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: 7, 8, Key Stage 3

Forward Education

Wildfire detection with Autonomous Vehicles

Idaho Content Standards

Mathematics

Grade **7** - Adopted: **2022**

STANDARD / COURSE		Seventh Grade 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	7.EE.	Expressions and Equations
CONTENT KNOWLEDGE AND SKILLS / GOAL	**7.EE.B.**	**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**

GLE / BIG IDEA	**7.EE.B.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
OBJECTIVE	7.EE.B.4.a.	Solve word problems leading to equations of the form □x + □ = □ and □(□+□)=□ , where □, □, and □ are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.

Idaho Content Standards

Mathematics

Grade **8** - Adopted: **2022**

STANDARD / COURSE		**Eighth Grade 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	**8.EE.**	**Expressions and Equations**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**8.EE.B.**	**Understand the connections between proportional relationships, lines, and linear equations.**
GLE / BIG IDEA	8.EE.B.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

Idaho Content Standards

Science

Grade **7** - Adopted: **2022**

STANDARD / COURSE	**MS-PS.**	**Physical Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-PS-3.**	**Energy**
GLE / BIG IDEA	MS-PS-3.3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

STANDARD / COURSE	**MS-PS.**	**Physical Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-PS-4.**	**Waves**
GLE / BIG IDEA	MS-PS-4.3.	Present qualitative scientific and technical information to support the claim that digitized signals (0s and 1s) can be used to encode and transmit information.

STANDARD / COURSE	**MS-LS.**	**Life Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-LS-2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / BIG IDEA	MS-LS-2.5.	Construct an argument supported by evidence that changes to physical or biological components of an ecosystem affect populations.
GLE / BIG IDEA	MS-LS-2.6.	Design and evaluate solutions for maintaining biodiversity and ecosystem services.

STANDARD / COURSE	**MS-ESS.**	**Earth and Space Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-ESS-2.**	**Earth's Systems**
GLE / BIG IDEA	MS-ESS-2.2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

STANDARD / COURSE	**MS-ESS.**	**Earth and Space Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-ESS-3.**	**Earth and Human Activity**
GLE / BIG IDEA	MS-ESS-3.2.	Analyze and interpret data on natural hazards to forecast future catastrophic events to mitigate their effects.
GLE / BIG IDEA	MS-ESS-3.3.	Apply scientific practices to design a method for monitoring human activity and increasing beneficial human influences on the environment.

GLE / BIG IDEA	MS-ESS-3.5.	Ask questions to interpret evidence of the factors that cause climate variability throughout Earth's history.

Idaho Content Standards

Science

Grade **8** - Adopted: **2022**

STANDARD / COURSE	**MS-PS.**	**Physical Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-PS-3.**	**Energy**
GLE / BIG IDEA	MS-PS-3.3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

STANDARD / COURSE	**MS-PS.**	**Physical Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-PS-4.**	**Waves**
GLE / BIG IDEA	MS-PS-4.3.	Present qualitative scientific and technical information to support the claim that digitized signals (0s and 1s) can be used to encode and transmit information.

STANDARD / COURSE	**MS-LS.**	**Life Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-LS-2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / BIG IDEA	MS-LS-2.5.	Construct an argument supported by evidence that changes to physical or biological components of an ecosystem affect populations.
GLE / BIG IDEA	MS-LS-2.6.	Design and evaluate solutions for maintaining biodiversity and ecosystem services.

STANDARD / COURSE	**MS-ESS.**	**Earth and Space Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-ESS-2.**	**Earth's Systems**
GLE / BIG IDEA	MS-ESS-2.2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

STANDARD / COURSE	**MS-ESS.**	**Earth and Space Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-ESS-3.**	**Earth and Human Activity**

GLE / BIG IDEA	MS-ESS-3.2.	Analyze and interpret data on natural hazards to forecast future catastrophic events to mitigate their effects.
GLE / BIG IDEA	MS-ESS-3.3.	Apply scientific practices to design a method for monitoring human activity and increasing beneficial human influences on the environment.
GLE / BIG IDEA	MS-ESS-3.5.	Ask questions to interpret evidence of the factors that cause climate variability throughout Earth's history.

