Main Criteria: Forward Education

Secondary Criteria: Idaho Content Standards, Illinois Learning Standards, Indiana Academic Standards, Iowa Student Standards, Kansas Academic Standards, Kentucky Academic Standards, Louisiana Academic Standards, Maine Learning Results, Maryland College and Career-Ready Standards, Massachusetts Curriculum Frameworks, Michigan Academic Standards, Minnesota Academic Standards, Mississippi College & Career Readiness Standards, Missouri Learning Standards, Montana Content Standards

Subjects: Mathematics, Science, Technology Education

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

Forward Education

Replanting our Forests with Automated Tree Seeders

Idaho Content Standards

Mathematics

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

STANDARD / COURSE		Grades 9 – 12 Standards for Mathematical Practice
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.1.	Make sense of problems and persevere in solving them.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.2.	Reason abstractly and quantitatively.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.3.	Construct viable arguments and critique the reasoning of others.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.4.	Model with mathematics.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.6.	Attend to precision.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.7.	Look for and make use of structure.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.8.	Look for and express regularity in repeated reasoning.
STANDARD / COURSE	**F.**	**Grades 9 – 12 Functions (F)**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**F.IF.**	**Interpreting Functions – F.IF**

GLE / BIG IDEA	**F.IF.B.**	**Interpret functions that arise in applications in terms of the context. Include linear, quadratic, exponential, rational, polynomial, square root and cube root, trigonometric, and logarithmic functions.**
OBJECTIVE	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.
STANDARD / COURSE	**S.**	**Grades 9 – 12 Statistics and Probability (S)**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**S.ID.**	**Interpreting Categorical and Quantitative Data – S.ID**
GLE / BIG IDEA	**S.ID.A.**	**Summarize, represent, and interpret data on a single count or measurement variable. Use calculators, spreadsheets, and other technology as appropriate.**
OBJECTIVE	S.ID.A.3.	Compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different variables, using statistics appropriate to the shape of the distribution for each measurement variable.

Idaho Content Standards

Mathematics

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

STANDARD / COURSE		**Grades 9 – 12 Standards for Mathematical Practice**
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.1.	Make sense of problems and persevere in solving them.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.2.	Reason abstractly and quantitatively.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.3.	Construct viable arguments and critique the reasoning of others.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.4.	Model with mathematics.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.6.	Attend to precision.
CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.7.	Look for and make use of structure.

CONTENT KNOWLEDGE AND SKILLS / GOAL	MP.8.	Look for and express regularity in repeated reasoning.

STANDARD / COURSE	**F.**	**Grades 9 – 12 Functions (F)**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**F.IF.**	**Interpreting Functions – F.IF**
GLE / BIG IDEA	**F.IF.B.**	**Interpret functions that arise in applications in terms of the context. Include linear, quadratic, exponential, rational, polynomial, square root and cube root, trigonometric, and logarithmic functions.**
OBJECTIVE	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.

STANDARD / COURSE	**S.**	**Grades 9 – 12 Statistics and Probability (S)**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**S.ID.**	**Interpreting Categorical and Quantitative Data – S.ID**
GLE / BIG IDEA	**S.ID.A.**	**Summarize, represent, and interpret data on a single count or measurement variable. Use calculators, spreadsheets, and other technology as appropriate.**
OBJECTIVE	S.ID.A.3.	Compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different variables, using statistics appropriate to the shape of the distribution for each measurement variable.

Idaho Content Standards

Science

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

STANDARD / COURSE	**HS-LS.**	**Life Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**HS-LS-2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / BIG IDEA	HS-LS-2.2.	Use mathematical representations to support explanations that biotic and abiotic factors affect biodiversity at different scales within an ecosystem.
GLE / BIG IDEA	HS-LS-2.3.	Construct an explanation using mathematical representations to support claims for the flow of energy through trophic levels and the cycling of matter in an ecosystem.
GLE / BIG IDEA	HS-LS-2.4.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
GLE / BIG IDEA	HS-LS-2.6.	Design, evaluate, and/or refine practices used to manage a natural resource based on direct and indirect influences of human activities on biodiversity and ecosystem health.

STANDARD / COURSE	**HS-PSP.**	**Physical Science – Physics**

CONTENT KNOWLEDGE AND SKILLS / GOAL	**HS-PSP-3.**	**Waves**
GLE / BIG IDEA	HS-PSP-3.2.	Evaluate questions about the advantages of using digital transmission and storage of information.
STANDARD / COURSE	**HS-ESS.**	**Earth and Space Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**HS-ESS-2.**	**Earth's Systems**
GLE / BIG IDEA	HS-ESS-2.4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in variations in climate.
GLE / BIG IDEA	HS-ESS-2.6.	Develop a model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STANDARD / COURSE	**HS-ESS.**	**Earth and Space Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**HS-ESS-3.**	**Earth and Human Activity**
GLE / BIG IDEA	HS-ESS-3.1.	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.
GLE / BIG IDEA	HS-ESS-3.2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
GLE / BIG IDEA	HS-ESS-3.3.	Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity.
GLE / BIG IDEA	HS-ESS-3.6.	Communicate how relationships among Earth systems are being influenced by human activity.

Idaho Content Standards

Science

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

STANDARD / COURSE	**HS-LS.**	**Life Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**HS-LS-2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / BIG IDEA	HS-LS-2.2.	Use mathematical representations to support explanations that biotic and abiotic factors affect biodiversity at different scales within an ecosystem.
GLE / BIG IDEA	HS-LS-2.3.	Construct an explanation using mathematical representations to support claims for the flow of energy through trophic levels and the cycling of matter in an ecosystem.

GLE / BIG IDEA	HS-LS-2.4.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
GLE / BIG IDEA	HS-LS-2.6.	Design, evaluate, and/or refine practices used to manage a natural resource based on direct and indirect influences of human activities on biodiversity and ecosystem health.
STANDARD / COURSE	**HS-PSP.**	**Physical Science – Physics**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**HS-PSP-3.**	**Waves**
GLE / BIG IDEA	HS-PSP-3.2.	Evaluate questions about the advantages of using digital transmission and storage of information.
STANDARD / COURSE	**HS-ESS.**	**Earth and Space Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**HS-ESS-2.**	**Earth's Systems**
GLE / BIG IDEA	HS-ESS-2.4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in variations in climate.
GLE / BIG IDEA	HS-ESS-2.6.	Develop a model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STANDARD / COURSE	**HS-ESS.**	**Earth and Space Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**HS-ESS-3.**	**Earth and Human Activity**
GLE / BIG IDEA	HS-ESS-3.1.	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.
GLE / BIG IDEA	HS-ESS-3.2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
GLE / BIG IDEA	HS-ESS-3.3.	Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity.
GLE / BIG IDEA	HS-ESS-3.6.	Communicate how relationships among Earth systems are being influenced by human activity.

Idaho Content Standards

Technology Education

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

STANDARD / COURSE	**ID.ICT.9-12.3.**	**STANDARD 3: KNOWLEDGE CONSTRUCTOR**

CONTENT KNOWLEDGE AND SKILLS / GOAL		**Goal 3: 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.**
GLE / BIG IDEA	ICT.9-12.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.
STANDARD / COURSE	**ID.ICT.9-12.4.**	**STANDARD 4: INNOVATIVE DESIGNER**
CONTENT KNOWLEDGE AND SKILLS / GOAL		**Goal 4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
GLE / BIG IDEA	ICT.9-12.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
STANDARD / COURSE	**ID.ICT.9-12.5.**	**STANDARD 5: COMPUTATIONAL THINKER**
CONTENT KNOWLEDGE AND SKILLS / GOAL		**Goal 5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**
GLE / BIG IDEA	ICT.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.
GLE / BIG IDEA	ICT.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.
GLE / BIG IDEA	ICT.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.
GLE / BIG IDEA	ICT.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.
STANDARD / COURSE	**ID.CS.9-10.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**9-10.DA.**	**Data and Analysis (DA)**
GLE / BIG IDEA		**Recognizing and Defining Computational Problems**
OBJECTIVE	9-10.DA.05.	Apply basic techniques for locating, collecting, and understanding the quality of small and large-scale data sets (e.g. public data sets). (Grades 9-10)
STANDARD / COURSE	**ID.CS.9-10.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**9-10.IC.**	**Impacts of Computing (IC)**
GLE / BIG IDEA		**Communicating About Computing**

OBJECTIVE	9-10.IC.03.	Understand and explain the impact of artificial intelligence and robotics. (Grades 9-10)

STANDARD / COURSE	**ID.CS.9-10.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**9-10.AP.**	**Algorithms and Programming (AP)**
GLE / BIG IDEA		**Collaborating around Computing**

OBJECTIVE	9-10.AP.03.	Compare a variety of programming languages available to solve problems and develop systems. (Grades 9-10)

STANDARD / COURSE	**ID.CS.9-10.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**9-10.AP.**	**Algorithms and Programming (AP)**
GLE / BIG IDEA		**Recognizing and Defining Computational Problems**

OBJECTIVE	9-10.AP.12.	Design algorithms using sequence, selection, iteration and recursion. (Grades 9-10)

Idaho Content Standards

Technology Education

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

STANDARD / COURSE	**ID.ICT.9-12.3.**	**STANDARD 3: KNOWLEDGE CONSTRUCTOR**
CONTENT KNOWLEDGE AND SKILLS / GOAL		**Goal 3: 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.**
GLE / BIG IDEA	ICT.9-12.3.d.	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

STANDARD / COURSE	**ID.ICT.9-12.4.**	**STANDARD 4: INNOVATIVE DESIGNER**
CONTENT KNOWLEDGE AND SKILLS / GOAL		**Goal 4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.**
GLE / BIG IDEA	ICT.9-12.4.b.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

STANDARD / COURSE	**ID.ICT.9-12.5.**	**STANDARD 5: COMPUTATIONAL THINKER**
CONTENT KNOWLEDGE AND SKILLS / GOAL		**Goal 5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**

GLE / BIG IDEA	ICT.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.
GLE / BIG IDEA	ICT.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.
GLE / BIG IDEA	ICT.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.
GLE / BIG IDEA	ICT.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.

STANDARD / COURSE	**ID.CS.9-10.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**9-10.DA.**	**Data and Analysis (DA)**
GLE / BIG IDEA		**Recognizing and Defining Computational Problems**
OBJECTIVE	9-10.DA.05.	Apply basic techniques for locating, collecting, and understanding the quality of small and large-scale data sets (e.g. public data sets). (Grades 9-10)

STANDARD / COURSE	**ID.CS.9-10.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**9-10.IC.**	**Impacts of Computing (IC)**
GLE / BIG IDEA		**Communicating About Computing**
OBJECTIVE	9-10.IC.03.	Understand and explain the impact of artificial intelligence and robotics. (Grades 9-10)

STANDARD / COURSE	**ID.CS.9-10.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**9-10.AP.**	**Algorithms and Programming (AP)**
GLE / BIG IDEA		**Collaborating around Computing**
OBJECTIVE	9-10.AP.03.	Compare a variety of programming languages available to solve problems and develop systems. (Grades 9-10)

STANDARD / COURSE	**ID.CS.9-10.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**9-10.AP.**	**Algorithms and Programming (AP)**
GLE / BIG IDEA		**Recognizing and Defining Computational Problems**

OBJECTIVE	9-10.AP.12.	Design algorithms using sequence, selection, iteration and recursion. (Grades 9-10)

Illinois Learning Standards

Mathematics

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

STATE GOAL / DISCIPLINARY CONCEPT	IL.K-12.MP.	Mathematical Practices
LEARNING STANDARD / DISCIPLINE	K-12.MP.1.	Make sense of problems and persevere in solving them.
LEARNING STANDARD / DISCIPLINE	K-12.MP.2.	Reason abstractly and quantitatively.
LEARNING STANDARD / DISCIPLINE	K-12.MP.3.	Construct viable arguments and critique the reasoning of others.
LEARNING STANDARD / DISCIPLINE	K-12.MP.4.	Model with mathematics.
LEARNING STANDARD / DISCIPLINE	K-12.MP.6.	Attend to precision.
LEARNING STANDARD / DISCIPLINE	K-12.MP.7.	Look for and make use of structure.
LEARNING STANDARD / DISCIPLINE	K-12.MP.8.	Look for and express regularity in repeated reasoning.

STATE GOAL / DISCIPLINARY CONCEPT	IL.9-12.F.	Functions
LEARNING STANDARD / DISCIPLINE	**CC.9-12.F.IF.**	**Interpreting Functions**
DESCRIPTOR / CONTENT DISCIPLINE		**Interpret functions that arise in applications in terms of the context.**
STANDARD	CC.9-12.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.

Illinois Learning Standards

Mathematics

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

STATE GOAL / DISCIPLINARY CONCEPT	IL.9-12.K-12.MP.	Mathematical Practices
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.1.	Make sense of problems and persevere in solving them.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.2.	Reason abstractly and quantitatively.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.3.	Construct viable arguments and critique the reasoning of others.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.4.	Model with mathematics.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.6.	Attend to precision.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.7.	Look for and make use of structure.
LEARNING STANDARD / DISCIPLINE	CC.9-12.CC.K.12.MP.8.	Look for and express regularity in repeated reasoning.

STATE GOAL / DISCIPLINARY CONCEPT	IL.9-12.F.	Functions
LEARNING STANDARD / DISCIPLINE	**CC.9-12.F.IF.**	**Interpreting Functions**
DESCRIPTOR / CONTENT DISCIPLINE		**Interpret functions that arise in applications in terms of the context.**
STANDARD	CC.9-12.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.

Illinois Learning Standards

Science

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

STATE GOAL / DISCIPLINARY CONCEPT	IL.HS-PS.	PHYSICAL SCIENCE
LEARNING STANDARD / DISCIPLINE	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**

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

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-LS.**	**LIFE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STANDARD	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STANDARD	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.
STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-LS.**	**LIFE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ESS.**	**EARTH AND SPACE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-ESS2.**	**Earth's Systems**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	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.
STANDARD	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ESS.**	**EARTH AND SPACE SCIENCE**

LEARNING STANDARD / DISCIPLINE	**HS-ESS3.**	**Earth and Human Activity**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
STANDARD	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD	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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ETS.**	**ENGINEERING DESIGN**
LEARNING STANDARD / DISCIPLINE	**HS-ETS1.**	**Engineering Design**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
STANDARD	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
STANDARD	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**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Key Ideas and Details**
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**

LEARNING STANDARD / DISCIPLINE		**Craft and Structure**
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.
DESCRIPTOR / CONTENT DISCIPLINE	CC.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).
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Integration of Knowledge and Ideas**
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Range of Reading and Level of Text Complexity**
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Text Types and Purposes**
DESCRIPTOR / CONTENT DISCIPLINE	**CC.9-10.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
STANDARD	CC.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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Production and Distribution of Writing**
DESCRIPTOR / CONTENT DISCIPLINE	CC.9-10.WHST.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

DESCRIPTOR / CONTENT DISCIPLINE	CC.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.

Illinois Learning Standards

Science

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

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-PS.**	**PHYSICAL SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-LS.**	**LIFE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STANDARD	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STANDARD	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.
STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-LS.**	**LIFE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ESS.**	**EARTH AND SPACE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-ESS2.**	**Earth's Systems**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	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.
STANDARD	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ESS.**	**EARTH AND SPACE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**HS-ESS3.**	**Earth and Human Activity**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
STANDARD	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD	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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.HS-ETS.**	**ENGINEERING DESIGN**
LEARNING STANDARD / DISCIPLINE	**HS-ETS1.**	**Engineering Design**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
STANDARD	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

STANDARD	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**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Key Ideas and Details**
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Craft and Structure**
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.
DESCRIPTOR / CONTENT DISCIPLINE	CC.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).
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Integration of Knowledge and Ideas**
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Range of Reading and Level of Text Complexity**
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Text Types and Purposes**
DESCRIPTOR / CONTENT DISCIPLINE	**CC.9-10.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
STANDARD	CC.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.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.9-10.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Production and Distribution of Writing**
DESCRIPTOR / CONTENT DISCIPLINE	CC.9-10.WHST.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
DESCRIPTOR / CONTENT DISCIPLINE	CC.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.

Illinois Learning Standards

Technology Education

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

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Practices**
DESCRIPTOR / CONTENT DISCIPLINE	3	Recognizing and defining computational problems.
DESCRIPTOR / CONTENT DISCIPLINE	5	Creating computational artifacts.
DESCRIPTOR / CONTENT DISCIPLINE	6	Testing and refining computational artifacts.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**

DESCRIPTOR / CONTENT DISCIPLINE	**9-10.AP.**	**Algorithms and Programming**
STANDARD		**Algorithms**
EXPECTATION	9-10.AP.13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**9-10.AP.**	**Algorithms and Programming**
STANDARD		**Program Development**
EXPECTATION	9-10.AP.22.	Design and develop computational artifacts working in team roles using collaborative tools.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**9-10.IC.**	**Impacts of Computing**
STANDARD		**Culture**
EXPECTATION	9-10.IC.27.	Demonstrate ways a given algorithm applies to problems across disciplines.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**9-10.ET.**	**Emerging and Future Technologies**
STANDARD	9-10.ET.E.	Create new or original work by applying emerging technologies.

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

STATE GOAL / DISCIPLINARY CONCEPT		**ISTE Standards for Students**
LEARNING STANDARD / DISCIPLINE	**IL.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.**

DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.3.d.	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

STATE GOAL / DISCIPLINARY CONCEPT		ISTE Standards for Students
LEARNING STANDARD / DISCIPLINE	**IL.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.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.a.	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.b.	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

STATE GOAL / DISCIPLINARY CONCEPT		ISTE Standards for Students
LEARNING STANDARD / DISCIPLINE	**IL.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.**
DESCRIPTOR / CONTENT DISCIPLINE	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.
DESCRIPTOR / CONTENT DISCIPLINE	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.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.5.d.	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Illinois Learning Standards

Technology Education

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

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		**Computer Science Practices**
DESCRIPTOR / CONTENT DISCIPLINE	3	Recognizing and defining computational problems.
DESCRIPTOR / CONTENT DISCIPLINE	5	Creating computational artifacts.

DESCRIPTOR / CONTENT DISCIPLINE	6	Testing and refining computational artifacts.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**9-10.AP.**	**Algorithms and Programming**
STANDARD		**Algorithms**
EXPECTATION	9-10.AP.13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**9-10.AP.**	**Algorithms and Programming**
STANDARD		**Program Development**
EXPECTATION	9-10.AP.22.	Design and develop computational artifacts working in team roles using collaborative tools.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**9-10.IC.**	**Impacts of Computing**
STANDARD		**Culture**
EXPECTATION	9-10.IC.27.	Demonstrate ways a given algorithm applies to problems across disciplines.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**9-10.ET.**	**Emerging and Future Technologies**

STANDARD	9-10.ET.E.	Create new or original work by applying emerging technologies.

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

STATE GOAL / DISCIPLINARY CONCEPT		ISTE Standards for Students
LEARNING STANDARD / DISCIPLINE	**IL.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.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.3.d.	Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

STATE GOAL / DISCIPLINARY CONCEPT		ISTE Standards for Students
LEARNING STANDARD / DISCIPLINE	**IL.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.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.a.	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.b.	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

STATE GOAL / DISCIPLINARY CONCEPT		ISTE Standards for Students
LEARNING STANDARD / DISCIPLINE	**IL.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.**
DESCRIPTOR / CONTENT DISCIPLINE	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.
DESCRIPTOR / CONTENT DISCIPLINE	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.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.5.d.	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

Indiana Academic Standards

Mathematics

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

STANDARD / STRAND		Mathematics Process Standards

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

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

STANDARD / STRAND		**Calculus**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.

INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Finite Mathematics**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Precalculus: Algebra**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.

INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Precalculus: Trigonometry**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Probability and Statistics**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.

INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Probability and Statistics**
PROFICIENCY STATEMENT / SUBSTRAND		**Data Analysis**
INDICATOR / STANDARD	PS.DA.2	Compute and use mean, median, mode, weighted mean, geometric mean, harmonic mean, range, quartiles, variance, and standard deviation. Use tables and technology to estimate areas under the normal curve. Fit a data set to a normal distribution and estimate population percentages. Recognize that there are data sets not normally distributed for which such procedures are inappropriate.
STANDARD / STRAND		**Quantitative Reasoning**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Quantitative Reasoning**
PROFICIENCY STATEMENT / SUBSTRAND		**Ratio and Proportional Reasoning**
INDICATOR / STANDARD	QR.P.3	Solve real-life problems requiring interpretation and comparison of various representations of ratios, (i.e. fractions, decimals, rate, and percentages), such as problems that involve non-standard ratios (e.g., media and risk reporting) or part-to-part versus part-to-whole ratios taken from meaningful context.
STANDARD / STRAND		**Quantitative Reasoning**

PROFICIENCY STATEMENT / SUBSTRAND		Statistics
INDICATOR / STANDARD	QR.S.9	Recognize when data are normally distributed and use the mean and standard deviation of the data to fit it to a normal distribution.

Indiana Academic Standards

Mathematics

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

STANDARD / STRAND		Mathematics Process Standards
PROFICIENCY STATEMENT / SUBSTRAND	PS.1:	Make sense of problems and persevere in solving them.
PROFICIENCY STATEMENT / SUBSTRAND	PS.2:	Reason abstractly and quantitatively.
PROFICIENCY STATEMENT / SUBSTRAND	PS.3:	Construct viable arguments and critique the reasoning of others.
PROFICIENCY STATEMENT / SUBSTRAND	PS.4:	Model with mathematics.
PROFICIENCY STATEMENT / SUBSTRAND	PS.6:	Attend to precision.
PROFICIENCY STATEMENT / SUBSTRAND	PS.7:	Look for and make use of structure.
PROFICIENCY STATEMENT / SUBSTRAND	PS.8:	Look for and express regularity in repeated reasoning.

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

STANDARD / STRAND		Calculus
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.

INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Finite Mathematics**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Precalculus: Algebra**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.

INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Precalculus: Trigonometry**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Probability and Statistics**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.

INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Probability and Statistics**
PROFICIENCY STATEMENT / SUBSTRAND		**Data Analysis**
INDICATOR / STANDARD	PS.DA.2	Compute and use mean, median, mode, weighted mean, geometric mean, harmonic mean, range, quartiles, variance, and standard deviation. Use tables and technology to estimate areas under the normal curve. Fit a data set to a normal distribution and estimate population percentages. Recognize that there are data sets not normally distributed for which such procedures are inappropriate.
STANDARD / STRAND		**Quantitative Reasoning**
PROFICIENCY STATEMENT / SUBSTRAND		**Process Standards for Mathematics**
INDICATOR / STANDARD	PS.1	Make sense of problems and persevere in solving them.
INDICATOR / STANDARD	PS.2	Reason abstractly and quantitatively.
INDICATOR / STANDARD	PS.3	Construct viable arguments and critique the reasoning of others.
INDICATOR / STANDARD	PS.4	Model with mathematics.
INDICATOR / STANDARD	PS.6	Attend to precision.
INDICATOR / STANDARD	PS.7	Look for and make use of structure.
INDICATOR / STANDARD	PS.8	Look for and express regularity in repeated reasoning.
STANDARD / STRAND		**Quantitative Reasoning**

PROFICIENCY STATEMENT / SUBSTRAND		**Ratio and Proportional Reasoning**
INDICATOR / STANDARD	QR.P.3	Solve real-life problems requiring interpretation and comparison of various representations of ratios, (i.e. fractions, decimals, rate, and percentages), such as problems that involve non-standard ratios (e.g., media and risk reporting) or part-to-part versus part-to-whole ratios taken from meaningful context.
STANDARD / STRAND		**Quantitative Reasoning**
PROFICIENCY STATEMENT / SUBSTRAND		**Statistics**
INDICATOR / STANDARD	QR.S.9	Recognize when data are normally distributed and use the mean and standard deviation of the data to fit it to a normal distribution.

Indiana Academic Standards

Science

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

STANDARD / STRAND		**Science and Engineering Practices**
PROFICIENCY STATEMENT / SUBSTRAND	SEP.2.	Developing and using models
PROFICIENCY STATEMENT / SUBSTRAND	SEP.6.	Constructing explanations (for science) and designing solutions (for engineering)
PROFICIENCY STATEMENT / SUBSTRAND	SEP.8.	Obtaining, evaluating, and communicating information
STANDARD / STRAND		**Biology**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-2.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STANDARD / STRAND		**Biology**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-4.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STANDARD / STRAND		**Biology**

PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-5.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	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.
STANDARD / STRAND		**Biology**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-7.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD / STRAND		**Biology**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS4-6.**	**Biological Evolution: Unity and Diversity**
INDICATOR / STANDARD	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS2-4.**	**Earth's Systems**
INDICATOR / STANDARD	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.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS2-6.**	**Earth's Systems**
INDICATOR / STANDARD	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-1.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-2.**	**Human Interaction with Earth's Systems**

INDICATOR / STANDARD	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-3.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-6.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	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.

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

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV1-2.**	**Environmental Systems**
INDICATOR / STANDARD	HS-ENV1-2.	Use a computational representation to illustrate that humans are part of Earth's ecosystems and how human activities can, deliberately or inadvertently, alter ecosystems.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV1-3.**	**Environmental Systems**
INDICATOR / STANDARD	HS-ENV1-3.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-1.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-1.	Construct and revise an explanation based on evidence for the cycling of matter through sources and sinks and how energy is transferred.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-3.**	**Flow of Matter and Energy**

INDICATOR / STANDARD	HS-ENV2-3.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-6.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-6.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-7.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-7.	Analyze computational tools and other technologies that allow for the management of natural resources. Evaluate the trade-offs of these tools regarding human physical and cultural needs versus sustainability and biodiversity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV4-1.**	**Biodiversity**
INDICATOR / STANDARD	HS-ENV4-1.	Use a model or simulation to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV4-2.**	**Biodiversity**
INDICATOR / STANDARD	HS-ENV4-2.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-2.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-2.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-4.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-4.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV6-2.**	**Environmental Policy**
INDICATOR / STANDARD	HS-ENV6-2.	Construct an argument to explain that environmental policies/decisions have negative and positive impacts on people, societies, and the environment.

Indiana Academic Standards

Science

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

STANDARD / STRAND		**Science and Engineering Practices**
PROFICIENCY STATEMENT / SUBSTRAND	SEP.2.	Developing and using models
PROFICIENCY STATEMENT / SUBSTRAND	SEP.6.	Constructing explanations (for science) and designing solutions (for engineering)
PROFICIENCY STATEMENT / SUBSTRAND	SEP.8.	Obtaining, evaluating, and communicating information

STANDARD / STRAND		**Biology**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-2.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

STANDARD / STRAND		**Biology**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-4.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

STANDARD / STRAND		**Biology**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-5.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	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.

STANDARD / STRAND		**Biology**

PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS2-7.**	**Ecosystems: Interactions, Energy and Dynamics**
INDICATOR / STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD / STRAND		**Biology**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-LS4-6.**	**Biological Evolution: Unity and Diversity**
INDICATOR / STANDARD	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS2-4.**	**Earth's Systems**
INDICATOR / STANDARD	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.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS2-6.**	**Earth's Systems**
INDICATOR / STANDARD	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-1.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-2.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-3.**	**Human Interaction with Earth's Systems**

INDICATOR / STANDARD	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD / STRAND		**Earth and Space Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ESS3-6.**	**Human Interaction with Earth's Systems**
INDICATOR / STANDARD	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.

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

STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV1-2.**	**Environmental Systems**
INDICATOR / STANDARD	HS-ENV1-2.	Use a computational representation to illustrate that humans are part of Earth's ecosystems and how human activities can, deliberately or inadvertently, alter ecosystems.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV1-3.**	**Environmental Systems**
INDICATOR / STANDARD	HS-ENV1-3.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-1.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-1.	Construct and revise an explanation based on evidence for the cycling of matter through sources and sinks and how energy is transferred.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-3.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-3.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-6.**	**Flow of Matter and Energy**

INDICATOR / STANDARD	HS-ENV2-6.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV2-7.**	**Flow of Matter and Energy**
INDICATOR / STANDARD	HS-ENV2-7.	Analyze computational tools and other technologies that allow for the management of natural resources. Evaluate the trade-offs of these tools regarding human physical and cultural needs versus sustainability and biodiversity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV4-1.**	**Biodiversity**
INDICATOR / STANDARD	HS-ENV4-1.	Use a model or simulation to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV4-2.**	**Biodiversity**
INDICATOR / STANDARD	HS-ENV4-2.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-2.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-2.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV5-4.**	**The Effect of Human Population and Activities on the Environment**
INDICATOR / STANDARD	HS-ENV5-4.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STANDARD / STRAND		**Environmental Science**
PROFICIENCY STATEMENT / SUBSTRAND	**HS-ENV6-2.**	**Environmental Policy**
INDICATOR / STANDARD	HS-ENV6-2.	Construct an argument to explain that environmental policies/decisions have negative and positive impacts on people, societies, and the environment.

Indiana Academic Standards

Technology Education

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

STANDARD / STRAND		**Computer Science I**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs and Algorithms (PA)**
INDICATOR / STANDARD	CSI-1.2.	Outline the problem assigned and describe the solution.
INDICATOR / STANDARD	CSI-1.3.	Use puzzles and games to enhance problem solving skills.
INDICATOR / STANDARD	CSI-3.1.	Develop algorithms to determine a solution.
INDICATOR / STANDARD	CSI-3.2.	Assess the use of algorithms to provide a solution.
INDICATOR / STANDARD	CSI-3.3.	Use pseudocode to describe a solution.
INDICATOR / STANDARD	CSI-3.5.	Explain how the algorithm can be used to solve a problem.
INDICATOR / STANDARD	CSI-4.2.	Create a computer program that corresponds to an algorithm or proposed solution.
STANDARD / STRAND		**Computer Science I**
PROFICIENCY STATEMENT / SUBSTRAND		**Networking and Communication (NC)**
INDICATOR / STANDARD	CSI-2.3.	Utilize a problem solving approach to develop a solution using technology.
INDICATOR / STANDARD	CSI-2.5.	Program a solution to a problem using pair programming or other methods.
STANDARD / STRAND		**Computer Science II**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs and Algorithms (PA)**
INDICATOR / STANDARD	CSII-3.1.	Develop algorithms to determine a solution.
INDICATOR / STANDARD	CSII-3.5.	Explain how the algorithm can be used to solve a problem.

STANDARD / STRAND		**Computer Science II**
PROFICIENCY STATEMENT / SUBSTRAND		**Networking and Communication (NC)**
INDICATOR / STANDARD	CSII-2.1.	Design a solution to a problem by working in a team.
INDICATOR / STANDARD	CSII-2.3.	Utilize a problem solving approach to develop a solution using technology.

STANDARD / STRAND		**Introduction to Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Data and Information (DI)**
INDICATOR / STANDARD	ICS-2.5.	Formulate algorithms using programming structures to decompose a complex problem.
INDICATOR / STANDARD	ICS-5.3.	Utilize a problem solving approach to develop a solution using technology.

STANDARD / STRAND		**Introduction to Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Computing Devices and Systems (CD)**
INDICATOR / STANDARD	ICS-4.6.	Investigate innovations in computing, including robotics.

Indiana Academic Standards

Technology Education

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

STANDARD / STRAND		**Computer Science I**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs and Algorithms (PA)**
INDICATOR / STANDARD	CSI-1.2.	Outline the problem assigned and describe the solution.
INDICATOR / STANDARD	CSI-1.3.	Use puzzles and games to enhance problem solving skills.
INDICATOR / STANDARD	CSI-3.1.	Develop algorithms to determine a solution.
INDICATOR / STANDARD	CSI-3.2.	Assess the use of algorithms to provide a solution.

INDICATOR / STANDARD	CSI-3.3.	Use pseudocode to describe a solution.
INDICATOR / STANDARD	CSI-3.5.	Explain how the algorithm can be used to solve a problem.
INDICATOR / STANDARD	CSI-4.2.	Create a computer program that corresponds to an algorithm or proposed solution.
STANDARD / STRAND		**Computer Science I**
PROFICIENCY STATEMENT / SUBSTRAND		**Networking and Communication (NC)**
INDICATOR / STANDARD	CSI-2.3.	Utilize a problem solving approach to develop a solution using technology.
INDICATOR / STANDARD	CSI-2.5.	Program a solution to a problem using pair programming or other methods.
STANDARD / STRAND		**Computer Science II**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs and Algorithms (PA)**
INDICATOR / STANDARD	CSII-3.1.	Develop algorithms to determine a solution.
INDICATOR / STANDARD	CSII-3.5.	Explain how the algorithm can be used to solve a problem.
STANDARD / STRAND		**Computer Science II**
PROFICIENCY STATEMENT / SUBSTRAND		**Networking and Communication (NC)**
INDICATOR / STANDARD	CSII-2.1.	Design a solution to a problem by working in a team.
INDICATOR / STANDARD	CSII-2.3.	Utilize a problem solving approach to develop a solution using technology.
STANDARD / STRAND		**Introduction to Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Data and Information (DI)**
INDICATOR / STANDARD	ICS-2.5.	Formulate algorithms using programming structures to decompose a complex problem.

INDICATOR / STANDARD	ICS-5.3.	Utilize a problem solving approach to develop a solution using technology.

STANDARD / STRAND		**Introduction to Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Computing Devices and Systems (CD)**
INDICATOR / STANDARD	ICS-4.6.	Investigate innovations in computing, including robotics.

Iowa Student Standards

Mathematics

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

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

STRAND / COURSE	**HS.F.**	**High School—Functions**
ESSENTIAL CONCEPT AND/OR SKILL	**F-IF.**	**Interpreting Functions F-IF**
DETAILED DESCRIPTOR	**F-IF.B.**	**Interpret functions that arise in applications in terms of the context (F-IF.B)**

GRADE LEVEL 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. (F-IF.B.6)

Iowa Student Standards

Mathematics

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

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

STRAND / COURSE	HS.F.	High School—Functions
ESSENTIAL CONCEPT AND/OR SKILL	**F-IF.**	**Interpreting Functions F-IF**
DETAILED DESCRIPTOR	**F-IF.B.**	**Interpret functions that arise in applications in terms of the context (F-IF.B)**
GRADE LEVEL 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. (F-IF.B.6)

Iowa Student Standards

Science

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

STRAND / COURSE	IA.HS-PS4.	Waves and Their Applications in Technologies for Information Transfer

ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STRAND / COURSE	**IA.HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND / COURSE	**IA.HS-LS4.**	**Biological Evolution: Unity and Diversity**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STRAND / COURSE	**IA.HS-ESS2.**	**Earth's Systems**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND / COURSE	**IA.HS-ESS3.**	**Earth and Human Activity**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	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.

DETAILED DESCRIPTOR	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
DETAILED DESCRIPTOR	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
DETAILED DESCRIPTOR	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / COURSE	**IA.HS-ETS1.**	**Engineering Design**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	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: **2016**

STRAND / COURSE	**IA.CC.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Key Ideas and Details**
DETAILED DESCRIPTOR	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. (RST.9-10.2.)
DETAILED DESCRIPTOR	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. (RST.9-10.3)
STRAND / COURSE	**IA.CC.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Craft and Structure**
DETAILED DESCRIPTOR	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. (RST.9-10.4.)
DETAILED DESCRIPTOR	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). (RST.9-10.5.)
STRAND / COURSE	**IA.CC.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Integration of Knowledge and Ideas**

DETAILED DESCRIPTOR	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. (RST.9-10.9.)

STRAND / COURSE	**IA.CC.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Range of Reading and Level of Text Complexity**

DETAILED DESCRIPTOR	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. (RST.9-10.10.)

STRAND / COURSE	**IA.CC.WHST.9-10.**	**Writing Standards for Literacy Science, and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Text Types and Purposes**
DETAILED DESCRIPTOR	**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. (WHST.9-10.2.)

STRAND / COURSE	**IA.CC.WHST.9-10.**	**Writing Standards for Literacy Science, and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Production and Distribution of Writing**

DETAILED DESCRIPTOR	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (WHST.9-10.4.)

DETAILED DESCRIPTOR	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. (WHST.9-10.6.)

Iowa Student Standards

Science

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

STRAND / COURSE	**IA.HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**

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

STRAND / COURSE	**IA.HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**

DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND / COURSE	**IA.HS-LS4.**	**Biological Evolution: Unity and Diversity**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STRAND / COURSE	**IA.HS-ESS2.**	**Earth's Systems**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND / COURSE	**IA.HS-ESS3.**	**Earth and Human Activity**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
DETAILED DESCRIPTOR	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
DETAILED DESCRIPTOR	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / COURSE	**IA.HS-ETS1.**	**Engineering Design**

ESSENTIAL CONCEPT AND/OR SKILL		Students who demonstrate understanding can:
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	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.
DETAILED DESCRIPTOR	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: **2016**

STRAND / COURSE	IA.CC.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
ESSENTIAL CONCEPT AND/OR SKILL		Key Ideas and Details
DETAILED DESCRIPTOR	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. (RST.9-10.2.)
DETAILED DESCRIPTOR	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. (RST.9-10.3)

STRAND / COURSE	IA.CC.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
ESSENTIAL CONCEPT AND/OR SKILL		Craft and Structure
DETAILED DESCRIPTOR	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. (RST.9-10.4.)
DETAILED DESCRIPTOR	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). (RST.9-10.5.)

STRAND / COURSE	IA.CC.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
ESSENTIAL CONCEPT AND/OR SKILL		Integration of Knowledge and Ideas
DETAILED DESCRIPTOR	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. (RST.9-10.9.)

STRAND / COURSE	IA.CC.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
ESSENTIAL CONCEPT AND/OR SKILL		Range of Reading and Level of Text Complexity
DETAILED DESCRIPTOR	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. (RST.9-10.10.)

STRAND / COURSE	IA.CC.WHST.9-10.	Writing Standards for Literacy Science, and Technical Subjects
ESSENTIAL CONCEPT AND/OR SKILL		Text Types and Purposes
DETAILED DESCRIPTOR	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. (WHST.9-10.2.)

STRAND / COURSE	IA.CC.WHST.9-10.	Writing Standards for Literacy Science, and Technical Subjects
ESSENTIAL CONCEPT AND/OR SKILL		Production and Distribution of Writing
DETAILED DESCRIPTOR	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (WHST.9-10.4.)
DETAILED DESCRIPTOR	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. (WHST.9-10.6.)

Iowa Student Standards
Technology Education
Grade **9** - Adopted: **2018**

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.3A.	Level 3A (Ages 14-16)
DETAILED DESCRIPTOR	3A-AP.	Algorithms & Programming
GRADE LEVEL EXPECTATION		Algorithms
EXAMPLE	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. (P5.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.3A.	Level 3A (Ages 14-16)
DETAILED DESCRIPTOR	3A-IC.	Impacts of Computing
GRADE LEVEL EXPECTATION		Culture
EXAMPLE	3A-IC-25.	Test and refine computational artifacts to reduce bias and equity deficits. (P1.2)

Iowa Student Standards
Technology Education
Grade **10** - Adopted: **2018**

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.3 A.	Level 3A (Ages 14-16)
DETAILED DESCRIPTOR	3A-AP.	Algorithms & Programming
GRADE LEVEL EXPECTATION		Algorithms
EXAMPLE	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. (P5.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.3 A.	Level 3A (Ages 14-16)
DETAILED DESCRIPTOR	3A-IC.	Impacts of Computing
GRADE LEVEL EXPECTATION		Culture
EXAMPLE	3A-IC-25.	Test and refine computational artifacts to reduce bias and equity deficits. (P1.2)

Kansas Academic Standards

Mathematics

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

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

STANDARD		Functions
BENCHMARK	F.IF.	Interpreting Functions
INDICATOR / PROFICIENCY LEVEL		Interpret functions that arise in applications in terms of the context.

