANDARD	ITL.ID.	Content Area: Innovative Designer (ID)
PERFORMANCE STANDARD / LEARNING PRIORITY	ITL.ID1.	Students use a variety of digital tools and resources to identify and solve authentic problems using design thinking.
DESCRIPTOR / FOCUS AREA	ITL.ID1.b.	Exhibit tolerance for ambiguity, perseverance and the capacity to work with authentic, open-ended problems.
LEARNING CONTINUUM	ITL.ID1.b.4.h.	Apply abstract concepts to solve authentic, open-ended problems for a group of stakeholders.

DOMAIN	WI.ITL.	Information and Technology Literacy
CONTENT STANDARD	ITL.ID.	Content Area: Innovative Designer (ID)
PERFORMANCE STANDARD / LEARNING PRIORITY	ITL.ID2.	Students use a variety of technologies within a design process to create new, useful, and imaginative solutions.
DESCRIPTOR / FOCUS AREA	ITL.ID2.b.	Select and use digital resources to plan and manage a design process that considers design constraints and calculated risks as they apply to authentic problems.
LEARNING CONTINUUM	ITL.ID2.b.4.h.	Select and use digital resources to plan and manage a design process that considers design constraints and calculated risks as they apply to authentic problems.

DOMAIN	WI.ITL.	Information and Technology Literacy
CONTENT STANDARD	ITL.CT.	Content Area: Computational Thinker (CT)

PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.CT1.**	**Students develop and employ strategies for understanding and solving problems.**
DESCRIPTOR / FOCUS AREA	**ITL.CT1.a.**	**Identify, define, and interpret problems where digital tools can assist in finding solutions.**
LEARNING CONTINUUM	ITL.CT1.a.4.h.	Create and articulate a precise and thorough description of a problem designed to utilize digital tools, data analysis, abstract modeling, or algorithmic thinking to facilitate a solution.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.CT.**	**Content Area: Computational Thinker (CT)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.CT1.**	**Students develop and employ strategies for understanding and solving problems.**
DESCRIPTOR / FOCUS AREA	**ITL.CT1.c.**	**Break problems into smaller parts, identify key information, and develop descriptive models.**
LEARNING CONTINUUM	ITL.CT1.c.4.h.	Evaluate the problem solving process and algorithms of others, and synthesize this information to create the most effective and efficient way to solve an authentic problem.

DOMAIN	**WI.ITL.**	**Information and Technology Literacy**
CONTENT STANDARD	**ITL.GC.**	**Content Area: Global Collaborator (GC)**
PERFORMANCE STANDARD / LEARNING PRIORITY	**ITL.GC2.**	**Students use digital tools to connect with a global network of learners and engage with issues that impact local and global communities.**
DESCRIPTOR / FOCUS AREA	**ITL.GC2.b.**	**Explore local and global issues and use collaborative digital resources to investigate and develop solutions.**
LEARNING CONTINUUM	ITL.GC2.b.4.h.	Explore and analyze local and global issues and leverage collaborative digital tools to work with others to investigate, develop, and actualize solutions.

Wyoming Content and Performance Standards

Mathematics

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

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

BENCHMARK	8	Look for and express regularity in repeated reasoning.

Wyoming Content and Performance Standards

Mathematics

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

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

CONTENT STANDARD		Functions
BENCHMARK		**Functions - Interpreting Functions**
GRADE LEVEL EXAMPLE	**F.IF.B.**	**Interpret functions that arise in application in terms of the context.**
EXPECTATION	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.

Wyoming Content and Performance Standards

Science

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

CONTENT STANDARD		PHYSICAL SCIENCE
BENCHMARK	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
GRADE LEVEL EXAMPLE	HS-PS4-2.	Evaluate the advantages and disadvantages of using digital transmission and storage of information.

CONTENT STANDARD		LIFE SCIENCE
BENCHMARK	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GRADE LEVEL EXAMPLE	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 EXAMPLE	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 EXAMPLE	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 EXAMPLE	HS-LS2-7.	Evaluate and assess impacts on the environment and biodiversity in order to refine or design a solution for detrimental impacts or enhancement for positive impacts.
CONTENT STANDARD		**LIFE SCIENCE**
BENCHMARK	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
GRADE LEVEL EXAMPLE	HS-LS4-6.	Create and/or use a simulation to evaluate the impacts of human activity on biodiversity.
CONTENT STANDARD		**EARTH AND SPACE SCIENCE**
BENCHMARK	**HS-ESS2.**	**Earth's Systems**
GRADE LEVEL EXAMPLE	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 EXAMPLE	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**
BENCHMARK	**HS-ESS3.**	**Earth and Human Activity**
GRADE LEVEL EXAMPLE	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 EXAMPLE	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and using energy and mineral resources based on cost-benefit ratios.
GRADE LEVEL EXAMPLE	HS-ESS3-3.	Use computational tools to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
GRADE LEVEL EXAMPLE	HS-ESS3-6.	Use the results of a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
CONTENT STANDARD		**ENGINEERING DESIGN**
BENCHMARK	**HS-ETS1.**	**Engineering, Technology, & Applications of Science**
GRADE LEVEL EXAMPLE	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 EXAMPLE	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 EXAMPLE	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: **2012**