Idaho Content Standards

Technology Education

Grade **7** - Adopted: **2017**

STANDARD / COURSE	**ID.ICT.6-8.4.**	**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.6-8.4.a.	Students engage in a design process and employ it to generate ideas, create innovative products or solve authentic problems.

STANDARD / COURSE	**ID.CS.6-8.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**6-8.NI.**	**Networks and the Internet (NI)**
GLE / BIG IDEA		**Communicating About Computing**
OBJECTIVE	6-8.NI.01.	Simulate the flow of information as packets on the Internet and networks (e.g. model using strings and paper, note passing). (Grades 6-8)

STANDARD / COURSE	**ID.CS.6-8.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**6-8.AP.**	**Algorithms and Programming (AP)**
GLE / BIG IDEA		**Creating Computational Artifacts**
OBJECTIVE	6-8.AP.03.	Interpret, modify, and analyze content-specific models used to run simulations (e.g. ecosystems, epidemics, spread of ideas). (Grades 6-8)

Idaho Content Standards

Technology Education

Grade **8** - Adopted: **2017**

STANDARD / COURSE	**ID.ICT.6-8.4.**	**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.6-8.4.a.	Students engage in a design process and employ it to generate ideas, create innovative products or solve authentic problems.

STANDARD / COURSE	**ID.CS.6-8.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**6-8.NI.**	**Networks and the Internet (NI)**
GLE / BIG IDEA		**Communicating About Computing**
OBJECTIVE	6-8.NI.01.	Simulate the flow of information as packets on the Internet and networks (e.g. model using strings and paper, note passing). (Grades 6-8)

STANDARD / COURSE	**ID.CS.6-8.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**6-8.AP.**	**Algorithms and Programming (AP)**
GLE / BIG IDEA		**Creating Computational Artifacts**
OBJECTIVE	6-8.AP.03.	Interpret, modify, and analyze content-specific models used to run simulations (e.g. ecosystems, epidemics, spread of ideas). (Grades 6-8)

Illinois Learning Standards

Mathematics

Grade **7** - 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.7.EE.**	**Expressions and Equations**
LEARNING STANDARD / DISCIPLINE		**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
DESCRIPTOR / CONTENT DISCIPLINE	**CC.7.EE.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
STANDARD	CC.7.EE.4.a.	Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Illinois Learning Standards

Mathematics

Grade **8** - 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.8.EE.**	**Expressions and Equations**
LEARNING STANDARD / DISCIPLINE		**Understand the connections between proportional relationships, lines, and linear equations.**
DESCRIPTOR / CONTENT DISCIPLINE	CC.8.EE.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Illinois Learning Standards

Science

Grade **7** - Adopted: **2014**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.MS-PS.**	**PHYSICAL SCIENCE**
LEARNING STANDARD / DISCIPLINE	**MS-PS3.**	**Energy**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.MS-LS.**	**LIFE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**MS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
STANDARD	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.MS-ESS.**	**EARTH AND SPACE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**MS-ESS2.**	**Earth's Systems**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**

STANDARD	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.MS-ESS.**	**EARTH AND SPACE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**MS-ESS3.**	**Earth and Human Activity**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
STANDARD	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
STANDARD	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.MS-ETS.**	**ENGINEERING DESIGN**
LEARNING STANDARD / DISCIPLINE	**MS-ETS1.**	**Engineering Design**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
STANDARD	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
STANDARD	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **7** - Adopted: **2010**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Key Ideas and Details**
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.RST.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.RST.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Craft and Structure**
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.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 6-8 texts and topics.
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.RST.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Integration of Knowledge and Ideas**
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.RST.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.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.6-8.RST.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Text Types and Purposes**
DESCRIPTOR / CONTENT DISCIPLINE	**CC.6-8.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
STANDARD	CC.6-8.WHST.2.d.	Use precise language and domain-specific vocabulary to inform about or explain the topic.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Production and Distribution of Writing**

DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.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.6-8.WHST.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Illinois Learning Standards