INDICATOR	F.IF.6.	(9/10/11) 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. (9/10) limited to linear functions.

Kansas Academic Standards

Mathematics

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

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

STANDARD		Functions
BENCHMARK	**F.IF.**	**Interpreting Functions**
INDICATOR / PROFICIENCY LEVEL		**Interpret functions that arise in applications in terms of the context.**
INDICATOR	F.IF.6.	(9/10/11) 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. (9/10) limited to linear functions.

Kansas Academic Standards

Science

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

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

STANDARD	KS.HS-LS.	LIFE SCIENCE
BENCHMARK	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**

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

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.
STANDARD	**KS.HS-ETS.**	**ENGINEERING DESIGN**
BENCHMARK	**HS-ETS1.**	**Engineering Design**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
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.
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.
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**

STANDARD	**KS.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Key Ideas and Details**
INDICATOR / PROFICIENCY LEVEL	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 / PROFICIENCY LEVEL	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	**KS.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Craft and Structure**
INDICATOR / PROFICIENCY LEVEL	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 / PROFICIENCY LEVEL	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	**KS.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Integration of Knowledge and Ideas**
INDICATOR / PROFICIENCY LEVEL	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	**KS.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Range of Reading and Level of Text Complexity**
INDICATOR / PROFICIENCY LEVEL	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	**KS.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Text Types and Purposes**
INDICATOR / PROFICIENCY LEVEL	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
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.

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

Kansas Academic Standards

Science

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

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

STANDARD	**KS.HS-LS.**	**LIFE SCIENCE**
BENCHMARK	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
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.

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

STANDARD	**KS.HS-ETS.**	**ENGINEERING DESIGN**
BENCHMARK	**HS-ETS1.**	**Engineering Design**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
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.
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.
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**

STANDARD	**KS.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Key Ideas and Details**
INDICATOR / PROFICIENCY LEVEL	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 / PROFICIENCY LEVEL	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	**KS.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Craft and Structure**
INDICATOR / PROFICIENCY LEVEL	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 / PROFICIENCY LEVEL	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	**KS.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Integration of Knowledge and Ideas**
INDICATOR / PROFICIENCY LEVEL	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	**KS.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**

BENCHMARK		**Range of Reading and Level of Text Complexity**
INDICATOR / PROFICIENCY LEVEL	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	**KS.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Text Types and Purposes**
INDICATOR / PROFICIENCY LEVEL	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
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.

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

Kansas Academic Standards

Technology Education

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

STANDARD		**Computer Science Standards - Secondary Grades L1 (All Students)**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Algorithms**
INDICATOR	L1.AP.A.01.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

STANDARD		**Computer Science Standards - Secondary Grades L1 (All Students)**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Variables**
INDICATOR	L1.AP.V.01.	Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.

STANDARD		**Computer Science Standards - Secondary Grades L1 (All Students)**
BENCHMARK		**Impacts of Computing**

INDICATOR / PROFICIENCY LEVEL		**Culture**
INDICATOR	L1.IC.C.02.	Test and refine computational artifacts to reduce bias and equity deficits.
INDICATOR	L1.IC.C.03.	Demonstrate how a given algorithm applies to problems across disciplines.
STANDARD		**Computer Science Standards - Secondary Grades L2 (Students who wish to pursue computer science beyond what is expected of all students)**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Algorithms**
INDICATOR	L2.AP.A.01.	Describe how artificial intelligence algorithms drive many software and physical systems (e.g., digital advertising, autonomous robots, computer vision, pattern recognition, text analysis).
INDICATOR	L2.AP.A.05.	Use and adapt classic algorithms to solve computational problems.
INDICATOR	L2.AP.A.06.	Evaluate algorithms in terms of their efficiency, correctness, and clarity.
STANDARD		**Computer Science Standards - Secondary Grades L2 (Students who wish to pursue computer science beyond what is expected of all students)**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Modularity**
INDICATOR	L2.AP.M.01.	Construct solutions to problems using student-created components, such as procedures, modules and/or objects.
INDICATOR	L2.AP.M.02.	Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.
STANDARD		**Computer Science Standards - Secondary Grades L2 (Students who wish to pursue computer science beyond what is expected of all students)**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Program Development**
INDICATOR	L2.AP.PD.08.	Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems.

Kansas Academic Standards

Technology Education

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

STANDARD		**Computer Science Standards - Secondary Grades L1 (All Students)**
BENCHMARK		**Algorithms and Programing**

INDICATOR / PROFICIENCY LEVEL		**Algorithms**
INDICATOR	L1.AP.A.01.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

STANDARD		**Computer Science Standards - Secondary Grades L1 (All Students)**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Variables**
INDICATOR	L1.AP.V.01.	Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.

STANDARD		**Computer Science Standards - Secondary Grades L1 (All Students)**
BENCHMARK		**Impacts of Computing**
INDICATOR / PROFICIENCY LEVEL		**Culture**
INDICATOR	L1.IC.C.02.	Test and refine computational artifacts to reduce bias and equity deficits.
INDICATOR	L1.IC.C.03.	Demonstrate how a given algorithm applies to problems across disciplines.

STANDARD		**Computer Science Standards - Secondary Grades L2 (Students who wish to pursue computer science beyond what is expected of all students)**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Algorithms**
INDICATOR	L2.AP.A.01.	Describe how artificial intelligence algorithms drive many software and physical systems (e.g., digital advertising, autonomous robots, computer vision, pattern recognition, text analysis).
INDICATOR	L2.AP.A.05.	Use and adapt classic algorithms to solve computational problems.
INDICATOR	L2.AP.A.06.	Evaluate algorithms in terms of their efficiency, correctness, and clarity.

STANDARD		**Computer Science Standards - Secondary Grades L2 (Students who wish to pursue computer science beyond what is expected of all students)**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Modularity**
INDICATOR	L2.AP.M.01.	Construct solutions to problems using student-created components, such as procedures, modules and/or objects.

INDICATOR	L2.AP.M.02.	Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution.

STANDARD		**Computer Science Standards - Secondary Grades L2 (Students who wish to pursue computer science beyond what is expected of all students)**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Program Development**
INDICATOR	L2.AP.PD.08.	Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems.

Kentucky Academic Standards

Mathematics

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

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

STRAND		**Conceptual Category Functions**
CATEGORY / GOAL		**Functions—Interpreting Functions**
STANDARD / ORGANIZER		**Cluster: Interpret functions that arise in applications in terms of the context.**
EXPECTATION	**KY.HS.F.3.**	**Understand average rate of change of a function over an interval. (MP.2, MP.4)**
INDICATOR	KY.HS.F.3.a.	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval.
INDICATOR	KY.HS.F.3.b.	Estimate the rate of change from a graph.

Kentucky Academic Standards

Mathematics

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

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

STRAND		Conceptual Category Functions
CATEGORY / GOAL		**Functions—Interpreting Functions**
STANDARD / ORGANIZER		**Cluster: Interpret functions that arise in applications in terms of the context.**
EXPECTATION	**KY.HS.F. 3.**	**Understand average rate of change of a function over an interval. (MP.2, MP.4)**
INDICATOR	KY.HS.F. 3.a.	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval.
INDICATOR	KY.HS.F. 3.b.	Estimate the rate of change from a graph.

Kentucky Academic Standards

Science

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

STRAND		High School
CATEGORY / GOAL	HS-PS4-2.	Evaluate questions about the advantages of using digital transmission and storage of information.
CATEGORY / GOAL	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.

CATEGORY / GOAL	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
CATEGORY / GOAL	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.
CATEGORY / GOAL	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
CATEGORY / GOAL	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
CATEGORY / GOAL	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
CATEGORY / GOAL	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.
CATEGORY / GOAL	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost[1]benefit ratios.
CATEGORY / GOAL	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity.
CATEGORY / GOAL	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.
CATEGORY / GOAL	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.
CATEGORY / GOAL	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.
CATEGORY / GOAL	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.

Kentucky Academic Standards

Science

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

STRAND		High School
CATEGORY / GOAL	HS-PS4-2.	Evaluate questions about the advantages of using digital transmission and storage of information.
CATEGORY / GOAL	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.
CATEGORY / GOAL	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

CATEGORY / GOAL	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.
CATEGORY / GOAL	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
CATEGORY / GOAL	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
CATEGORY / GOAL	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
CATEGORY / GOAL	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.
CATEGORY / GOAL	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost[1]benefit ratios.
CATEGORY / GOAL	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity.
CATEGORY / GOAL	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.
CATEGORY / GOAL	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.
CATEGORY / GOAL	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.
CATEGORY / GOAL	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.

Kentucky Academic Standards

Technology Education

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

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Algorithms & Programming**
STANDARD / ORGANIZER		**Algorithms**
EXPECTATION	H-AP-07.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. A prototype is a computational artifact that demonstrates the core functionality of a product or process. Prototypes are useful for getting early feedback in the design process, and can yield insight into the feasibility of a product. The process of developing computational artifacts embraces both creative expression and the exploration of ideas to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to their community and beyond. Students should develop artifacts in response to a task or a computational problem that demonstrate the performance, re-usability, and ease of implementation of an algorithm.
STRAND		**Kentucky Academic Standards (KAS) for Computer Science**

CATEGORY / GOAL		**Algorithms & Programming**
STANDARD / ORGANIZER		**Program Development**
EXPECTATION	H-AP-08.	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps. Complex programs are designed as systems of interacting modules, each with a specific role, coordinating for a common overall purpose. Modules allow for better management of complex tasks. The focus at this level is understanding a program as a system with relationships between modules. The choice of implementation, such as programming language or paradigm, may vary. Students could incorporate computer vision libraries to increase the capabilities of a robot or leverage open-source JavaScript libraries to expand the functionality of a web application.

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Algorithms & Programming**
STANDARD / ORGANIZER		**Algorithms**
EXPECTATION	H-AP-13.	Use and adapt classic algorithms to solve computational problems. Students should be able to identify and use well-known algorithms in sorting (e.g., bubble sort, quicksort, merge sort, insertion sort), searching (e.g., linear search, binary search), and shortest-path (e.g., Dijkstra's algorithm) problems. Students will also be able to adapt and combine such well-known algorithms to add features that address more complex computational tasks.
EXPECTATION	H-AP-14.	Evaluate algorithms in terms of their efficiency, correctness, and clarity. Students should be able to calculate the total number times a loop will be executed given a code snippet, will be able to state whether an algorithm is correct for solving a given problem, and compare/contrast algorithms for clarity and the number of executed operations.

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Algorithms & Programming**
STANDARD / ORGANIZER		**Program Development**
EXPECTATION	H-AP-24.	Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems. Students should be able to explain the difference between a compiled and scripted programming language, defend a choice of a programming language for a certain computing device and defend a choice of a language (3rd generation versus 4th generation) for solving different types of problems.

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Impacts of Computing**
STANDARD / ORGANIZER		**Culture**
EXPECTATION	H-IC-07.	Demonstrate ways computational design (i.e. algorithms, abstractions and analysis) can apply to problems across disciplines. Computational design can share features across disciplines (i.e. art, music etc.) by translating human intention into an artifact through algorithmic development and the need to solve a problem. Students should be able to demonstrate how these features are shared across disciplines and how real-world problems can be solved using computational methods.

STRAND		**Technology – High**

CATEGORY / GOAL		**Big Idea: Information, Communication and Productivity – Students demonstrate a sound understanding of the nature and operations of technology systems. Students use technology to learn, to communicate, increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.**
STANDARD / ORGANIZER		**Academic Expectations**
EXPECTATION	H.BI1.AE.6.1.	Students connect knowledge and experiences from different subject areas.

STRAND		**Technology – High**
CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**Academic Expectations**
EXPECTATION	H.BI3.AE.5.5.	Students use problem-solving processes to develop solutions to relatively complex problems.
EXPECTATION	H.BI3.AE.6.1.	Students connect knowledge and experiences from different subject areas.

STRAND		**Technology – High**
CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**High Enduring Knowledge – Understandings**
EXPECTATION	H.BI3.EK.1.	Technology supports critical thinking skills used in inquiry/problem solving to make informed decisions for independent learning.

STRAND		**Technology – High**
CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**High Skills and Concepts – Research**
EXPECTATION	H.BI3.SC1.6.	Express and synthesize digital information collected in research effectively and accurately to produce original work (e.g., desktop-published or word-processed report, multimedia presentation, engineering design).

STRAND		**Technology – High**
CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**High Skills and Concepts – Inquiry/Problem-solving**
EXPECTATION	H.BI3.SC2.3.	Explain how technology can be used for problem solving and creativity (e.g., simulation software, environmental probes, computer-aided design, geographic information systems, dynamic geometric software, graphing calculators, art and music composition software).

STRAND		Kentucky Academic Standards (KAS) for Computer Science
CATEGORY / GOAL		Algorithms & Programming
STANDARD / ORGANIZER		Algorithms
EXPECTATION	H-AP-07.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. A prototype is a computational artifact that demonstrates the core functionality of a product or process. Prototypes are useful for getting early feedback in the design process, and can yield insight into the feasibility of a product. The process of developing computational artifacts embraces both creative expression and the exploration of ideas to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to their community and beyond. Students should develop artifacts in response to a task or a computational problem that demonstrate the performance, re-usability, and ease of implementation of an algorithm.

STRAND		Kentucky Academic Standards (KAS) for Computer Science
CATEGORY / GOAL		Algorithms & Programming
STANDARD / ORGANIZER		Program Development
EXPECTATION	H-AP-08.	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps. Complex programs are designed as systems of interacting modules, each with a specific role, coordinating for a common overall purpose. Modules allow for better management of complex tasks. The focus at this level is understanding a program as a system with relationships between modules. The choice of implementation, such as programming language or paradigm, may vary. Students could incorporate computer vision libraries to increase the capabilities of a robot or leverage open-source JavaScript libraries to expand the functionality of a web application.

STRAND		Kentucky Academic Standards (KAS) for Computer Science
CATEGORY / GOAL		Algorithms & Programming
STANDARD / ORGANIZER		Algorithms
EXPECTATION	H-AP-13.	Use and adapt classic algorithms to solve computational problems. Students should be able to identify and use well-known algorithms in sorting (e.g., bubble sort, quicksort, merge sort, insertion sort), searching (e.g., linear search, binary search), and shortest-path (e.g., Dijkstra's algorithm) problems. Students will also be able to adapt and combine such well-known algorithms to add features that address more complex computational tasks.
EXPECTATION	H-AP-14.	Evaluate algorithms in terms of their efficiency, correctness, and clarity. Students should be able to calculate the total number times a loop will be executed given a code snippet, will be able to state whether an algorithm is correct for solving a given problem, and compare/contrast algorithms for clarity and the number of executed operations.

STRAND		Kentucky Academic Standards (KAS) for Computer Science
CATEGORY / GOAL		Algorithms & Programming
STANDARD / ORGANIZER		Program Development

EXPECTATION	H-AP-24.	Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems. Students should be able to explain the difference between a compiled and scripted programming language, defend a choice of a programming language for a certain computing device and defend a choice of a language (3rd generation versus 4th generation) for solving different types of problems.

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Impacts of Computing**
STANDARD / ORGANIZER		**Culture**
EXPECTATION	H-IC-07.	Demonstrate ways computational design (i.e. algorithms, abstractions and analysis) can apply to problems across disciplines. Computational design can share features across disciplines (i.e. art, music etc.) by translating human intention into an artifact through algorithmic development and the need to solve a problem. Students should be able to demonstrate how these features are shared across disciplines and how real-world problems can be solved using computational methods.

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

STRAND		**Technology – High**
CATEGORY / GOAL		**Big Idea: Information, Communication and Productivity – Students demonstrate a sound understanding of the nature and operations of technology systems. Students use technology to learn, to communicate, increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.**
STANDARD / ORGANIZER		**Academic Expectations**
EXPECTATION	H.BI1.AE. 6.1.	Students connect knowledge and experiences from different subject areas.

STRAND		**Technology – High**
CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**Academic Expectations**
EXPECTATION	H.BI3.AE. 5.5.	Students use problem-solving processes to develop solutions to relatively complex problems.
EXPECTATION	H.BI3.AE. 6.1.	Students connect knowledge and experiences from different subject areas.

STRAND		**Technology – High**
CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**High Enduring Knowledge – Understandings**
EXPECTATION	H.BI3.EK. 1.	Technology supports critical thinking skills used in inquiry/problem solving to make informed decisions for independent learning.

STRAND		**Technology – High**

CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**High Skills and Concepts – Research**
EXPECTATION	H.BI3.SC 1.6.	Express and synthesize digital information collected in research effectively and accurately to produce original work (e.g., desktop-published or word-processed report, multimedia presentation, engineering design).

STRAND		**Technology – High**
CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**High Skills and Concepts – Inquiry/Problem-solving**
EXPECTATION	H.BI3.SC 2.3.	Explain how technology can be used for problem solving and creativity (e.g., simulation software, environmental probes, computer-aided design, geographic information systems, dynamic geometric software, graphing calculators, art and music composition software).

Louisiana Academic Standards

Mathematics

Grade **9** - Adopted: **2016/Updated 2017**

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

STRAND	**A1.**	**Algebra I (A1)**
TITLE	**A1:F-IF.**	**Interpreting Functions**
PERFORMANCE EXPECTATION	**A1:F-IF.B.**	**Interpret functions that arise in applications in terms of the context.**
INDICATOR	A1:F-IF.B.6.	Calculate and interpret the average rate of change of a linear, quadratic, piecewise linear (to include absolute value), and exponential function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

STRAND	**A2.**	**Algebra II (A2)**
TITLE	**A2:F-IF.**	**Functions - Interpreting Functions**

PERFORMANCE EXPECTATION	**A2:F-IF.B.**	**Interpret functions that arise in applications in terms of the context.**
INDICATOR	A2: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.

Louisiana Academic Standards

Mathematics

Grade **10** - Adopted: **2016/Updated 2017**

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

STRAND	**A1.**	**Algebra I (A1)**
TITLE	**A1:F-IF.**	**Interpreting Functions**
PERFORMANCE EXPECTATION	**A1:F-IF.B.**	**Interpret functions that arise in applications in terms of the context.**
INDICATOR	A1:F-IF.B.6.	Calculate and interpret the average rate of change of a linear, quadratic, piecewise linear (to include absolute value), and exponential function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

STRAND	**A2.**	**Algebra II (A2)**
TITLE	**A2:F-IF.**	**Functions - Interpreting Functions**
PERFORMANCE EXPECTATION	**A2:F-IF.B.**	**Interpret functions that arise in applications in terms of the context.**
INDICATOR	A2: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.