CONTENT STANDARD	**RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Key Ideas and Details**
GRADE LEVEL EXAMPLE	RST.9-10.2.	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
GRADE LEVEL EXAMPLE	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	**RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Craft and Structure**
GRADE LEVEL EXAMPLE	RST.9-10.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
GRADE LEVEL EXAMPLE	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	**RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Integration of Knowledge and Ideas**
GRADE LEVEL EXAMPLE	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	**RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXAMPLE	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	**WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Text Types and Purposes**
GRADE LEVEL EXAMPLE	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION	WHST.9-10.2(d)	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
CONTENT STANDARD	**WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Production and Distribution of Writing**

GRADE LEVEL EXAMPLE	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GRADE LEVEL EXAMPLE	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.

Wyoming Content and Performance Standards

Technology Education

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

CONTENT STANDARD		**Wyoming Computer Science Content Standards**
BENCHMARK		**Computer Science Practices**
GRADE LEVEL EXAMPLE	**1**	**Fostering an Inclusive Computing Culture**
EXPECTATION	1.1.	"Include the unique perspectives of others and reflect on one's own perspectives when designing and developing computational products."
EXPECTATION	1.2.	Address the needs of diverse end users during the design process to produce artifacts with broad accessibility and usability.
EXPECTATION	1.3.	"Employ self- and peer-advocacy to address bias in interactions, product design, and development methods."

CONTENT STANDARD		**Wyoming Computer Science Content Standards**
BENCHMARK		**Computer Science Practices**
GRADE LEVEL EXAMPLE	**3**	**Recognizing and Defining Computational Problems**
EXPECTATION	3.2.	Decompose complex real-world problems into manageable subproblems that could integrate existing solutions or procedures.
EXPECTATION	3.3.	Evaluate whether it is appropriate and feasible to solve a problem computationally.

CONTENT STANDARD		**Wyoming Computer Science Content Standards**
BENCHMARK		**Computer Science Practices**
GRADE LEVEL EXAMPLE	**4**	**Developing and Using Abstractions**
EXPECTATION	4.2.	Evaluate existing technological functionalities and incorporate them into new designs.
EXPECTATION	4.3.	Create modules and develop points of interaction that can apply to multiple situations and reduce complexity.

CONTENT STANDARD		**Wyoming Computer Science Content Standards**
BENCHMARK		**Computer Science Practices**
GRADE LEVEL EXAMPLE	**5**	**Creating Computational Artifacts**

EXPECTATION	5.1.	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.
EXPECTATION	5.2.	Create a computational artifact for practical intent, personal expression, or to address a societal issue.
CONTENT STANDARD		**Wyoming Computer Science Content Standards**
BENCHMARK		**Computer Science Practices**
GRADE LEVEL EXAMPLE	**6**	**Testing and Refining Computational Artifact**
EXPECTATION	6.1.	Systematically test computational artifacts by considering all scenarios and using test cases.
CONTENT STANDARD		**Wyoming Computer Science Content Standards**
BENCHMARK		**HS Computer Science Standards**
GRADE LEVEL EXAMPLE	**AP.A.**	**Algorithms**
EXPECTATION	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 relevant to the student.
EXPECTATION	L1.AP.A.02.	Describe how artificial intelligence algorithms drive many software and physical systems.
CONTENT STANDARD		**Wyoming Computer Science Content Standards**
BENCHMARK		**HS Computer Science Standards**
GRADE LEVEL EXAMPLE	**AP.M.**	**Modularity**
EXPECTATION	L2.AP.M.01.	Construct solutions to problems using student-created components, such as procedures, modules, and/or objects.
CONTENT STANDARD		**Wyoming Computer Science Content Standards**
BENCHMARK		**HS Computer Science Standards**
GRADE LEVEL EXAMPLE	**AP.PD.**	**Program Development**
EXPECTATION	L1.AP.PD.01.	Plan and develop programs by analyzing a problem and/or process, developing and documenting a solution, testing outcomes, and adapting the program for a variety of users.
CONTENT STANDARD		**Wyoming Computer Science Content Standards**
BENCHMARK		**HS Computer Science Standards**
GRADE LEVEL EXAMPLE	**IC.C.**	**Culture**
EXPECTATION	L1.IC.C.02.	Test and refine computational artifacts to reduce bias and equity deficits.

EXPECTATION	L1.IC.C.03.	Demonstrate how a given algorithm applies to problems across disciplines.