Science

Grade **8** - Adopted: **2014**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.MS-PS.**	**PHYSICAL SCIENCE**
LEARNING STANDARD / DISCIPLINE	**MS-PS3.**	**Energy**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.MS-LS.**	**LIFE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**MS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
STANDARD	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

STATE GOAL / DISCIPLINARY CONCEPT	**IL.MS-ESS.**	**EARTH AND SPACE SCIENCE**
LEARNING STANDARD / DISCIPLINE	**MS-ESS2.**	**Earth's Systems**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

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

LEARNING STANDARD / DISCIPLINE	**MS-ESS3.**	**Earth and Human Activity**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
STANDARD	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
STANDARD	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.MS-ETS.**	**ENGINEERING DESIGN**
LEARNING STANDARD / DISCIPLINE	**MS-ETS1.**	**Engineering Design**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
STANDARD	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
STANDARD	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **8** - Adopted: **2010**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Key Ideas and Details**
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.RST.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.RST.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**

LEARNING STANDARD / DISCIPLINE		**Craft and Structure**
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.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 6-8 texts and topics.
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.RST.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.RST.**	**Reading Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Integration of Knowledge and Ideas**
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.RST.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.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.6-8.RST.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Text Types and Purposes**
DESCRIPTOR / CONTENT DISCIPLINE	**CC.6-8.WHST.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
STANDARD	CC.6-8.WHST.2.d.	Use precise language and domain-specific vocabulary to inform about or explain the topic.
STATE GOAL / DISCIPLINARY CONCEPT	**IL.6-8.WHST.**	**Writing Standards for Literacy in Science and Technical Subjects**
LEARNING STANDARD / DISCIPLINE		**Production and Distribution of Writing**
DESCRIPTOR / CONTENT DISCIPLINE	CC.6-8.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.6-8.WHST.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Illinois Learning Standards
Technology Education
Grade **7** - 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	**6-8.NI.**	**Networks and the Internet**
STANDARD		**Network Communication and Organization**
EXPECTATION	6-8.NI.04.	Model the role of protocols in transmitting data across networks and the internet.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**6-8.DA.**	**Data and Analysis**
STANDARD		**Interference and Models**
EXPECTATION	6-8.DA.09.	Refine computational models based on the data they have generated.
EXPECTATION	6-8.DA.10.	Evaluate the misuse of data and impact of distorted outcomes.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		Computer Science Standards
DESCRIPTOR / CONTENT DISCIPLINE	6-8.AP.	Algorithms and Programming
STANDARD		Variables
EXPECTATION	6-8.AP.12.	Perform operations on student-created variables that possess descriptive names and represent different data types.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		Computer Science Standards
DESCRIPTOR / CONTENT DISCIPLINE	6-8.AP.	Algorithms and Programming
STANDARD		Control
EXPECTATION	6-8.AP.13.	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		Computer Science Standards
DESCRIPTOR / CONTENT DISCIPLINE	6-8.IC.	Impacts of Computing
STANDARD		Social Interactions
EXPECTATION	6-8.IC.23.	Collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		Computer Science Standards
DESCRIPTOR / CONTENT DISCIPLINE	6-8.ET.	Emerging and Future Technologies
STANDARD	6-8.ET.E.	Create new or original work by applying emerging technologies.

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.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.c.	Develop, test and refine prototypes as part of a cyclical design process.

STATE GOAL / DISCIPLINARY CONCEPT		ISTE Standards for Students
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.6.**	**Creative Communicators: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.6.c.	Communication complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models, or simulations.

STATE GOAL / DISCIPLINARY CONCEPT		ISTE Standards for Students
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.7.**	**Global Collaborators: Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.7.b.	Use collaborative technologies to work with others, including peers, experts, or community members to examine issues and problems from multiple viewpoints.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.7.d.	Explore local and global issues and use collaborative technologies to work with others to investigate solutions.

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	6-8.NI.	Networks and the Internet
STANDARD		Network Communication and Organization
EXPECTATION	6-8.NI.04.	Model the role of protocols in transmitting data across networks and the internet.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		Computer Science Standards
DESCRIPTOR / CONTENT DISCIPLINE	6-8.DA.	Data and Analysis
STANDARD		Interference and Models
EXPECTATION	6-8.DA.09.	Refine computational models based on the data they have generated.
EXPECTATION	6-8.DA.10.	Evaluate the misuse of data and impact of distorted outcomes.