Louisiana Academic Standards

Science

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

STRAND	**LA.SC.ES.**	**Earth Science**
TITLE	**HS-ESS2.**	**EARTH'S SYSTEMS**

PERFORMANCE EXPECTATION	HS-ESS2-4.	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems result in changes in atmosphere and climate.
PERFORMANCE EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND	**LA.SC.ES.**	**Earth Science**
TITLE	**HS-ESS3.**	**HUMAN SUSTAINABILITY**
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.
PERFORMANCE EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
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.
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.
STRAND	**LA.SC.ENS.**	**Environmental Science**
TITLE	**HS-EVS1.**	**RESOURCES AND RESOURCE MANAGEMENT**
PERFORMANCE EXPECTATION	HS-EVS1-3.	Analyze and interpret data about the consequences of environmental decisions to determine the risk-benefit values of actions and practices implemented for selected issues.
STRAND	**LA.SC.ENS.**	**Environmental Science**
TITLE	**HS-ESS2.**	**EARTH'S SYSTEMS**
PERFORMANCE EXPECTATION	HS-ESS2-4.	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems result in changes in atmosphere and climate.
PERFORMANCE EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND	**LA.SC.ENS.**	**Environmental Science**
TITLE	**HS-ESS3.**	**HUMAN SUSTAINABILITY**

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.
PERFORMANCE EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
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.
PERFORMANCE EXPECTATION	HS-ESS3-4.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
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.
STRAND	**LA.SC.ENS.**	**Environmental Science**
TITLE	**HS-LS2.**	**ECOSYSTEMS: INTERACTIONS, ENERGY AND DYNAMICS**
PERFORMANCE EXPECTATION	HS-LS2-1.	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity, biodiversity and populations of ecosystems at different scales.
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.
PERFORMANCE EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND	**LA.SC.LS.**	**Life Science**
TITLE	**HS-LS2.**	**ECOSYSTEMS: INTERACTIONS, ENERGY AND DYNAMICS**
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.
PERFORMANCE EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Louisiana Academic Standards

Science

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

STRAND	**LA.SC.ES.**	**Earth Science**

TITLE	**HS-ESS2.**	**EARTH'S SYSTEMS**
PERFORMANCE EXPECTATION	HS-ESS2-4.	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems result in changes in atmosphere and climate.
PERFORMANCE EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND	**LA.SC.ES.**	**Earth Science**
TITLE	**HS-ESS3.**	**HUMAN SUSTAINABILITY**
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.
PERFORMANCE EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
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.
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.
STRAND	**LA.SC.ENS.**	**Environmental Science**
TITLE	**HS-EVS1.**	**RESOURCES AND RESOURCE MANAGEMENT**
PERFORMANCE EXPECTATION	HS-EVS1-3.	Analyze and interpret data about the consequences of environmental decisions to determine the risk-benefit values of actions and practices implemented for selected issues.
STRAND	**LA.SC.ENS.**	**Environmental Science**
TITLE	**HS-ESS2.**	**EARTH'S SYSTEMS**
PERFORMANCE EXPECTATION	HS-ESS2-4.	Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems result in changes in atmosphere and climate.
PERFORMANCE EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND	**LA.SC.ENS.**	**Environmental Science**

TITLE	**HS-ESS3.**	**HUMAN SUSTAINABILITY**
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.
PERFORMANCE EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
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.
PERFORMANCE EXPECTATION	HS-ESS3-4.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
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.
STRAND	**LA.SC.ENS.**	**Environmental Science**
TITLE	**HS-LS2.**	**ECOSYSTEMS: INTERACTIONS, ENERGY AND DYNAMICS**
PERFORMANCE EXPECTATION	HS-LS2-1.	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity, biodiversity and populations of ecosystems at different scales.
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.
PERFORMANCE EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND	**LA.SC.LS.**	**Life Science**
TITLE	**HS-LS2.**	**ECOSYSTEMS: INTERACTIONS, ENERGY AND DYNAMICS**
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.
PERFORMANCE EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Louisiana Academic Standards

Technology Education

Grade **9** - Adopted: **2008**

STRAND	**LA.ET.**	**Educational Technology**

TITLE		PreK-12 Educational Technology Content Standards
PERFORMANCE EXPECTATION	ET.4.	Critical Thinking, Problem Solving, and Decision Making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

STRAND	LA.ET.	Educational Technology
TITLE		Performance Indicators for Grades 9-12
PERFORMANCE EXPECTATION	ET.E.	Identify a complex global issue, develop a systematic plan of investigation, and present a viable solution. (1,2,3,4)

Louisiana Academic Standards

Technology Education

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

STRAND	LA.ET.	Educational Technology
TITLE		PreK-12 Educational Technology Content Standards
PERFORMANCE EXPECTATION	ET.4.	Critical Thinking, Problem Solving, and Decision Making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

STRAND	LA.ET.	Educational Technology
TITLE		Performance Indicators for Grades 9-12
PERFORMANCE EXPECTATION	ET.E.	Identify a complex global issue, develop a systematic plan of investigation, and present a viable solution. (1,2,3,4)

Maine Learning Results

Mathematics

Grade **9** - Adopted: **2020/Implemented 2020**

STRAND / DOMAIN		Standards for Mathematical Practice
CATEGORY / PERFORMANCE INDICATOR	MP1.	Make sense of problems and persevere in solving them: Students will plan strategies to use and persevere in solving math problems.
CATEGORY / PERFORMANCE INDICATOR	MP2.	Reason abstractly and quantitatively: Students will think about numbers in many ways and make sense of numerical relationships as they solve problems.
CATEGORY / PERFORMANCE INDICATOR	MP3.	Construct viable arguments and critique the reasoning of others: Students will explain their thinking and make sense of the thinking of others.
CATEGORY / PERFORMANCE INDICATOR	MP4.	Model with mathematics: Students will use representations to show their thinking in a variety of ways.

CATEGORY / PERFORMANCE INDICATOR	MP6.	Attend to precision: Students will use precise mathematical language and check their work for accuracy.
CATEGORY / PERFORMANCE INDICATOR	MP7.	Look for and make use of structure: Students will use their current mathematical understandings to identify patterns and structure to make sense of new learning.
CATEGORY / PERFORMANCE INDICATOR	MP8.	Look for and express regularity in repeated reasoning: Students will look for patterns and rules to help create general methods and shortcuts that can be applied to similar mathematical problems.
STRAND / DOMAIN		**Algebraic Reasoning – Functions: Interpreting Functions**
CATEGORY / PERFORMANCE INDICATOR	**AR.A.13**	**Interpret functions that arise in applications in terms of the context.**
STANDARD	HSF.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.

Maine Learning Results

Mathematics

Grade **10** - Adopted: **2020/Implemented 2020**

STRAND / DOMAIN		**Standards for Mathematical Practice**
CATEGORY / PERFORMANCE INDICATOR	MP1.	Make sense of problems and persevere in solving them: Students will plan strategies to use and persevere in solving math problems.
CATEGORY / PERFORMANCE INDICATOR	MP2.	Reason abstractly and quantitatively: Students will think about numbers in many ways and make sense of numerical relationships as they solve problems.
CATEGORY / PERFORMANCE INDICATOR	MP3.	Construct viable arguments and critique the reasoning of others: Students will explain their thinking and make sense of the thinking of others.
CATEGORY / PERFORMANCE INDICATOR	MP4.	Model with mathematics: Students will use representations to show their thinking in a variety of ways.
CATEGORY / PERFORMANCE INDICATOR	MP6.	Attend to precision: Students will use precise mathematical language and check their work for accuracy.
CATEGORY / PERFORMANCE INDICATOR	MP7.	Look for and make use of structure: Students will use their current mathematical understandings to identify patterns and structure to make sense of new learning.
CATEGORY / PERFORMANCE INDICATOR	MP8.	Look for and express regularity in repeated reasoning: Students will look for patterns and rules to help create general methods and shortcuts that can be applied to similar mathematical problems.

STRAND / DOMAIN		**Algebraic Reasoning – Functions: Interpreting Functions**
CATEGORY / PERFORMANCE INDICATOR	**AR.A.13**	**Interpret functions that arise in applications in terms of the context.**
STANDARD	HSF.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.

Maine Learning Results

Science

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

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

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

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

STRAND / DOMAIN	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**

CATEGORY / PERFORMANCE INDICATOR	**HS-ESS2.**	**Earth's Systems**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND / DOMAIN	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**HS-ESS3.**	**Earth and Human Activity**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
EXPECTATION	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
EXPECTATION	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / DOMAIN	**NGSS.HS-ETS.**	**ENGINEERING DESIGN**
CATEGORY / PERFORMANCE INDICATOR	**HS-ETS1.**	**Engineering Design**
STANDARD		**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.

Maine Learning Results

Science

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

STRAND / DOMAIN	**NGSS.HS-PS.**	**PHYSICAL SCIENCE**

CATEGORY / PERFORMANCE INDICATOR	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STRAND / DOMAIN	**NGSS.HS-LS.**	**LIFE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
EXPECTATION	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
EXPECTATION	HS-LS2-5.	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
EXPECTATION	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND / DOMAIN	**NGSS.HS-LS.**	**LIFE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STRAND / DOMAIN	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**HS-ESS2.**	**Earth's Systems**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
EXPECTATION	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND / DOMAIN	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**

CATEGORY / PERFORMANCE INDICATOR	**HS-ESS3.**	**Earth and Human Activity**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
EXPECTATION	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
EXPECTATION	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
EXPECTATION	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / DOMAIN	**NGSS.HS-ETS.**	**ENGINEERING DESIGN**
CATEGORY / PERFORMANCE INDICATOR	**HS-ETS1.**	**Engineering Design**
STANDARD		**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.

Maryland College and Career-Ready Standards

Mathematics

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

STRAND / TOPIC / STANDARD		**Algebra 1**
TOPIC / INDICATOR	**HSF.IF.**	**Interpreting Functions**
INDICATOR / PROFICIENCY LEVEL	**HSF.IF.B.**	**Interpret functions that arise in applications in terms of the context**
OBJECTIVE	HSF.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.
STRAND / TOPIC / STANDARD		**Algebra 2**
TOPIC / INDICATOR	**HSF.IF.**	**Interpreting Functions**

INDICATOR / PROFICIENCY LEVEL	**HSF.IF.B.**	**Interpret functions that arise in applications in terms of the context**
OBJECTIVE	HSF.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.

Maryland College and Career-Ready Standards

Mathematics

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

STRAND / TOPIC / STANDARD		**Algebra 1**
TOPIC / INDICATOR	**HSF.IF.**	**Interpreting Functions**
INDICATOR / PROFICIENCY LEVEL	**HSF.IF.B.**	**Interpret functions that arise in applications in terms of the context**
OBJECTIVE	HSF.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.

STRAND / TOPIC / STANDARD		**Algebra 2**
TOPIC / INDICATOR	**HSF.IF.**	**Interpreting Functions**
INDICATOR / PROFICIENCY LEVEL	**HSF.IF.B.**	**Interpret functions that arise in applications in terms of the context**
OBJECTIVE	HSF.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.

Maryland College and Career-Ready Standards

Science

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

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

STRAND / TOPIC / STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
TOPIC / INDICATOR	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**

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

OBJECTIVE	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
OBJECTIVE	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / TOPIC / STANDARD	**NGSS.HS-ETS.**	**ENGINEERING DESIGN**
TOPIC / INDICATOR	**HS-ETS1.**	**Engineering Design**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	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.
OBJECTIVE	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.
OBJECTIVE	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.

Maryland College and Career-Ready Standards

Science

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

STRAND / TOPIC / STANDARD	**NGSS.HS-PS.**	**PHYSICAL SCIENCE**
TOPIC / INDICATOR	**HS-PS4.**	**Waves and Their Applications in Technologies for Information Transfer**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STRAND / TOPIC / STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
TOPIC / INDICATOR	**HS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	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.
OBJECTIVE	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

OBJECTIVE	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.
OBJECTIVE	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STRAND / TOPIC / STANDARD	**NGSS.HS-LS.**	**LIFE SCIENCE**
TOPIC / INDICATOR	**HS-LS4.**	**Biological Evolution: Unity and Diversity**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STRAND / TOPIC / STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
TOPIC / INDICATOR	**HS-ESS2.**	**Earth's Systems**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	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.
OBJECTIVE	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND / TOPIC / STANDARD	**NGSS.HS-ESS.**	**EARTH AND SPACE SCIENCE**
TOPIC / INDICATOR	**HS-ESS3.**	**Earth and Human Activity**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	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.
OBJECTIVE	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
OBJECTIVE	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
OBJECTIVE	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

STRAND / TOPIC / STANDARD	NGSS.HS-ETS.	ENGINEERING DESIGN
TOPIC / INDICATOR	HS-ETS1.	Engineering Design
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
OBJECTIVE	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.
OBJECTIVE	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.
OBJECTIVE	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.

Maryland College and Career-Ready Standards

Technology Education

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

STRAND / TOPIC / STANDARD		Maryland's K-12 Computer Science Standards
TOPIC / INDICATOR		Concept: Algorithms and Programming
INDICATOR / PROFICIENCY LEVEL		Subconcept: Algorithms
OBJECTIVE	10.AP.A.01.	Develop prototypes that use algorithms (e.g., sequencing, selection, iteration, recursion, etc.) to solve computational problems by leveraging prior student knowledge and personal interest.
OBJECTIVE	10.AP.A.02.	Design and implement an algorithm to play a game against a human opponent or solve a problem.

STRAND / TOPIC / STANDARD		Maryland's K-12 Computer Science Standards
TOPIC / INDICATOR		Concept: Impacts of Computing
INDICATOR / PROFICIENCY LEVEL		Subconcept: Culture and Diversity
OBJECTIVE	10.IC.C.03.	Demonstrate and explain how an existing algorithm/computational Innovation applies to problems across disciplines.
OBJECTIVE	10.IC.C.04.	Demonstrate and explain how an existing algorithm applies to problems in society.

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

STRAND / TOPIC / STANDARD		Maryland Technology Education Standards: Grades 9-12

TOPIC / INDICATOR		**Standard One: The Nature of Technology – Students will develop an understanding of the nature of technology.**
INDICATOR / PROFICIENCY LEVEL		**1. The characteristics and scope of technology. This includes but is not limited to how products and systems are developed to solve problems, how demand is created for a product by marketing and advertising, and how goal-directed research can result in invention and innovation. 2. The core concepts of technology. This includes but is not limited to systems, resources, requirements, optimization, trade-offs, processes, and controls. 3. The connections between technology and other fields of study. This includes understanding how technological systems interact with each other, how technology can be repurposed, how other fields of study can impact technological products, and how technological ideas are protected.**
OBJECTIVE		**Core Concepts of Technology**
EXPECTATION		Employ constraint-based modeling to describe a biological system.
EXPECTATION		Demonstrate how trade-offs can impact a design product.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 9-12**
TOPIC / INDICATOR		**Standard One: The Nature of Technology – Students will develop an understanding of the nature of technology.**
INDICATOR / PROFICIENCY LEVEL		**1. The characteristics and scope of technology. This includes but is not limited to how products and systems are developed to solve problems, how demand is created for a product by marketing and advertising, and how goal-directed research can result in invention and innovation. 2. The core concepts of technology. This includes but is not limited to systems, resources, requirements, optimization, trade-offs, processes, and controls. 3. The connections between technology and other fields of study. This includes understanding how technological systems interact with each other, how technology can be repurposed, how other fields of study can impact technological products, and how technological ideas are protected.**
OBJECTIVE		**Connections Between Technology and Other Fields of Study**
EXPECTATION		Correlate technological advances to progress in other fields of study such as science and mathematics (STL, 3J).
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 9-12**
TOPIC / INDICATOR		**Standard Three: Engineering Design and Development – Students will demonstrate knowledge of and apply the engineering design process to develop solutions to problems.**
INDICATOR / PROFICIENCY LEVEL		**Engineering design and development includes but is not limited to research and development, invention and innovation, problem solving, and using and maintaining technological products and systems.**
OBJECTIVE		Apply design principles (e.g. flexibility, balance, function, proportion) to evaluate existing designs, to collect data, and to guide the design process (STL, 9I).
OBJECTIVE		Evaluate design solutions using software and other tools to develop conceptual, physical, and mathematical models at various intervals of the design process in order to ensure compliance with design requirements (STL, 11P).
OBJECTIVE		Assess how design requirements such as criteria, constraints, and efficiency can compete with each other (STL, 8K).
OBJECTIVE		Identify the capital and other resources needed to develop solutions to problems.
OBJECTIVE		Apply the research and development problem-solving approach to prepare devices and systems for the marketplace.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 9-12**

TOPIC / INDICATOR		**Standard Four: Core Technologies and The Designed World – Students will demonstrate knowledge of the core technologies that underpin the designed world and major enterprises that produce the goods and services of the designed world. Core technologies include but are not limited to biotechnology, electrical, electronics, fluid, material, mechanical, optical, structural, and thermal technologies. Major enterprises include medical, agriculture, biotechnology, energy and power, information and communication, transportation, and manufacturing and construction technologies.**
INDICATOR / PROFICIENCY LEVEL		**Apply knowledge of core technologies in the development of solutions to problems.**
OBJECTIVE		**Manufacturing Technologies**
EXPECTATION		Create machine code to manufacture a product.

STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 9-12**
TOPIC / INDICATOR		**Standard Four: Core Technologies and The Designed World – Students will demonstrate knowledge of the core technologies that underpin the designed world and major enterprises that produce the goods and services of the designed world. Core technologies include but are not limited to biotechnology, electrical, electronics, fluid, material, mechanical, optical, structural, and thermal technologies. Major enterprises include medical, agriculture, biotechnology, energy and power, information and communication, transportation, and manufacturing and construction technologies.**
INDICATOR / PROFICIENCY LEVEL		**Apply knowledge of core technologies in the development of solutions to problems.**
OBJECTIVE		**Construction Technologies**
EXPECTATION		Design and create models of a variety of structures.

STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 9-12**
TOPIC / INDICATOR		**Standard Five: Computational Thinking and Computer Science Applications – Students will be able to apply computational thinking skills and computer science applications as tools to develop solutions to engineering problems.**
INDICATOR / PROFICIENCY LEVEL		Automate solutions through algorithmic thinking.

Maryland College and Career-Ready Standards

Technology Education

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

STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Algorithms and Programming**
INDICATOR / PROFICIENCY LEVEL		**Subconcept: Algorithms**
OBJECTIVE	10.AP.A.01.	Develop prototypes that use algorithms (e.g., sequencing, selection, iteration, recursion, etc.) to solve computational problems by leveraging prior student knowledge and personal interest.
OBJECTIVE	10.AP.A.02.	Design and implement an algorithm to play a game against a human opponent or solve a problem.

STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Impacts of Computing**
INDICATOR / PROFICIENCY LEVEL		**Subconcept: Culture and Diversity**
OBJECTIVE	10.IC.C.03.	Demonstrate and explain how an existing algorithm/computational Innovation applies to problems across disciplines.
OBJECTIVE	10.IC.C.04.	Demonstrate and explain how an existing algorithm applies to problems in society.

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

STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Advanced Technology Grades 10-12**
TOPIC / INDICATOR		**Standard Four: Core Technologies and The Designed World – Students will demonstrate knowledge of the core technologies that underpin the designed world and major enterprises that produce the goods and services of the designed world. Core technologies include but are not limited to biotechnology, electrical, electronics, fluid, material, mechanical, optical, structural, and thermal technologies. Major enterprises include medical, agriculture, biotechnology, energy and power, information and communication, transportation, and manufacturing and construction technologies.**
INDICATOR / PROFICIENCY LEVEL		**Apply knowledge of core technologies in the development of solutions to problems.**
OBJECTIVE		**Agricultural Technologies**
EXPECTATION		Explore sustainable farming practices.

STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Advanced Technology Grades 10-12**
TOPIC / INDICATOR		**Standard Five: Computational Thinking and Computer Science Applications – Students will be able to apply computational thinking skills and computer science applications as tools to develop solutions to engineering problems.**
INDICATOR / PROFICIENCY LEVEL		Analyze and/or design algorithms necessary for developing solutions to problems.

STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 9-12**
TOPIC / INDICATOR		**Standard One: The Nature of Technology – Students will develop an understanding of the nature of technology.**
INDICATOR / PROFICIENCY LEVEL		**1. The characteristics and scope of technology. This includes but is not limited to how products and systems are developed to solve problems, how demand is created for a product by marketing and advertising, and how goal-directed research can result in invention and innovation. 2. The core concepts of technology. This includes but is not limited to systems, resources, requirements, optimization, trade-offs, processes, and controls. 3. The connections between technology and other fields of study. This includes understanding how technological systems interact with each other, how technology can be repurposed, how other fields of study can impact technological products, and how technological ideas are protected.**
OBJECTIVE		**Core Concepts of Technology**
EXPECTATION		Employ constraint-based modeling to describe a biological system.

EXPECTATION		Demonstrate how trade-offs can impact a design product.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 9-12**
TOPIC / INDICATOR		**Standard One: The Nature of Technology – Students will develop an understanding of the nature of technology.**
INDICATOR / PROFICIENCY LEVEL		**1. The characteristics and scope of technology. This includes but is not limited to how products and systems are developed to solve problems, how demand is created for a product by marketing and advertising, and how goal-directed research can result in invention and innovation. 2. The core concepts of technology. This includes but is not limited to systems, resources, requirements, optimization, trade-offs, processes, and controls. 3. The connections between technology and other fields of study. This includes understanding how technological systems interact with each other, how technology can be repurposed, how other fields of study can impact technological products, and how technological ideas are protected.**
OBJECTIVE		**Connections Between Technology and Other Fields of Study**
EXPECTATION		Correlate technological advances to progress in other fields of study such as science and mathematics (STL, 3J).
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 9-12**
TOPIC / INDICATOR		**Standard Three: Engineering Design and Development – Students will demonstrate knowledge of and apply the engineering design process to develop solutions to problems.**
INDICATOR / PROFICIENCY LEVEL		**Engineering design and development includes but is not limited to research and development, invention and innovation, problem solving, and using and maintaining technological products and systems.**
OBJECTIVE		Apply design principles (e.g. flexibility, balance, function, proportion) to evaluate existing designs, to collect data, and to guide the design process (STL, 9I).
OBJECTIVE		Evaluate design solutions using software and other tools to develop conceptual, physical, and mathematical models at various intervals of the design process in order to ensure compliance with design requirements (STL, 11P).
OBJECTIVE		Assess how design requirements such as criteria, constraints, and efficiency can compete with each other (STL, 8K).
OBJECTIVE		Identify the capital and other resources needed to develop solutions to problems.
OBJECTIVE		Apply the research and development problem-solving approach to prepare devices and systems for the marketplace.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 9-12**
TOPIC / INDICATOR		**Standard Four: Core Technologies and The Designed World – Students will demonstrate knowledge of the core technologies that underpin the designed world and major enterprises that produce the goods and services of the designed world. Core technologies include but are not limited to biotechnology, electrical, electronics, fluid, material, mechanical, optical, structural, and thermal technologies. Major enterprises include medical, agriculture, biotechnology, energy and power, information and communication, transportation, and manufacturing and construction technologies.**
INDICATOR / PROFICIENCY LEVEL		**Apply knowledge of core technologies in the development of solutions to problems.**
OBJECTIVE		**Manufacturing Technologies**
EXPECTATION		Create machine code to manufacture a product.

STRAND / TOPIC / STANDARD		Maryland Technology Education Standards: Grades 9-12
TOPIC / INDICATOR		**Standard Four: Core Technologies and The Designed World – Students will demonstrate knowledge of the core technologies that underpin the designed world and major enterprises that produce the goods and services of the designed world. Core technologies include but are not limited to biotechnology, electrical, electronics, fluid, material, mechanical, optical, structural, and thermal technologies. Major enterprises include medical, agriculture, biotechnology, energy and power, information and communication, transportation, and manufacturing and construction technologies.**
INDICATOR / PROFICIENCY LEVEL		**Apply knowledge of core technologies in the development of solutions to problems.**
OBJECTIVE		**Construction Technologies**
EXPECTATION		Design and create models of a variety of structures.

STRAND / TOPIC / STANDARD		Maryland Technology Education Standards: Grades 9-12
TOPIC / INDICATOR		**Standard Five: Computational Thinking and Computer Science Applications – Students will be able to apply computational thinking skills and computer science applications as tools to develop solutions to engineering problems.**
INDICATOR / PROFICIENCY LEVEL		Automate solutions through algorithmic thinking.

Massachusetts Curriculum Frameworks

Mathematics

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

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

FOCUS / COURSE	MA.CC.	High School Content Standards by Conceptual Categories
STRAND	**F-IF.**	**Functions Overview - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**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).**

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.

FOCUS / COURSE	**MA.CC.**	**High School Content Standards by Conceptual Categories**
STRAND	**F-IF.**	**Functions Overview - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**F-IF.C.**	**Analyze functions using different representations.**

INDICATOR	F-IF.C.9.	Translate among different representations of functions (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one polynomial function (including quadratic functions) and an algebraic expression for another, say which has the larger/smaller relative maximum and/or minimum.

FOCUS / COURSE	**MA.AI.**	**Model Algebra I Content Standards [AI]**
STRAND	**AI.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**AI.F-IF.B.**	**Interpret linear, quadratic, and exponential functions with integer exponents that arise in applications in terms of the context.**

INDICATOR	AI.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.

FOCUS / COURSE	**MA.AII.**	**Model Algebra II Content Standards [AII]**
STRAND	**AII.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**AII.F-IF.B.**	**Interpret functions that arise in applications in terms of the context (polynomial, rational, square root and cube root, trigonometric, and logarithmic functions).**

INDICATOR	AII.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.

FOCUS / COURSE	**MA.AII.**	**Model Algebra II Content Standards [AII]**
STRAND	**AII.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**AII.F-IF.C.**	**Analyze functions using different representations.**

INDICATOR	AII.F-IF.C.9.	Translate among different representations of functions (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one polynomial function and an algebraic expression for another, say which has the larger relative maximum and/or smaller relative minimum.

FOCUS / COURSE	**MA.MI.**	**Model Mathematics I Content Standards [MI]**
STRAND	**MI.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**MI.F-IF.B.**	**Interpret linear and exponential functions having integer exponents that arise in applications in terms of the context.**

INDICATOR	MI.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.

FOCUS / COURSE	**MA.MI.**	**Model Mathematics I Content Standards [MI]**
STRAND	**MI.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**MI.F-IF.C.**	**Analyze functions using different representations.**

INDICATOR	MI.F-IF.C.9.	Translate among different representations of functions: (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one exponential function and an algebraic expression for another, say which has the larger y-intercept.

FOCUS / COURSE	**MA.MII.**	**Model Mathematics II Content Standards [MII]**
STRAND	**MII.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**MII.F-IF.B.**	**Interpret quadratic and exponential functions with integer exponents that arise in applications in terms of the context.**

INDICATOR	MII.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.

FOCUS / COURSE	**MA.MII.**	**Model Mathematics II Content Standards [MII]**
STRAND	**MII.F-IF.**	**Functions - Interpreting Functions**

STANDARD / CONCEPT / SKILL	MII.F-IF.C.9.	Translate among different representations of functions (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

FOCUS / COURSE	**MA.MIII.**	**Model Mathematics III Content Standards [MIII]**
STRAND	**MIII.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**MIII.F-IF.B.**	**Interpret functions that arise in applications in terms of the context (rational, polynomial, square root, cube root, trigonometric, logarithmic).**

INDICATOR	MIII.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.

FOCUS / COURSE	**MA.MIII.**	**Model Mathematics III Content Standards [MIII]**
STRAND	**MIII.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**MIII.F-IF.C.**	**Analyze functions using different representations.**

INDICATOR	MIII.F-IF.C.9.	Translate among different representations of functions: (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one polynomial function and an algebraic expression for another, say which has the larger relative maximum and/or smaller relative minimum.

Massachusetts Curriculum Frameworks

Mathematics

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

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

FOCUS / COURSE	MA.CC.	High School Content Standards by Conceptual Categories
STRAND	**F-IF.**	**Functions Overview - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**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).**
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.

FOCUS / COURSE	MA.CC.	High School Content Standards by Conceptual Categories
STRAND	**F-IF.**	**Functions Overview - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**F-IF.C.**	**Analyze functions using different representations.**
INDICATOR	F-IF.C.9.	Translate among different representations of functions (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one polynomial function (including quadratic functions) and an algebraic expression for another, say which has the larger/smaller relative maximum and/or minimum.

FOCUS / COURSE	MA.AI.	Model Algebra I Content Standards [AI]
STRAND	**AI.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**AI.F-IF.B.**	**Interpret linear, quadratic, and exponential functions with integer exponents that arise in applications in terms of the context.**
INDICATOR	AI.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.

FOCUS / COURSE	**MA.AII.**	**Model Algebra II Content Standards [AII]**
STRAND	**AII.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**AII.F-IF.B.**	**Interpret functions that arise in applications in terms of the context (polynomial, rational, square root and cube root, trigonometric, and logarithmic functions).**
INDICATOR	AII.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.

FOCUS / COURSE	**MA.AII.**	**Model Algebra II Content Standards [AII]**
STRAND	**AII.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**AII.F-IF.C.**	**Analyze functions using different representations.**
INDICATOR	AII.F-IF.C.9.	Translate among different representations of functions (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one polynomial function and an algebraic expression for another, say which has the larger relative maximum and/or smaller relative minimum.

FOCUS / COURSE	**MA.MI.**	**Model Mathematics I Content Standards [MI]**
STRAND	**MI.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**MI.F-IF.B.**	**Interpret linear and exponential functions having integer exponents that arise in applications in terms of the context.**
INDICATOR	MI.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.

FOCUS / COURSE	**MA.MI.**	**Model Mathematics I Content Standards [MI]**
STRAND	**MI.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**MI.F-IF.C.**	**Analyze functions using different representations.**
INDICATOR	MI.F-IF.C.9.	Translate among different representations of functions: (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one exponential function and an algebraic expression for another, say which has the larger y-intercept.

FOCUS / COURSE	**MA.MII.**	**Model Mathematics II Content Standards [MII]**
STRAND	**MII.F-IF.**	**Functions - Interpreting Functions**
STANDARD / CONCEPT / SKILL	**MII.F-IF.B.**	**Interpret quadratic and exponential functions with integer exponents that arise in applications in terms of the context.**
INDICATOR	MII.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.

FOCUS / COURSE	MA.MII.	Model Mathematics II Content Standards [MII]
STRAND	MII.F-IF.	Functions - Interpreting Functions
STANDARD / CONCEPT / SKILL	MII.F-IF.C.9.	Translate among different representations of functions (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

FOCUS / COURSE	MA.MIII.	Model Mathematics III Content Standards [MIII]
STRAND	MIII.F-IF.	Functions - Interpreting Functions
STANDARD / CONCEPT / SKILL	MIII.F-IF.B.	Interpret functions that arise in applications in terms of the context (rational, polynomial, square root, cube root, trigonometric, logarithmic).
INDICATOR	MIII.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.

FOCUS / COURSE	MA.MIII.	Model Mathematics III Content Standards [MIII]
STRAND	MIII.F-IF.	Functions - Interpreting Functions
STANDARD / CONCEPT / SKILL	MIII.F-IF.C.	Analyze functions using different representations.
INDICATOR	MIII.F-IF.C.9.	Translate among different representations of functions: (algebraically, graphically, numerically in tables, or by verbal descriptions). Compare properties of two functions each represented in a different way. For example, given a graph of one polynomial function and an algebraic expression for another, say which has the larger relative maximum and/or smaller relative minimum.

Massachusetts Curriculum Frameworks

Science

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

FOCUS / COURSE	MA.HS-ESS.	High School Earth and Space Science
STRAND	ESS2.	Earth's Systems
STANDARD / CONCEPT / SKILL	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems over different time scales result in changes in climate. Analyze and interpret data to explain that long-term changes in Earth's tilt and orbit result in cycles of climate change such as Ice Ages.
STANDARD / CONCEPT / SKILL	HS-ESS2-6.	Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations due to human activity have resulted in atmospheric and climate changes.

FOCUS / COURSE	MA.HS-ESS.	High School Earth and Space Science
STRAND	ESS3.	Earth and Human Activity
STANDARD / CONCEPT / SKILL	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of key natural resources and changes due to variations in climate have influenced human activity.

STANDARD / CONCEPT / SKILL	HS-ESS3-3.	Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity.
FOCUS / COURSE	**MA.HS-LS.**	**High School Biology**
STRAND	**LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
STANDARD / CONCEPT / SKILL	HS-LS2-2.	Use mathematical representations to support explanations that biotic and abiotic factors affect biodiversity, including genetic diversity within a population and species diversity within an ecosystem.
STANDARD / CONCEPT / SKILL	HS-LS2-5.	Use a model that illustrates the roles of photosynthesis, cellular respiration, decomposition, and combustion to explain the cycling of carbon in its various forms among the biosphere, atmosphere, hydrosphere, and geosphere.
STANDARD / CONCEPT / SKILL	HS-LS2-7.	Analyze direct and indirect effects of human activities on biodiversity and ecosystem health, specifically habitat fragmentation, introduction of non-native or invasive species, overharvesting, pollution, and climate change. Evaluate and refine a solution for reducing the impacts of human activities on biodiversity and ecosystem health.
FOCUS / COURSE	**MA.HS-ETS.**	**High School Technology/Engineering**
STRAND	**ETS1.**	**Engineering Design**
STANDARD / CONCEPT / SKILL	HS-ETS1-1.	Analyze a major global challenge to specify a design problem that can be improved. Determine necessary qualitative and quantitative criteria and constraints for solutions, including any requirements set by society.
STANDARD / CONCEPT / SKILL	HS-ETS1-2.	Break a complex real-world problem into smaller, more manageable problems that each can be solved using scientific and engineering principles.
STANDARD / CONCEPT / SKILL	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, aesthetics, and maintenance, as well as social, cultural, and environmental impacts.
STANDARD / CONCEPT / SKILL	HS-ETS1-6(MA).	Document and present solutions that include specifications, performance results, successes and remaining issues, and limitations.

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

FOCUS / COURSE	**MA.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND		**Key Ideas and Details**
STANDARD / CONCEPT / 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.
STANDARD / CONCEPT / 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.

FOCUS / COURSE	MA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STRAND		**Craft and Structure**
STANDARD / CONCEPT / 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.
STANDARD / CONCEPT / 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).

FOCUS / COURSE	MA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STRAND		**Integration of Knowledge and Ideas**
STANDARD / CONCEPT / 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.

FOCUS / COURSE	MA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STRAND		**Range of Reading and Level of Text Complexity**
STANDARD / CONCEPT / 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.

FOCUS / COURSE	MA.WHST.9-10.	Writing Standards for Literacy in Science and Technical Subjects
STRAND		**Text Types and Purposes**
STANDARD / CONCEPT / SKILL	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
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.

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

FOCUS / COURSE	**MA.HS-ESS.**	**High School Earth and Space Science**
STRAND	**ESS2.**	**Earth's Systems**
STANDARD / CONCEPT / SKILL	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems over different time scales result in changes in climate. Analyze and interpret data to explain that long-term changes in Earth's tilt and orbit result in cycles of climate change such as Ice Ages.
STANDARD / CONCEPT / SKILL	HS-ESS2-6.	Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations due to human activity have resulted in atmospheric and climate changes.
FOCUS / COURSE	**MA.HS-ESS.**	**High School Earth and Space Science**
STRAND	**ESS3.**	**Earth and Human Activity**
STANDARD / CONCEPT / SKILL	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of key natural resources and changes due to variations in climate have influenced human activity.
STANDARD / CONCEPT / SKILL	HS-ESS3-3.	Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity.
FOCUS / COURSE	**MA.HS-LS.**	**High School Biology**
STRAND	**LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
STANDARD / CONCEPT / SKILL	HS-LS2-2.	Use mathematical representations to support explanations that biotic and abiotic factors affect biodiversity, including genetic diversity within a population and species diversity within an ecosystem.
STANDARD / CONCEPT / SKILL	HS-LS2-5.	Use a model that illustrates the roles of photosynthesis, cellular respiration, decomposition, and combustion to explain the cycling of carbon in its various forms among the biosphere, atmosphere, hydrosphere, and geosphere.
STANDARD / CONCEPT / SKILL	HS-LS2-7.	Analyze direct and indirect effects of human activities on biodiversity and ecosystem health, specifically habitat fragmentation, introduction of non-native or invasive species, overharvesting, pollution, and climate change. Evaluate and refine a solution for reducing the impacts of human activities on biodiversity and ecosystem health.
FOCUS / COURSE	**MA.HS-ETS.**	**High School Technology/Engineering**
STRAND	**ETS1.**	**Engineering Design**
STANDARD / CONCEPT / SKILL	HS-ETS1-1.	Analyze a major global challenge to specify a design problem that can be improved. Determine necessary qualitative and quantitative criteria and constraints for solutions, including any requirements set by society.
STANDARD / CONCEPT / SKILL	HS-ETS1-2.	Break a complex real-world problem into smaller, more manageable problems that each can be solved using scientific and engineering principles.

STANDARD / CONCEPT / SKILL	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, aesthetics, and maintenance, as well as social, cultural, and environmental impacts.
STANDARD / CONCEPT / SKILL	HS-ETS1-6(MA).	Document and present solutions that include specifications, performance results, successes and remaining issues, and limitations.

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

FOCUS / COURSE	MA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STRAND		**Key Ideas and Details**
STANDARD / CONCEPT / 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.
STANDARD / CONCEPT / 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.

FOCUS / COURSE	MA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STRAND		**Craft and Structure**
STANDARD / CONCEPT / 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.
STANDARD / CONCEPT / 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).

FOCUS / COURSE	MA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STRAND		**Integration of Knowledge and Ideas**
STANDARD / CONCEPT / 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.

FOCUS / COURSE	MA.RST.9-10.	Reading Standards for Literacy in Science and Technical Subjects
STRAND		**Range of Reading and Level of Text Complexity**
STANDARD / CONCEPT / 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.

FOCUS / COURSE	MA.WHST.9-10.	Writing Standards for Literacy in Science and Technical Subjects
STRAND		**Text Types and Purposes**

STANDARD / CONCEPT / SKILL	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
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.
FOCUS / COURSE	**MA.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND		**Production and Distribution of Writing**
STANDARD / CONCEPT / SKILL	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
STANDARD / CONCEPT / 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.

Massachusetts Curriculum Frameworks

Technology Education

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

FOCUS / COURSE	**MA.9-12.CT.**	**Grades 9 – 12: Computational Thinking (CT)**
STRAND	**9-12.CT.b.**	**Algorithms**
STANDARD / CONCEPT / SKILL	9-12.CT.b.1.	Recognize that the design of an algorithm is distinct from its expression in a programming language.
STANDARD / CONCEPT / SKILL	9-12.CT.b.5.	Explain that there are some problems which cannot be computationally solved.

Massachusetts Curriculum Frameworks

Technology Education

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

FOCUS / COURSE	**MA.9-12.CT.**	**Grades 9 – 12: Computational Thinking (CT)**
STRAND	**9-12.CT.b.**	**Algorithms**
STANDARD / CONCEPT / SKILL	9-12.CT.b.1.	Recognize that the design of an algorithm is distinct from its expression in a programming language.
STANDARD / CONCEPT / SKILL	9-12.CT.b.5.	Explain that there are some problems which cannot be computationally solved.

Michigan Academic Standards

Mathematics

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

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

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

Michigan Academic Standards

Mathematics

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

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

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

Michigan Academic Standards

Science

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

STRAND / STANDARD CATEGORY	**MI.SC.5.**	**Waves and Electromagnetic Radiation**
STANDARD	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.
STRAND / STANDARD CATEGORY	**MI.SC.7.**	**Matter and Energy in Organisms and Ecosystems**
STANDARD	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STRAND / STANDARD CATEGORY	**MI.SC.8.**	**Matter and Energy in Organisms and Ecosystems (cont.)**
STANDARD	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.
STRAND / STANDARD CATEGORY	**MI.SC.9.**	**Interdependent Relationships in Ecosystems**
STANDARD	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STRAND / STANDARD CATEGORY	**MI.SC.15.**	**Earth's Systems**
STANDARD	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

STRAND / STANDARD CATEGORY	**MI.SC.16.**	**Weather and Climate**
STANDARD	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STRAND / STANDARD CATEGORY	**MI.SC.17.**	**Human Sustainability**
STANDARD	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
STANDARD	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
STRAND / STANDARD CATEGORY	**MI.SC.18.**	**Engineering Design**
STANDARD	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
STANDARD	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
STANDARD	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**

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

GRADE LEVEL EXPECTATION	RST.9-10.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
GRADE LEVEL EXPECTATION	RST.9-10.5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
STRAND / STANDARD CATEGORY	**MI.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD		**Integration of Knowledge and Ideas**
GRADE LEVEL EXPECTATION	RST.9-10.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
STRAND / STANDARD CATEGORY	**MI.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXPECTATION	RST.9-10.10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
STRAND / STANDARD CATEGORY	**MI.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION	**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.
STRAND / STANDARD CATEGORY	**MI.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STANDARD		**Production and Distribution of Writing**
GRADE LEVEL EXPECTATION	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GRADE LEVEL EXPECTATION	WHST.9-10.6.	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

Michigan Academic Standards

Science

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

STRAND / STANDARD CATEGORY	**MI.SC.5.**	**Waves and Electromagnetic Radiation**
STANDARD	HS-PS4-2.	Evaluate questions about the advantages of using a digital transmission and storage of information.

STRAND / STANDARD CATEGORY	**MI.SC.7.**	**Matter and Energy in Organisms and Ecosystems**
STANDARD	HS-LS2-4.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
STRAND / STANDARD CATEGORY	**MI.SC.8.**	**Matter and Energy in Organisms and Ecosystems (cont.)**
STANDARD	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.
STRAND / STANDARD CATEGORY	**MI.SC.9.**	**Interdependent Relationships in Ecosystems**
STANDARD	HS-LS2-2.	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
STANDARD	HS-LS2-7.	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
STANDARD	HS-LS4-6.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
STRAND / STANDARD CATEGORY	**MI.SC.15.**	**Earth's Systems**
STANDARD	HS-ESS2-6.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
STRAND / STANDARD CATEGORY	**MI.SC.16.**	**Weather and Climate**
STANDARD	HS-ESS2-4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STRAND / STANDARD CATEGORY	**MI.SC.17.**	**Human Sustainability**
STANDARD	HS-ESS3-1.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
STANDARD	HS-ESS3-2.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
STANDARD	HS-ESS3-3.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
STANDARD	HS-ESS3-6.	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

STRAND / STANDARD CATEGORY	MI.SC.18.	Engineering Design
STANDARD	HS-ETS1-1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
STANDARD	HS-ETS1-2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
STANDARD	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**

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

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

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

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

STRAND / STANDARD CATEGORY	**MI.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION	**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.

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

Michigan Academic Standards

Technology Education

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

STRAND / STANDARD CATEGORY	**MI.MITECS.**	**Michigan Integrated Technology Competencies for Students**
STANDARD	**MITECS.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.**
GRADE LEVEL EXPECTATION	MITECS.3.d.	Build knowledge by actively exploring realworld issues and problems, developing ideas and theories, and pursuing answers and solutions.

STRAND / STANDARD CATEGORY	**MI.MITECS.**	**Michigan Integrated Technology Competencies for Students**
STANDARD	**MITECS.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.**
GRADE LEVEL EXPECTATION	MITECS.4.b.	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
GRADE LEVEL EXPECTATION	MITECS.4.c.	Develop, test, and refine prototypes as part of a cyclical design process.
GRADE LEVEL EXPECTATION	MITECS.4.d.	Exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.

STRAND / STANDARD CATEGORY	**MI.MITECS.**	**Michigan Integrated Technology Competencies for Students**
STANDARD	**MITECS.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.**

GRADE LEVEL EXPECTATION	MITECS.5.a.	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
GRADE LEVEL EXPECTATION	MITECS.5.d.	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

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

STRAND / STANDARD CATEGORY		Michigan Computer Science Standards
STANDARD		**LEVEL 3A: HIGH SCHOOL (GRADES 9-10)**
GRADE LEVEL EXPECTATION		**ALGORITHMS AND PROGRAMMING**
EXPECTATION	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. Subconcept: Algorithms; Practice 5.2
EXPECTATION	3A-AP-18.	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. Subconcept: Modularity; Practice 5.2

STRAND / STANDARD CATEGORY		Michigan Computer Science Standards
STANDARD		**LEVEL 3A: HIGH SCHOOL (GRADES 9-10)**
GRADE LEVEL EXPECTATION		**IMPACTS OF COMPUTING**
EXPECTATION	3A-IC-26.	Demonstrate ways a given algorithm applies to problems across disciplines. Subconcept: Culture; Practice 3.1

Michigan Academic Standards

Technology Education

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

STRAND / STANDARD CATEGORY	MI.MITECS.	Michigan Integrated Technology Competencies for Students
STANDARD	**MITECS.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.**
GRADE LEVEL EXPECTATION	MITECS.3.d.	Build knowledge by actively exploring realworld issues and problems, developing ideas and theories, and pursuing answers and solutions.

STRAND / STANDARD CATEGORY	MI.MITECS.	Michigan Integrated Technology Competencies for Students
STANDARD	**MITECS.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.**
GRADE LEVEL EXPECTATION	MITECS.4.b.	Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
GRADE LEVEL EXPECTATION	MITECS.4.c.	Develop, test, and refine prototypes as part of a cyclical design process.

GRADE LEVEL EXPECTATION	MITECS.4.d.	Exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.

STRAND / STANDARD CATEGORY	**MI.MITECS.**	**Michigan Integrated Technology Competencies for Students**
STANDARD	**MITECS.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.**
GRADE LEVEL EXPECTATION	MITECS.5.a.	Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
GRADE LEVEL EXPECTATION	MITECS.5.d.	Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

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

STRAND / STANDARD CATEGORY		**Michigan Computer Science Standards**
STANDARD		**LEVEL 3A: HIGH SCHOOL (GRADES 9-10)**
GRADE LEVEL EXPECTATION		**ALGORITHMS AND PROGRAMMING**
EXPECTATION	3A-AP-13.	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. Subconcept: Algorithms; Practice 5.2
EXPECTATION	3A-AP-18.	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. Subconcept: Modularity; Practice 5.2

STRAND / STANDARD CATEGORY		**Michigan Computer Science Standards**
STANDARD		**LEVEL 3A: HIGH SCHOOL (GRADES 9-10)**
GRADE LEVEL EXPECTATION		**IMPACTS OF COMPUTING**
EXPECTATION	3A-IC-26.	Demonstrate ways a given algorithm applies to problems across disciplines. Subconcept: Culture; Practice 3.1

Minnesota Academic Standards

Mathematics

Grade **9** - Adopted: **2008**

CONTENT STANDARD / DOMAIN	**MN.9.4.**	**Data Analysis & Probability**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.4.1.**	**Display and analyze data; use various measures associated with data to draw conclusions, identify trends and describe relationships.**
INDICATORS OF PROGRESS / STRAND	9.4.1.1.	Describe a data set using data displays, including box-and whisker plots; describe and compare data sets using summary statistics, including measures of center, location and spread. Measures of center and location include mean, median, quartile and percentile. Measures of spread include standard deviation, range and inter-quartile range. Know how to use calculators, spreadsheets or other technology to display data and calculate summary statistics.

Minnesota Academic Standards

Mathematics

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

CONTENT STANDARD / DOMAIN	**MN.9.4.**	**Data Analysis & Probability**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.4.1.**	**Display and analyze data; use various measures associated with data to draw conclusions, identify trends and describe relationships.**
INDICATORS OF PROGRESS / STRAND	9.4.1.1.	Describe a data set using data displays, including box-and whisker plots; describe and compare data sets using summary statistics, including measures of center, location and spread. Measures of center and location include mean, median, quartile and percentile. Measures of spread include standard deviation, range and inter-quartile range. Know how to use calculators, spreadsheets or other technology to display data and calculate summary statistics.

Minnesota Academic Standards

Science

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

CONTENT STANDARD / DOMAIN	**MN.9.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.1.2.**	**The Practice of Engineering**
INDICATORS OF PROGRESS / STRAND	**9.1.2.1.**	**The student will understand that engineering is a way of addressing human needs by applying science concepts and mathematical techniques to develop new products, tools, processes and systems.**
INDICATORS OF PROGRESS	9.1.2.1.1.	Understand that engineering designs and products must be continually checked and critiqued for alternatives, risks, costs and benefits, so that subsequent designs are refined and improved.
INDICATORS OF PROGRESS	9.1.2.1.2.	Recognize that risk analysis is used to determine the potential positive and negative consequences of using a new technology or design, including the evaluation of causes and effects of failures.
INDICATORS OF PROGRESS	9.1.2.1.3.	Explain and give examples of how, in the design of a device or process, engineers consider how it is to be manufactured, operated, maintained, replaced and disposed of.

CONTENT STANDARD / DOMAIN	**MN.9.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.1.2.**	**The Practice of Engineering**
INDICATORS OF PROGRESS / STRAND	**9.1.2.2.**	**The student will understand that engineering design is an analytical and creative process of devising a product or solution to meet a need or solve a specific problem.**
INDICATORS OF PROGRESS	9.1.2.2.1.	Identify a problem and the associated constraints on possible design solutions.
INDICATORS OF PROGRESS	9.1.2.2.2.	Develop possible solutions to an engineering problem and evaluate them using conceptual, physical and mathematical models to determine the extent to which the solutions meet the design specifications.

CONTENT STANDARD / DOMAIN	**MN.9.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.1.3.**	**Interactions Among Science, Technology, Engineering, Mathematics, and Society**
INDICATORS OF PROGRESS / STRAND	**9.1.3.4.**	**The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.**
INDICATORS OF PROGRESS	9.1.3.4.1.	Describe how technological problems and advances often create a demand for new scientific knowledge, improved mathematics and new technologies.
INDICATORS OF PROGRESS	9.1.3.4.2.	Determine and use appropriate safety procedures, tools, computers and measurement instruments in science and engineering contexts.
INDICATORS OF PROGRESS	9.1.3.4.3.	Select and use appropriate numeric, symbolic, pictorial, or graphical representation to communicate scientific ideas, procedures and experimental results.

CONTENT STANDARD / DOMAIN	**MN.9.4.**	**Life Science**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.4.2.**	**Interdependence among Living Systems**
INDICATORS OF PROGRESS / STRAND	**9.4.2.2.**	**The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.**
INDICATORS OF PROGRESS	9.4.2.2.2.	Explain how matter and energy in an ecosystem is transformed and transferred among organisms, and how energy is dissipated as heat into the environment.

CONTENT STANDARD / DOMAIN	**MN.9.4.**	**Life Science**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.4.4.**	**Human Interactions with Living Systems**
INDICATORS OF PROGRESS / STRAND	**9.4.4.1.**	**The student will understand that human activity has consequences on living organisms and ecosystems.**
INDICATORS OF PROGRESS	9.4.4.1.2.	Describe the social, economic and ecological risks and benefits of changing a natural ecosystem as a result of human activity.

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

CONTENT STANDARD / DOMAIN	**MN.9.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Key Ideas and Details**

INDICATORS OF PROGRESS / STRAND	9.13.2.2.	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.
INDICATORS OF PROGRESS / STRAND	9.13.3.3.	Follow precisely a complex multistep procedure when carrying out experiments, designing solutions, taking measurements, or performing technical tasks, attending to special cases (constraints) or exceptions defined in the text.
CONTENT STANDARD / DOMAIN	**MN.9.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Craft and Structure**
INDICATORS OF PROGRESS / STRAND	9.13.4.4.	Determine the meaning of symbols, equations, graphical representations, tabular representations, 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.
INDICATORS OF PROGRESS / STRAND	9.13.5.5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
INDICATORS OF PROGRESS / STRAND	9.13.6.6.	Analyze the author's purpose in describing phenomena, providing an explanation, describing a procedure, or discussing/reporting an experiment in a text, defining the question the author seeks to address.
CONTENT STANDARD / DOMAIN	**MN.9.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Integration of Knowledge and Ideas**
INDICATORS OF PROGRESS / STRAND	9.13.9.9.	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 / DOMAIN	**MN.9.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Range of Reading and Level of Text Complexity**
INDICATORS OF PROGRESS / STRAND	9.13.10.10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
CONTENT STANDARD / DOMAIN	**MN.9.14.**	**Writing Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Text Types and Purposes**

INDICATORS OF PROGRESS / STRAND	**9.14.2.2.**	**Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.**
INDICATORS OF PROGRESS	9.14.2.2.d.	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
CONTENT STANDARD / DOMAIN	**MN.9.14.**	**Writing Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Production and Distribution of Writing**
INDICATORS OF PROGRESS / STRAND	9.14.4.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.

Minnesota Academic Standards

Science

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

CONTENT STANDARD / DOMAIN	**MN.9.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.1.2.**	**The Practice of Engineering**
INDICATORS OF PROGRESS / STRAND	**9.1.2.1.**	**The student will understand that engineering is a way of addressing human needs by applying science concepts and mathematical techniques to develop new products, tools, processes and systems.**
INDICATORS OF PROGRESS	9.1.2.1.1.	Understand that engineering designs and products must be continually checked and critiqued for alternatives, risks, costs and benefits, so that subsequent designs are refined and improved.
INDICATORS OF PROGRESS	9.1.2.1.2.	Recognize that risk analysis is used to determine the potential positive and negative consequences of using a new technology or design, including the evaluation of causes and effects of failures.
INDICATORS OF PROGRESS	9.1.2.1.3.	Explain and give examples of how, in the design of a device or process, engineers consider how it is to be manufactured, operated, maintained, replaced and disposed of.
CONTENT STANDARD / DOMAIN	**MN.9.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.1.2.**	**The Practice of Engineering**
INDICATORS OF PROGRESS / STRAND	**9.1.2.2.**	**The student will understand that engineering design is an analytical and creative process of devising a product or solution to meet a need or solve a specific problem.**
INDICATORS OF PROGRESS	9.1.2.2.1.	Identify a problem and the associated constraints on possible design solutions.

INDICATORS OF PROGRESS	9.1.2.2.2.	Develop possible solutions to an engineering problem and evaluate them using conceptual, physical and mathematical models to determine the extent to which the solutions meet the design specifications.

CONTENT STANDARD / DOMAIN	**MN.9.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.1.3.**	**Interactions Among Science, Technology, Engineering, Mathematics, and Society**
INDICATORS OF PROGRESS / STRAND	**9.1.3.4.**	**The student will understand that science, technology, engineering and mathematics rely on each other to enhance knowledge and understanding.**
INDICATORS OF PROGRESS	9.1.3.4.1.	Describe how technological problems and advances often create a demand for new scientific knowledge, improved mathematics and new technologies.
INDICATORS OF PROGRESS	9.1.3.4.2.	Determine and use appropriate safety procedures, tools, computers and measurement instruments in science and engineering contexts.
INDICATORS OF PROGRESS	9.1.3.4.3.	Select and use appropriate numeric, symbolic, pictorial, or graphical representation to communicate scientific ideas, procedures and experimental results.

CONTENT STANDARD / DOMAIN	**MN.9.4.**	**Life Science**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.4.2.**	**Interdependence among Living Systems**
INDICATORS OF PROGRESS / STRAND	**9.4.2.2.**	**The student will understand that matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.**
INDICATORS OF PROGRESS	9.4.2.2.2.	Explain how matter and energy in an ecosystem is transformed and transferred among organisms, and how energy is dissipated as heat into the environment.

CONTENT STANDARD / DOMAIN	**MN.9.4.**	**Life Science**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9.4.4.**	**Human Interactions with Living Systems**
INDICATORS OF PROGRESS / STRAND	**9.4.4.1.**	**The student will understand that human activity has consequences on living organisms and ecosystems.**
INDICATORS OF PROGRESS	9.4.4.1.2.	Describe the social, economic and ecological risks and benefits of changing a natural ecosystem as a result of human activity.

CONTENT STANDARD / DOMAIN	**MN.9.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**

PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Key Ideas and Details**
INDICATORS OF PROGRESS / STRAND	9.13.2.2.	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.
INDICATORS OF PROGRESS / STRAND	9.13.3.3.	Follow precisely a complex multistep procedure when carrying out experiments, designing solutions, taking measurements, or performing technical tasks, attending to special cases (constraints) or exceptions defined in the text.
CONTENT STANDARD / DOMAIN	**MN.9.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Craft and Structure**
INDICATORS OF PROGRESS / STRAND	9.13.4.4.	Determine the meaning of symbols, equations, graphical representations, tabular representations, 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.
INDICATORS OF PROGRESS / STRAND	9.13.5.5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
INDICATORS OF PROGRESS / STRAND	9.13.6.6.	Analyze the author's purpose in describing phenomena, providing an explanation, describing a procedure, or discussing/reporting an experiment in a text, defining the question the author seeks to address.
CONTENT STANDARD / DOMAIN	**MN.9.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Integration of Knowledge and Ideas**
INDICATORS OF PROGRESS / STRAND	9.13.9.9.	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 / DOMAIN	**MN.9.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Range of Reading and Level of Text Complexity**
INDICATORS OF PROGRESS / STRAND	9.13.10.10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
CONTENT STANDARD / DOMAIN	**MN.9.14.**	**Writing Benchmarks: Literacy in Science and Technical Subjects 6-12**

PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Text Types and Purposes**
INDICATORS OF PROGRESS / STRAND	**9.14.2.2.**	**Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.**
INDICATORS OF PROGRESS	9.14.2.2.d.	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.

CONTENT STANDARD / DOMAIN	**MN.9.14.**	**Writing Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Production and Distribution of Writing**
INDICATORS OF PROGRESS / STRAND	9.14.4.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.

Minnesota Academic Standards

Technology Education

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

CONTENT STANDARD / DOMAIN	**MN.ITL.9-12.**	**Information and Technology Literacy Standards (Refresh 2009)**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9-12.3.**	**Technology Use and Concepts: Students will explore multiple technologies, evaluate their suitability for the desired educational or personal task, and apply the tools needed.**
INDICATORS OF PROGRESS / STRAND	**9-12.3.I.**	**Use of Technology**
INDICATORS OF PROGRESS	**9-12.3.I.D.**	**Strategically solve information and technology issues.**
INDICATOR	9-12.3.I.D.1.	Independently troubleshoot technology issues, following organizational policies.
INDICATOR	9-12.3.I.D.2.	Locate assistance independently and ask appropriate expert when necessary.

Minnesota Academic Standards

Technology Education

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

CONTENT STANDARD / DOMAIN	**MN.ITL.9-12.**	**Information and Technology Literacy Standards (Refresh 2009)**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**9-12.3.**	**Technology Use and Concepts: Students will explore multiple technologies, evaluate their suitability for the desired educational or personal task, and apply the tools needed.**

INDICATORS OF PROGRESS / STRAND	**9-12.3.I.**	**Use of Technology**
INDICATORS OF PROGRESS	**9-12.3.I.D.**	**Strategically solve information and technology issues.**
INDICATOR	9-12.3.I.D.1.	Independently troubleshoot technology issues, following organizational policies.
INDICATOR	9-12.3.I.D.2.	Locate assistance independently and ask appropriate expert when necessary.