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

DESCRIPTOR / CONTENT DISCIPLINE	**6-8.AP.**	**Algorithms and Programming**
STANDARD		**Variables**
EXPECTATION	6-8.AP.12.	Perform operations on student-created variables that possess descriptive names and represent different data types.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**6-8.AP.**	**Algorithms and Programming**
STANDARD		**Control**
EXPECTATION	6-8.AP.13.	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**6-8.IC.**	**Impacts of Computing**
STANDARD		**Social Interactions**
EXPECTATION	6-8.IC.23.	Collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**6-8.ET.**	**Emerging and Future Technologies**
STANDARD	6-8.ET.E.	Create new or original work by applying emerging technologies.

Grade **8** - 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.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.4.c.	Develop, test and refine prototypes as part of a cyclical design process.

STATE GOAL / DISCIPLINARY CONCEPT		ISTE Standards for Students
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.6.**	**Creative Communicators: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.6.c.	Communication complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models, or simulations.

STATE GOAL / DISCIPLINARY CONCEPT		ISTE Standards for Students
LEARNING STANDARD / DISCIPLINE	**IL.ISTE-S.7.**	**Global Collaborators: Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.**
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.7.b.	Use collaborative technologies to work with others, including peers, experts, or community members to examine issues and problems from multiple viewpoints.
DESCRIPTOR / CONTENT DISCIPLINE	ISTE-S.7.d.	Explore local and global issues and use collaborative technologies to work with others to investigate solutions.

Indiana Academic Standards

Mathematics

Grade **7** - 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.
STANDARD / STRAND		**Grade 7 Mathematics**
PROFICIENCY STATEMENT / SUBSTRAND		**Ratios and Proportional Reasoning – Students continue to use ratio and rate language, compute using unit rates, and use proportional relationships to solve real-world problems involving ratios and percents.**
INDICATOR / STANDARD	7.RP.3.	Represent real-world and other mathematical situations that involve proportional relationships. Write equations and draw graphs to represent these proportional relationships. Apply the definition of unit rate to y = mx. (E)
STANDARD / STRAND		**Grade 7 Mathematics**
PROFICIENCY STATEMENT / SUBSTRAND		**Algebra and Functions – Learning Outcome: Students use two variable equations, as well as graphs and tables, to model real-world proportional relationships and connect the constant of proportionality to the idea of slope.**
INDICATOR / STANDARD	7.AF.3.	Solve equations of the form px + q = r and p(x + q) = r fluently, where p, q, and r are specific rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E)
INDICATOR / STANDARD	7.AF.6.	Graph a line given its slope and a point on the line. Find the slope of a line given its graph. (E)

Indiana Academic Standards

Mathematics

Grade **8** - 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.
STANDARD / STRAND		**Grade 8 Mathematics**
PROFICIENCY STATEMENT / SUBSTRAND		**Algebra and Functions – Learning Outcome: Students understand the formal definition of a function, analyze linear functions in multiple representations, and differentiate between linear and nonlinear functions. Students also solve a system of linear equations in two unknowns.**
INDICATOR / STANDARD	8.AF.6.	Construct a function to model a linear relationship between two quantities given a verbal description, table of values, or graph. Within the context of a problem, describe the meaning of m (rate of change) and b (y-intercept) in y = mx + b. (E)
STANDARD / STRAND		**Grade 8 Mathematics**
PROFICIENCY STATEMENT / SUBSTRAND		**Data Analysis, Statistics, and Probability – Learning Outcome: Students begin to investigate and represent bivariate data using scatter plots.They build on their experience with univariate data. Students also build on the probability work in grade seven to examine and represent the probability and compound events.**
INDICATOR / STANDARD	8.DSP.4.	Define the probability of a compound event, just as with simple events, as the fraction of outcomes in the sample space for which the compound event occurs. Use appropriate terminology to describe independent, dependent, complementary, and mutually exclusive events. (E)