Mississippi College & Career Readiness Standards

Mathematics

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

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

THEME	MS.AI.	Algebra I
SUBJECT	**AI.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**
OBJECTIVE	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.

THEME	MS.AII.	Algebra II
SUBJECT	**AII.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**
OBJECTIVE	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.

THEME	MS.IMI.	Integrated Mathematics I
SUBJECT	**IMI.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**

OBJECTIVE	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.

THEME	**MS.IMII.**	**Integrated Mathematics II**
SUBJECT	**IMII.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**
OBJECTIVE	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.

THEME	**MS.IMIII.**	**Integrated Mathematics III**
SUBJECT	**IMIII.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**
OBJECTIVE	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.

THEME	**MS.FAC.**	**Foundations of Algebra Course**
SUBJECT	**FAC.S.**	**Statistics**
STANDARD	FAC.S.40.	Without technology, fluently calculate the measures of central tendency (mean, median, mode), measures of spread (range, interquartile range), and understand the impact of extreme values (outliers) on each of these values. (6.SP.5, 8.SP.1, S-ID.3) Justify which measure is appropriate to use when describing a data set or a real-world context.

Mississippi College & Career Readiness Standards

Mathematics

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

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

THEME	**MS.AI.**	**Algebra I**
SUBJECT	**AI.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**

OBJECTIVE	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.

THEME	**MS.AII.**	**Algebra II**
SUBJECT	**AII.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**

OBJECTIVE	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.

THEME	**MS.IMI.**	**Integrated Mathematics I**
SUBJECT	**IMI.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**

OBJECTIVE	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.

THEME	**MS.IMII.**	**Integrated Mathematics II**
SUBJECT	**IMII.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**

OBJECTIVE	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.

THEME	**MS.IMIII.**	**Integrated Mathematics III**
SUBJECT	**IMIII.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Interpret functions that arise in applications in terms of the context**

OBJECTIVE	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.

THEME	**MS.FAC.**	**Foundations of Algebra Course**
SUBJECT	**FAC.S.**	**Statistics**
STANDARD	FAC.S.40.	Without technology, fluently calculate the measures of central tendency (mean, median, mode), measures of spread (range, interquartile range), and understand the impact of extreme values (outliers) on each of these values. (6.SP.5, 8.SP.1, S-ID.3) Justify which measure is appropriate to use when describing a data set or a real-world context.

Mississippi College & Career Readiness Standards

Science

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

THEME	**MS.BIO.**	**Biology**
SUBJECT		**Interdependence of Organisms and Their Environments**
STANDARD	**BIO.5.**	**Students will Investigate and evaluate the interdependence of living organisms and their environment.**

OBJECTIVE	BIO.5.2.	Analyze models of the cycling of matter (e.g., carbon, nitrogen, phosphorus, and water) between abiotic and biotic factors in an ecosystem and evaluate the ability of these cycles to maintain the health and sustainability of the ecosystem.
OBJECTIVE	BIO.5.3.	Analyze and interpret quantitative data to construct an explanation for the effects of greenhouse gases on the carbon dioxide cycle and global climate.
OBJECTIVE	BIO.5.8.	Enrichment: Use an engineering design process to create a solution that addresses changing ecological conditions (e.g., climate change, invasive species, loss of biodiversity, human population growth, habitat destruction, biomagnification, or natural phenomena).
THEME	**MS.BOT.**	**Botany**
SUBJECT		**Plant Morphology, Cell Structure, and Function**
STANDARD	**BOT.1.**	**Students will investigate the morphology, anatomy, and physiology of plants.**
OBJECTIVE	BOT.1.9.	Communicate the importance of carbon, hydrogen, oxygen, phosphorus, and nitrogen cycles to plant physiology through graphics such as poster or computer presentations.
THEME	**MS.ESS.**	**Earth and Space Science**
SUBJECT		**Earth's Systems and Cycles**
STANDARD	**ESS.3.**	**Students will develop an understanding of Earth's systems and cycles.**
OBJECTIVE	ESS.3.6.	Construct an explanation from data sets to obtain and evaluate scientific information to construct scientific arguments on changes in climate caused by various natural factors (e.g., plate tectonics and continent location and Milankovitch cycles) versus anthropogenic factors (e.g., fossil fuel use and agricultural factors).
THEME	**MS.ESS.**	**Earth and Space Science**
SUBJECT		**Earth's Resources and Human Activity**
STANDARD	**ESS.4.**	**Students will develop an understanding of Earth's resources and the impact of human activities.**
OBJECTIVE	ESS.4.1.	Research, evaluate, and communicate about how human life on Earth shapes Earth's systems and responds to the interaction of Earth's systems (e.g., geosphere, hydrosphere, atmosphere, and biosphere). Examine how geochemical and ecological processes interact through time to cycle matter and energy and how human activity alters the rates of these processes.
OBJECTIVE	ESS.4.4.	Enrichment: Use an engineering design process to research, develop, and test models to aid in the responsible management of natural resources (e.g., recycling, composting, and energy usage).
THEME	**MS.ENV.**	**Environmental Science**
SUBJECT		**Biosphere and Biodiversity**
STANDARD	**ENV.1.**	**Students will investigate the interdependence of diverse living organisms and their interactions with the components of the biosphere.**
OBJECTIVE	ENV.1.2.	Evaluate evidence in nonfiction text to explain how biological or physical changes within biomes affect populations and communities and how changing conditions may result in altered ecosystems.
OBJECTIVE	ENV.1.5.	Develop and use models to diagram the flow of nitrogen, carbon, and phosphorus through the environment.

OBJECTIVE	ENV.1.9.	Evaluate and communicate data that explains how human activity may impact biodiversity (e.g., introduction, removal, and reintroduction of an organism within an ecosystem; land usage) and genetic variations of organisms, including endangered and threatened species.

THEME	**MS.ENV.**	**Environmental Science**
SUBJECT		**Natural Resources Use and Conservation**
STANDARD	**ENV.2.**	**Students will relate the impact of human activities on the environment, conservation activities, and efforts to maintain and restore ecosystems.**
OBJECTIVE	ENV.2.4.	Examine solutions for developing, conserving, managing, recycling, and reusing energy and mineral resources to minimize impacts in natural systems (e.g., agricultural soil use, mining for coal, construction sites, and exploration of petroleum and natural gas sources).

THEME	**MS.ENV.**	**Environmental Science**
SUBJECT		**Human Activities and Climate Change**
STANDARD	**ENV.3.**	**Students will discuss the direct and indirect impacts of certain types of human activities on the Earth's climate.**
OBJECTIVE	ENV.3.1.	Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations have resulted in atmospheric and climate changes.
OBJECTIVE	ENV.3.2.	Interpret data and climate models to predict how global and regional climate change can affect Earth's systems (e.g., precipitation, temperature, impacts on sea level, global ice volumes, and atmosphere and ocean composition).
OBJECTIVE	ENV.3.3.	Use satellite imagery and other resources to analyze changes in biomes over time (e.g., glacial retreat, deforestation, desertification) and propose strategies to reduce the impact of human activities leading to these issues.
OBJECTIVE	ENV.3.4.	Enrichment: Determine mathematically an individual's impact on the environment (carbon footprint, water usage, landfill contribution) and develop a plan to reduce personal contribution.

THEME	**MS.ENV.**	**Environmental Science**
SUBJECT		**Human Sustainability**
STANDARD	**ENV.4.**	**Students will demonstrate an understanding of the interdependence of human sustainability and the environment.**
OBJECTIVE	ENV.4.1.	Identify human impact and develop a solution for protection of the atmosphere, considering pollutants (e.g., acid rain, air pollution, smog, ozone layer, or increased levels of greenhouse gases) and the impacts of pollutants on human health (e.g., asthma, COPD, emphysema, and cancer).

THEME	**MS.FB.**	**Foundations of Biology**
SUBJECT		**Organization and Energy in Living Systems**
STANDARD	**FB.3.**	**Students will demonstrate an understanding of how the structure of living organisms supports the essential functions of life.**
OBJECTIVE	FB.3.4.	Analyze the relationship between photosynthesis and cellular respiration and explain that relationship in terms of the need for all living things to acquire energy from their environment.

THEME	**MS.FB.**	**Foundations of Biology**
SUBJECT		**Ecological Principals**

STANDARD	**FB.6.**	**Students will understand the interdependence of living organisms and their environment.**
OBJECTIVE	FB.6.2.	Use models to analyze the cycling of matter in an ecosystem (e.g., water, carbon dioxide/oxygen, nitrogen).
OBJECTIVE	FB.6.3.	Obtain, evaluate, and communicate information to explain relationships that exist between abiotic and biotic components of an ecosystem. Explain how changes in biotic and abiotic components affect the balance of an ecosystem over time.
OBJECTIVE	FB.6.7.	Enrichment: Design solutions to reduce the impact of human activity on the ecosystem.

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

THEME	**MS.FSL.**	**Foundations of Science Literacy**
SUBJECT		**History of Science and Impacts on Society**
STANDARD	**FSL.1.**	**Students will relate the importance of significant historical experiments and their impact on research and development.**
OBJECTIVE	FSL.1.2.	Research, analyze, explain, and communicate how scientific enterprise relates to society and classic inventions (e.g., microscope, telescope, computer, and telephone).
OBJECTIVE	FSL.1.3.	Identify and communicate the impact of mathematics and technology in the development of scientific thought and the practice of science (e.g., space exploration, the human genome project, and ocean exploration).
OBJECTIVE	FSL.1.4.	Enrichment: Research, analyze, explain, and communicate the influence of society, including cultural components, on the direction and progress of science and technology (e.g., medical treatments, antibiotic resistance, alternative energy development, and biomimicry).

THEME	**MS.FSL.**	**Foundations of Science Literacy**
SUBJECT		**Nature of Technology and Engineering**
STANDARD	**FSL.2.**	**Students will identify, research, and communicate the development of technology and engineering practices.**
OBJECTIVE	FSL.2.1.	Research and present a technology that was developed through engineering design. Identify its purpose, how it has advanced through alterations in design (e.g., systems that provide homes and businesses with utilities, parking structures, park and recreational structures, and traffic flow), and careers related to its use).
OBJECTIVE	FSL.2.2.	Use an engineering design process to identify a problem within the local community, and propose and develop a possible solution for that problem.

THEME	**MS.FSL.**	**Foundations of Science Literacy**
SUBJECT		**Nature of Science**
STANDARD	**FSL.3B.**	**Students will apply scientific literacy and thinking skills to analyze and interpret data found in various graphics including, but not limited to, those found in sample ACT science passages.**
OBJECTIVE	FSL.3B.5.	Analyze presented information when given new information (e.g., given a new scenario, how would a given scenario be changed).

THEME	**MS.FSL.**	**Foundations of Science Literacy**
SUBJECT		**Nature of Science**
STANDARD	**FSL.3C.**	**Students will apply scientific literacy and thinking skills to analyze scientific investigations found in various experimental designs including, but not limited to, those found in sample ACT science passages.**

OBJECTIVE	FSL.3C.1.	Analyze the methods and choice of tools used in simple and complex experimental designs.

THEME	**MS.MAQI.MAQ**	**Marine and Aquatic Science I**
SUBJECT		**Flora and Fauna**
STANDARD	**MAQI.MAQ.4.**	**Students will examine characteristics of specific aquatic ecosystems and the effects of human and natural phenomena on those ecosystems.**
OBJECTIVE	MAQI.MAQ.4.8.	Enrichment: Choose an environmental issue that currently exists in one of the aquatic ecosystems and use an engineering design process to propose and develop a possible solution using scientific knowledge and best management practices (BMPs). Create an environmental action plan to include moral, legal, societal, political, and economic decisions that impact animal diversity in both the short and long term. Results from developed plans will be communicated with classmates.

THEME	**MS.ZII.ZOO.**	**Zoology II**
SUBJECT		**Phylum Chordata, Class Mammalia**
STANDARD	**ZII.ZOO.10.**	**Students will understand the structure and function of phylum Chordata, class Mammalia, and how they demonstrate the characteristics of living things.**
OBJECTIVE	ZII.ZOO.10.7.	Enrichment: Use an engineering design process to develop a possible solution to an environmental issue that currently exists in an ecosystem.

Mississippi College & Career Readiness Standards

Science

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

THEME	**MS.BIO.**	**Biology**
SUBJECT		**Interdependence of Organisms and Their Environments**
STANDARD	**BIO.5.**	**Students will Investigate and evaluate the interdependence of living organisms and their environment.**
OBJECTIVE	BIO.5.2.	Analyze models of the cycling of matter (e.g., carbon, nitrogen, phosphorus, and water) between abiotic and biotic factors in an ecosystem and evaluate the ability of these cycles to maintain the health and sustainability of the ecosystem.
OBJECTIVE	BIO.5.3.	Analyze and interpret quantitative data to construct an explanation for the effects of greenhouse gases on the carbon dioxide cycle and global climate.
OBJECTIVE	BIO.5.8.	Enrichment: Use an engineering design process to create a solution that addresses changing ecological conditions (e.g., climate change, invasive species, loss of biodiversity, human population growth, habitat destruction, biomagnification, or natural phenomena).

THEME	**MS.BOT.**	**Botany**
SUBJECT		**Plant Morphology, Cell Structure, and Function**
STANDARD	**BOT.1.**	**Students will investigate the morphology, anatomy, and physiology of plants.**
OBJECTIVE	BOT.1.9.	Communicate the importance of carbon, hydrogen, oxygen, phosphorus, and nitrogen cycles to plant physiology through graphics such as poster or computer presentations.

THEME	**MS.ESS.**	**Earth and Space Science**
SUBJECT		**Earth's Systems and Cycles**

STANDARD	**ESS.3.**	**Students will develop an understanding of Earth's systems and cycles.**
OBJECTIVE	ESS.3.6.	Construct an explanation from data sets to obtain and evaluate scientific information to construct scientific arguments on changes in climate caused by various natural factors (e.g., plate tectonics and continent location and Milankovitch cycles) versus anthropogenic factors (e.g., fossil fuel use and agricultural factors).
THEME	**MS.ESS.**	**Earth and Space Science**
SUBJECT		**Earth's Resources and Human Activity**
STANDARD	**ESS.4.**	**Students will develop an understanding of Earth's resources and the impact of human activities.**
OBJECTIVE	ESS.4.1.	Research, evaluate, and communicate about how human life on Earth shapes Earth's systems and responds to the interaction of Earth's systems (e.g., geosphere, hydrosphere, atmosphere, and biosphere). Examine how geochemical and ecological processes interact through time to cycle matter and energy and how human activity alters the rates of these processes.
OBJECTIVE	ESS.4.4.	Enrichment: Use an engineering design process to research, develop, and test models to aid in the responsible management of natural resources (e.g., recycling, composting, and energy usage).
THEME	**MS.ENV.**	**Environmental Science**
SUBJECT		**Biosphere and Biodiversity**
STANDARD	**ENV.1.**	**Students will investigate the interdependence of diverse living organisms and their interactions with the components of the biosphere.**
OBJECTIVE	ENV.1.2.	Evaluate evidence in nonfiction text to explain how biological or physical changes within biomes affect populations and communities and how changing conditions may result in altered ecosystems.
OBJECTIVE	ENV.1.5.	Develop and use models to diagram the flow of nitrogen, carbon, and phosphorus through the environment.
OBJECTIVE	ENV.1.9.	Evaluate and communicate data that explains how human activity may impact biodiversity (e.g., introduction, removal, and reintroduction of an organism within an ecosystem; land usage) and genetic variations of organisms, including endangered and threatened species.
THEME	**MS.ENV.**	**Environmental Science**
SUBJECT		**Natural Resources Use and Conservation**
STANDARD	**ENV.2.**	**Students will relate the impact of human activities on the environment, conservation activities, and efforts to maintain and restore ecosystems.**
OBJECTIVE	ENV.2.4.	Examine solutions for developing, conserving, managing, recycling, and reusing energy and mineral resources to minimize impacts in natural systems (e.g., agricultural soil use, mining for coal, construction sites, and exploration of petroleum and natural gas sources).
THEME	**MS.ENV.**	**Environmental Science**
SUBJECT		**Human Activities and Climate Change**
STANDARD	**ENV.3.**	**Students will discuss the direct and indirect impacts of certain types of human activities on the Earth's climate.**
OBJECTIVE	ENV.3.1.	Use a model to describe cycling of carbon through the ocean, atmosphere, soil, and biosphere and how increases in carbon dioxide concentrations have resulted in atmospheric and climate changes.
OBJECTIVE	ENV.3.2.	Interpret data and climate models to predict how global and regional climate change can affect Earth's systems (e.g., precipitation, temperature, impacts on sea level, global ice volumes, and atmosphere and ocean composition).

OBJECTIVE	ENV.3.3.	Use satellite imagery and other resources to analyze changes in biomes over time (e.g., glacial retreat, deforestation, desertification) and propose strategies to reduce the impact of human activities leading to these issues.
OBJECTIVE	ENV.3.4.	Enrichment: Determine mathematically an individual's impact on the environment (carbon footprint, water usage, landfill contribution) and develop a plan to reduce personal contribution.
THEME	**MS.ENV.**	**Environmental Science**
SUBJECT		**Human Sustainability**
STANDARD	**ENV.4.**	**Students will demonstrate an understanding of the interdependence of human sustainability and the environment.**
OBJECTIVE	ENV.4.1.	Identify human impact and develop a solution for protection of the atmosphere, considering pollutants (e.g., acid rain, air pollution, smog, ozone layer, or increased levels of greenhouse gases) and the impacts of pollutants on human health (e.g., asthma, COPD, emphysema, and cancer).
THEME	**MS.FB.**	**Foundations of Biology**
SUBJECT		**Organization and Energy in Living Systems**
STANDARD	**FB.3.**	**Students will demonstrate an understanding of how the structure of living organisms supports the essential functions of life.**
OBJECTIVE	FB.3.4.	Analyze the relationship between photosynthesis and cellular respiration and explain that relationship in terms of the need for all living things to acquire energy from their environment.
THEME	**MS.FB.**	**Foundations of Biology**
SUBJECT		**Ecological Principals**
STANDARD	**FB.6.**	**Students will understand the interdependence of living organisms and their environment.**
OBJECTIVE	FB.6.2.	Use models to analyze the cycling of matter in an ecosystem (e.g., water, carbon dioxide/oxygen, nitrogen).
OBJECTIVE	FB.6.3.	Obtain, evaluate, and communicate information to explain relationships that exist between abiotic and biotic components of an ecosystem. Explain how changes in biotic and abiotic components affect the balance of an ecosystem over time.
OBJECTIVE	FB.6.7.	Enrichment: Design solutions to reduce the impact of human activity on the ecosystem.

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

THEME	**MS.FSL.**	**Foundations of Science Literacy**
SUBJECT		**History of Science and Impacts on Society**
STANDARD	**FSL.1.**	**Students will relate the importance of significant historical experiments and their impact on research and development.**
OBJECTIVE	FSL.1.2.	Research, analyze, explain, and communicate how scientific enterprise relates to society and classic inventions (e.g., microscope, telescope, computer, and telephone).
OBJECTIVE	FSL.1.3.	Identify and communicate the impact of mathematics and technology in the development of scientific thought and the practice of science (e.g., space exploration, the human genome project, and ocean exploration).