Indiana Academic Standards

Science

Grade **7** - 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		**Grade 7**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-PS3-3.**	**Energy**
INDICATOR / STANDARD	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
STANDARD / STRAND		**Grade 7**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ESS2-2.**	**Earth's Systems**
INDICATOR / STANDARD	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
STANDARD / STRAND		**Grade 7**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ESS3-2.**	**Earth and Human Activity**
INDICATOR / STANDARD	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
STANDARD / STRAND		**Grade 7**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ETS1-1.**	**Engineering Design**
INDICATOR / STANDARD	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
STANDARD / STRAND		**Grade 7**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ETS1-2.**	**Engineering Design**

INDICATOR / STANDARD	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

STANDARD / STRAND		**Grade 7**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ETS1-4.**	**Engineering Design**
INDICATOR / STANDARD	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Indiana Academic Standards

Science

Grade **8** - 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		**Grade 8**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ESS3-3.**	**Earth and Human Activity**
INDICATOR / STANDARD	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

STANDARD / STRAND		**Grade 8**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ESS3-5.**	**Earth and Human Activity**
INDICATOR / STANDARD	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over time.

STANDARD / STRAND		**Grade 8**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ETS1-1.**	**Engineering Design**

INDICATOR / STANDARD	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

STANDARD / STRAND		**Grade 8**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ETS1-2.**	**Engineering Design**

INDICATOR / STANDARD	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

STANDARD / STRAND		**Grade 8**
PROFICIENCY STATEMENT / SUBSTRAND	**MS-ETS1-4.**	**Engineering Design**

INDICATOR / STANDARD	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Indiana Academic Standards

Technology Education

Grade **7** - Adopted: **2023**

STANDARD / STRAND		**Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Computing Devices & Systems**
INDICATOR / STANDARD		**Learning Outcome: Students explain trade-offs, functionality, and accessibility of computer systems to improve the human-computer interaction.**

EXPECTATION / INDICATOR	6-8.CD.1.	Design projects that combine hardware and software components to collect and exchange data. (E)

STANDARD / STRAND		**Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs & Algorithms**
INDICATOR / STANDARD		**Learning Outcome: Students collaboratively design meaningful solutions for others by defining a problem, carefully considering the diverse needs and wants of the community, and testing whether solutions fit the criteria defined in the problem.**

EXPECTATION / INDICATOR	6-8.PA.1.	Design and iteratively develop programs that combine the following: sequencing, looping (including nested loops), conditionals (including compound conditionals), expressions, variables, functions, and parameters. (E)

STANDARD / STRAND		**Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Impact & Culture**
INDICATOR / STANDARD		**Learning Outcome: Students explain that society is faced with trade-offs due to the increasing globalization and automation that computing brings, as well as describe these trade-offs using multiple viewpoints from a diverse audience.**

EXPECTATION / INDICATOR	6-8.IC.3.	Collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact.

Indiana Academic Standards

Technology Education

Grade **8** - Adopted: **2023**

STANDARD / STRAND		**Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Computing Devices & Systems**
INDICATOR / STANDARD		**Learning Outcome: Students explain trade-offs, functionality, and accessibility of computer systems to improve the human-computer interaction.**
EXPECTATION / INDICATOR	6-8.CD.1.	Design projects that combine hardware and software components to collect and exchange data. (E)

STANDARD / STRAND		**Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs & Algorithms**
INDICATOR / STANDARD		**Learning Outcome: Students collaboratively design meaningful solutions for others by defining a problem, carefully considering the diverse needs and wants of the community, and testing whether solutions fit the criteria defined in the problem.**
EXPECTATION / INDICATOR	6-8.PA.1.	Design and iteratively develop programs that combine the following: sequencing, looping (including nested loops), conditionals (including compound conditionals), expressions, variables, functions, and parameters. (E)

STANDARD / STRAND		**Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Impact & Culture**
INDICATOR / STANDARD		**Learning Outcome: Students explain that society is faced with trade-offs due to the increasing globalization and automation that computing brings, as well as describe these trade-offs using multiple viewpoints from a diverse audience.**
EXPECTATION / INDICATOR	6-8.IC.3.	Collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact.