OBJECTIVE	FSL.1.4.	Enrichment: Research, analyze, explain, and communicate the influence of society, including cultural components, on the direction and progress of science and technology (e.g., medical treatments, antibiotic resistance, alternative energy development, and biomimicry).

THEME	**MS.FSL.**	**Foundations of Science Literacy**
SUBJECT		**Nature of Technology and Engineering**
STANDARD	**FSL.2.**	**Students will identify, research, and communicate the development of technology and engineering practices.**
OBJECTIVE	FSL.2.1.	Research and present a technology that was developed through engineering design. Identify its purpose, how it has advanced through alterations in design (e.g., systems that provide homes and businesses with utilities, parking structures, park and recreational structures, and traffic flow), and careers related to its use).
OBJECTIVE	FSL.2.2.	Use an engineering design process to identify a problem within the local community, and propose and develop a possible solution for that problem.

THEME	**MS.FSL.**	**Foundations of Science Literacy**
SUBJECT		**Nature of Science**
STANDARD	**FSL.3B.**	**Students will apply scientific literacy and thinking skills to analyze and interpret data found in various graphics including, but not limited to, those found in sample ACT science passages.**
OBJECTIVE	FSL.3B.5.	Analyze presented information when given new information (e.g., given a new scenario, how would a given scenario be changed).

THEME	**MS.FSL.**	**Foundations of Science Literacy**
SUBJECT		**Nature of Science**
STANDARD	**FSL.3C.**	**Students will apply scientific literacy and thinking skills to analyze scientific investigations found in various experimental designs including, but not limited to, those found in sample ACT science passages.**
OBJECTIVE	FSL.3C.1.	Analyze the methods and choice of tools used in simple and complex experimental designs.

THEME	**MS.MAQI.MAQ**	**Marine and Aquatic Science I**
SUBJECT		**Flora and Fauna**
STANDARD	**MAQI.MAQ.4.**	**Students will examine characteristics of specific aquatic ecosystems and the effects of human and natural phenomena on those ecosystems.**
OBJECTIVE	MAQI.MAQ.4.8.	Enrichment: Choose an environmental issue that currently exists in one of the aquatic ecosystems and use an engineering design process to propose and develop a possible solution using scientific knowledge and best management practices (BMPs). Create an environmental action plan to include moral, legal, societal, political, and economic decisions that impact animal diversity in both the short and long term. Results from developed plans will be communicated with classmates.

THEME	**MS.ZII.ZOO.**	**Zoology II**
SUBJECT		**Phylum Chordata, Class Mammalia**
STANDARD	**ZII.ZOO.10.**	**Students will understand the structure and function of phylum Chordata, class Mammalia, and how they demonstrate the characteristics of living things.**

OBJECTIVE	ZII.ZOO.10.7.	Enrichment: Use an engineering design process to develop a possible solution to an environmental issue that currently exists in an ecosystem.

Mississippi College & Career Readiness Standards

Technology Education

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

THEME		Mississippi College- and Career-Readiness Standards for Computer Science
SUBJECT		**Level 3A: GRADES 9-10 - Data and Analysis**
STANDARD	**DA.3A.**	**Data and Analysis (DA.3A)**
OBJECTIVE	**DA.3A.2.**	**Evaluate the tradeoffs in how data elements are organized and where data is stored. [STORAGE] (P3.3)**
OBJECTIVE	DA.3A.2a.	Students should evaluate whether a chosen solution is most appropriate for a particular problem.

Mississippi College & Career Readiness Standards

Technology Education

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

THEME		Mississippi College- and Career-Readiness Standards for Computer Science
SUBJECT		**Level 3A: GRADES 9-10 - Data and Analysis**
STANDARD	**DA.3A.**	**Data and Analysis (DA.3A)**
OBJECTIVE	**DA.3A.2.**	**Evaluate the tradeoffs in how data elements are organized and where data is stored. [STORAGE] (P3.3)**
OBJECTIVE	DA.3A.2a.	Students should evaluate whether a chosen solution is most appropriate for a particular problem.

Missouri Learning Standards

Science

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

STRAND: BIG IDEA / STANDARD	MO.9-12.LS.	Life Sciences
CONCEPT: GLE / BENCHMARK	**9-12.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / COMPONENT	**9-12.LS2.B.**	**Cycles of matter and Energy Transfer in Ecosystems**
INDICATOR / PROFICIENCY	9-12.LS2.B.3.	Use a model that illustrates the roles of photosynthesis, cellular respiration, decomposition, and combustion to explain the cycling of carbon in its various forms among the biosphere, atmosphere, hydrosphere, and geosphere. [Clarification Statement: The primary forms of carbon include carbon dioxide, hydrocarbons, waste, and biomass. Examples of models could include simulations and mathematical and conceptual models.]

STRAND: BIG IDEA / STANDARD	MO.9-12.LS.	Life Sciences
CONCEPT: GLE / BENCHMARK	**9-12.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / COMPONENT	**9-12.LS2.C.**	**Ecosystem Dynamics, Functioning and Resilience**

INDICATOR / PROFICIENCY	9-12.LS2.C.1.	Evaluate the claims, evidence, and reasoning that the interactions in ecosystems maintain relatively consistent populations of species while conditions remain stable, but changing conditions may result in new ecosystem dynamics. [Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.]
INDICATOR / PROFICIENCY	9-12.LS2.C.2.	Design, evaluate, and/or refine solutions that positively impact the environment and biodiversity. [Clarification Statement: Examples of solutions may include captive breeding programs, habitat restoration, pollution mitigation, energy conservation, agriculture and mining programs, and ecotourism.]
STRAND: BIG IDEA / STANDARD	**MO.9-12.LS.**	**Life Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.LS4.**	**Biological Evolution; Unity and Diversity**
GLE / COMPONENT	**9-12.LS4.C.**	**Adaptation**
INDICATOR / PROFICIENCY	9-12.LS4.C.3.	Create or revise a model to test a solution to mitigate adverse impacts of human activity on biodiversity. [Clarification Statement: Emphasis is on designing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.]
STRAND: BIG IDEA / STANDARD	**MO.9-12.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.ESS2.**	**Earth's Systems**
GLE / COMPONENT	**9-12.ESS2.A.**	**Earth Materials and Systems**
INDICATOR / PROFICIENCY	9-12.ESS2.A.4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STRAND: BIG IDEA / STANDARD	**MO.9-12.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.ESS2.**	**Earth's Systems**
GLE / COMPONENT	**9-12.ESS2.D.**	**Weather and Climate**
INDICATOR / PROFICIENCY	9-12.ESS2.D.1.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. [Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.]
STRAND: BIG IDEA / STANDARD	**MO.9-12.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.ESS3.**	**Earth and Human Activity**

GLE / COMPONENT	**9-12.ESS3.A.**	**Natural Resources**
INDICATOR / PROFICIENCY	9-12.ESS3.A.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. [Clarification Statement: Examples of key natural resources include access to fresh water, regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather. Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.]
STRAND: BIG IDEA / STANDARD	**MO.9-12.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.ESS3.**	**Earth and Human Activity**
GLE / COMPONENT	**9-12.ESS3.C.**	**Human Impacts on Earth's Systems**
INDICATOR / PROFICIENCY	9-12.ESS3.C.1.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. [Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.]
STRAND: BIG IDEA / STANDARD	**MO.9-12.ETS.**	**Engineering, Technology, and Application of Science**
CONCEPT: GLE / BENCHMARK	**9-12.ETS1.**	**Engineering Design**
GLE / COMPONENT	**9-12.ETS1.A.**	**Defining and Delimiting Engineering Problems**
INDICATOR / PROFICIENCY	9-12.ETS1.A.1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
INDICATOR / PROFICIENCY	9-12.ETS1.A.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.
STRAND: BIG IDEA / STANDARD	**MO.9-12.ETS.**	**Engineering, Technology, and Application of Science**
CONCEPT: GLE / BENCHMARK	**9-12.ETS1.**	**Engineering Design**
GLE / COMPONENT	**9-12.ETS1.B.**	**Developing Possible Solutions**
INDICATOR / PROFICIENCY	9-12.ETS1.B.1.	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

STRAND: BIG IDEA / STANDARD	**MO.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Key Ideas and Details**
GLE / COMPONENT	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.
GLE / COMPONENT	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.
STRAND: BIG IDEA / STANDARD	**MO.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Craft and Structure**
GLE / COMPONENT	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.
GLE / COMPONENT	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).
STRAND: BIG IDEA / STANDARD	**MO.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Integration of Knowledge and Ideas**
GLE / COMPONENT	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.
STRAND: BIG IDEA / STANDARD	**MO.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Range of Reading and Level of Text Complexity**
GLE / COMPONENT	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.
STRAND: BIG IDEA / STANDARD	**MO.WHST.9-10.**	**Writing Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Text Types and Purposes**
GLE / COMPONENT	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**

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

Missouri Learning Standards

Science

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

STRAND: BIG IDEA / STANDARD	**MO.9-12.LS.**	**Life Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / COMPONENT	**9-12.LS2.B.**	**Cycles of matter and Energy Transfer in Ecosystems**
INDICATOR / PROFICIENCY	9-12.LS2.B.3.	Use a model that illustrates the roles of photosynthesis, cellular respiration, decomposition, and combustion to explain the cycling of carbon in its various forms among the biosphere, atmosphere, hydrosphere, and geosphere. [Clarification Statement: The primary forms of carbon include carbon dioxide, hydrocarbons, waste, and biomass. Examples of models could include simulations and mathematical and conceptual models.]
STRAND: BIG IDEA / STANDARD	**MO.9-12.LS.**	**Life Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / COMPONENT	**9-12.LS2.C.**	**Ecosystem Dynamics, Functioning and Resilience**
INDICATOR / PROFICIENCY	9-12.LS2.C.1.	Evaluate the claims, evidence, and reasoning that the interactions in ecosystems maintain relatively consistent populations of species while conditions remain stable, but changing conditions may result in new ecosystem dynamics. [Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.]
INDICATOR / PROFICIENCY	9-12.LS2.C.2.	Design, evaluate, and/or refine solutions that positively impact the environment and biodiversity. [Clarification Statement: Examples of solutions may include captive breeding programs, habitat restoration, pollution mitigation, energy conservation, agriculture and mining programs, and ecotourism.]
STRAND: BIG IDEA / STANDARD	**MO.9-12.LS.**	**Life Sciences**

CONCEPT: GLE / BENCHMARK	**9-12.LS4.**	**Biological Evolution; Unity and Diversity**
GLE / COMPONENT	**9-12.LS4.C.**	**Adaptation**
INDICATOR / PROFICIENCY	9-12.LS4.C.3.	Create or revise a model to test a solution to mitigate adverse impacts of human activity on biodiversity. [Clarification Statement: Emphasis is on designing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.]
STRAND: BIG IDEA / STANDARD	**MO.9-12.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.ESS2.**	**Earth's Systems**
GLE / COMPONENT	**9-12.ESS2.A.**	**Earth Materials and Systems**
INDICATOR / PROFICIENCY	9-12.ESS2.A.4.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
STRAND: BIG IDEA / STANDARD	**MO.9-12.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.ESS2.**	**Earth's Systems**
GLE / COMPONENT	**9-12.ESS2.D.**	**Weather and Climate**
INDICATOR / PROFICIENCY	9-12.ESS2.D.1.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. [Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.]
STRAND: BIG IDEA / STANDARD	**MO.9-12.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.ESS3.**	**Earth and Human Activity**
GLE / COMPONENT	**9-12.ESS3.A.**	**Natural Resources**
INDICATOR / PROFICIENCY	9-12.ESS3.A.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. [Clarification Statement: Examples of key natural resources include access to fresh water, regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather. Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.]

STRAND: BIG IDEA / STANDARD	**MO.9-12.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**9-12.ESS3.**	**Earth and Human Activity**
GLE / COMPONENT	**9-12.ESS3.C.**	**Human Impacts on Earth's Systems**
INDICATOR / PROFICIENCY	9-12.ESS3.C.1.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. [Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.]

STRAND: BIG IDEA / STANDARD	**MO.9-12.ETS.**	**Engineering, Technology, and Application of Science**
CONCEPT: GLE / BENCHMARK	**9-12.ETS1.**	**Engineering Design**
GLE / COMPONENT	**9-12.ETS1.A.**	**Defining and Delimiting Engineering Problems**
INDICATOR / PROFICIENCY	9-12.ETS1.A.1.	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
INDICATOR / PROFICIENCY	9-12.ETS1.A.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.

STRAND: BIG IDEA / STANDARD	**MO.9-12.ETS.**	**Engineering, Technology, and Application of Science**
CONCEPT: GLE / BENCHMARK	**9-12.ETS1.**	**Engineering Design**
GLE / COMPONENT	**9-12.ETS1.B.**	**Developing Possible Solutions**
INDICATOR / PROFICIENCY	9-12.ETS1.B.1.	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**

STRAND: BIG IDEA / STANDARD	**MO.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Key Ideas and Details**
GLE / COMPONENT	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.

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

GLE / COMPONENT	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.

Missouri Learning Standards

Technology Education

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

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Algorithms**
INDICATOR / PROFICIENCY	9-10.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.

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Program Development**
INDICATOR / PROFICIENCY	9-10.AP.PD.02.	Create a program by analyzing a problem and/or process, developing and documenting a solution, testing outcomes, debugging errors and adapting the program for a variety of users.
INDICATOR / PROFICIENCY	9-10.AP.PD.04.	While collaborating in a team, develop, test and refine programs that solve practical problems or allow self-expression.

Missouri Learning Standards

Technology Education

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

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Algorithms**
INDICATOR / PROFICIENCY	9-10.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.

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**

CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Program Development**
INDICATOR / PROFICIENCY	9-10.AP.PD.02.	Create a program by analyzing a problem and/or process, developing and documenting a solution, testing outcomes, debugging errors and adapting the program for a variety of users.
INDICATOR / PROFICIENCY	9-10.AP.PD.04.	While collaborating in a team, develop, test and refine programs that solve practical problems or allow self-expression.

Montana Content Standards

Mathematics

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

CONTENT STANDARD / DOMAIN	**MT.CC.MP.**	**Mathematical Practices**
BENCHMARK / STANDARD	MP.1.	Make sense of problems and persevere in solving them.
BENCHMARK / STANDARD	MP.2.	Reason abstractly and quantitatively.
BENCHMARK / STANDARD	MP.3.	Construct viable arguments and critique the reasoning of others.
BENCHMARK / STANDARD	MP.4.	Model with mathematics.
BENCHMARK / STANDARD	MP.6.	Attend to precision.
BENCHMARK / STANDARD	MP.7.	Look for and make use of structure.
BENCHMARK / STANDARD	MP.8.	Look for and express regularity in repeated reasoning.
CONTENT STANDARD / DOMAIN	**MT.CC.F.**	**Functions**
BENCHMARK / STANDARD	**F-IF.**	**Interpreting Functions**
GRADE LEVEL EXPECTATION / BENCHMARK		**Interpret functions that arise in applications in terms of the context.**
EXPECTATION	F-IF.6.	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Montana Content Standards

Mathematics

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

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

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

Montana Content Standards

Science

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

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

CONTENT STANDARD / DOMAIN	**MT.9-12.LS.**	**LIFE SCIENCE content standards for ninth through twelfth grades are that each student will:**
BENCHMARK / STANDARD	**9-12.LS.19.**	**Evaluate the evidence supporting claims that changes in environmental conditions may result in:**
GRADE LEVEL EXPECTATION / BENCHMARK	9-12.LS.19.3.	The extinction of other species

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

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

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

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Craft and Structure**

GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Integration of Knowledge**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments, and knowledge derived from American Indian cultures), noting when the findings support or contradict previous explanations or accounts.
CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
CONTENT STANDARD / DOMAIN	**MT.WHST.9-10.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION / BENCHMARK	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION	WHST.9-10.2.d.	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
CONTENT STANDARD / DOMAIN	**MT.WHST.9-10.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Production and Distribution of Writing**
GRADE LEVEL EXPECTATION / BENCHMARK	WHST.9-10.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GRADE LEVEL EXPECTATION / BENCHMARK	WHST.9-10.6.	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CONTENT STANDARD / DOMAIN	**MT.9-12.LS.**	**LIFE SCIENCE content standards for ninth through twelfth grades are that each student will:**
BENCHMARK / STANDARD	9-12.LS.8.	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem
BENCHMARK / STANDARD	9-12.LS.9.	Use mathematical or computational representations to support arguments about environmental factors that affect carrying capacity, biodiversity, and populations in ecosystems
BENCHMARK / STANDARD	9-12.LS.11.	Design, evaluate, and refine a solution for reducing the direct and indirect impacts of human activities on the environment and biodiversity and analyze scientific concepts used by American Indians to maintain healthy relationships with environmental resources
CONTENT STANDARD / DOMAIN	**MT.9-12.LS.**	**LIFE SCIENCE content standards for ninth through twelfth grades are that each student will:**
BENCHMARK / STANDARD	**9-12.LS.19.**	**Evaluate the evidence supporting claims that changes in environmental conditions may result in:**
GRADE LEVEL EXPECTATION / BENCHMARK	9-12.LS.19.3.	The extinction of other species
CONTENT STANDARD / DOMAIN	**MT.9-12.ESS.**	**EARTH AND SPACE SCIENCE content standards for ninth through twelfth grades are that students will:**
BENCHMARK / STANDARD	9-12.ESS.11.	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere
BENCHMARK / STANDARD	9-12.ESS.13.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate
BENCHMARK / STANDARD	9-12.ESS.15.	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity
BENCHMARK / STANDARD	9-12.ESS.16.	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios
BENCHMARK / STANDARD	9-12.ESS.17.	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, biodiversity, and investigate and explain how some American Indian tribes use scientific knowledge and practices in managing natural resources

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

CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Key Ideas and Details**

GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.2.	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.3.	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Craft and Structure**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.4.	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Integration of Knowledge**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments, and knowledge derived from American Indian cultures), noting when the findings support or contradict previous explanations or accounts.
CONTENT STANDARD / DOMAIN	**MT.RST.9-10.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.9-10.10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
CONTENT STANDARD / DOMAIN	**MT.WHST.9-10.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION / BENCHMARK	**WHST.9-10.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION	WHST.9-10.2.d.	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
CONTENT STANDARD / DOMAIN	**MT.WHST.9-10.**	**Writing Standards for Literacy in Science, and Technical Subjects**

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

Montana Content Standards

Technology Education

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

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

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

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

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

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

Montana Content Standards

Technology Education

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

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

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR NINTH THROUGH TWELFTH GRADE
BENCHMARK / STANDARD	**(5)**	**The computational thinker content standards for ninth-twelfth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(a)	identify problems suited for technology-assisted methods for data analysis, abstract models, and algorithmic thinking;

GRADE LEVEL EXPECTATION / BENCHMARK	(5)(b)	collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making;
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(d)	explain how automation works and use algorithmic thinking to develop a sequence of steps to create and test automate solutions.
CONTENT STANDARD / DOMAIN		**CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR NINTH THROUGH TWELFTH GRADE**
BENCHMARK / STANDARD	**(6)**	**The creative communicator content standards for ninth-twelfth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(6)(b)	create original works or responsibly repurpose or remix digital resources into new creative works;
CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR NINTH THROUGH TWELFTH GRADE**
BENCHMARK / STANDARD	**(1)**	**Computer science algorithms and programming standards for ninth through twelfth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(a)	create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(c)	implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(s)	plan and develop programs for broad audiences using a software life cycle process;
CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR NINTH THROUGH TWELFTH GRADE**
BENCHMARK / STANDARD	**(4)**	**Computer science impacts of computing standards for ninth through twelfth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(c)	test and refine computational artifacts to reduce bias and equity deficits;