Iowa Student Standards

Mathematics

Grade **7** - 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	**7.EE.**	**Expressions and Equations 7.EE**
ESSENTIAL CONCEPT AND/OR SKILL	**7.EE.B.**	**Solve real-life and mathematical problems using numerical and algebraic expressions and equations. (7.EE.B)**
DETAILED DESCRIPTOR	**7.EE.B.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
GRADE LEVEL EXPECTATION	7.EE.B.4.a.	Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Iowa Student Standards

Mathematics

Grade **8** - 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	**8.EE.**	**Expressions and Equations 8.EE**
ESSENTIAL CONCEPT AND/OR SKILL	**8.EE.B.**	**Understand the connections between proportional relationships, lines, and linear equations. (8.EE.B)**
DETAILED DESCRIPTOR	8.EE.B.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. (8.EE.B.5) (DOK 1,2,3)

Iowa Student Standards

Science

Grade **7** - Adopted: **2015**

STRAND / COURSE	**IA.MS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

STRAND / COURSE	**IA.MS-ETS1.**	**Engineering Design**
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
DETAILED DESCRIPTOR	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
DETAILED DESCRIPTOR	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **7** - Adopted: **2016**

STRAND / COURSE	**IA.CC.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Key Ideas and Details**

DETAILED DESCRIPTOR	RST.6-8.2.	Determine the central ideas or conclusions of a distinct from prior knowledge or opinions. (RST.6-8.2.)
DETAILED DESCRIPTOR	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (RST.6-8.3.)
STRAND / COURSE	**IA.CC.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Craft and Structure**
DETAILED DESCRIPTOR	RST.6-8.4.	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 6–8 texts and topics. (RST.6-8.4.)
DETAILED DESCRIPTOR	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic. (RST.6-8.5.)
STRAND / COURSE	**IA.CC.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Integration of Knowledge and Ideas**
DETAILED DESCRIPTOR	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (RST.6-8.9.)
STRAND / COURSE	**IA.CC.RST.6-8.**	**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.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently. (RST.6-8.10.)
STRAND / COURSE	**IA.CC.WHST.6-8.**	**Writing Standards for Literacy Science, and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Text Types and Purposes**
DETAILED DESCRIPTOR	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
GRADE LEVEL EXPECTATION	WHST.6-8.2.d.	Use precise language and domain-specific vocabulary to inform about or explain the topic. (WHST.6-8.2.)
STRAND / COURSE	**IA.CC.WHST.6-8.**	**Writing Standards for Literacy Science, and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Production and Distribution of Writing**
DETAILED DESCRIPTOR	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (WHST.6-8.4.)

DETAILED DESCRIPTOR	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently. (WHST.6-8.6.)

Iowa Student Standards

Science

Grade **8** - Adopted: **2015**

STRAND / COURSE	IA.MS-PS3.	Energy
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

STRAND / COURSE	IA.MS-PS4.	Waves and Their Applications in Technologies for Information Transfer
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	MS-PS4-3.	Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

STRAND / COURSE	IA.MS-LS2.	Ecosystems: Interactions, Energy, and Dynamics
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

STRAND / COURSE	IA.MS-ESS3.	Earth and Human Activity
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
DETAILED DESCRIPTOR	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

STRAND / COURSE	IA.MS-ETS1.	Engineering Design
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

DETAILED DESCRIPTOR	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
DETAILED DESCRIPTOR	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **8** - Adopted: **2016**

STRAND / COURSE	**IA.CC.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Key Ideas and Details**
DETAILED DESCRIPTOR	RST.6-8.2.	Determine the central ideas or conclusions of a distinct from prior knowledge or opinions. (RST.6-8.2.)
DETAILED DESCRIPTOR	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (RST.6-8.3.)

STRAND / COURSE	**IA.CC.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Craft and Structure**
DETAILED DESCRIPTOR	RST.6-8.4.	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 6–8 texts and topics. (RST.6-8.4.)
DETAILED DESCRIPTOR	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic. (RST.6-8.5.)

STRAND / COURSE	**IA.CC.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Integration of Knowledge and Ideas**
DETAILED DESCRIPTOR	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (RST.6-8.9.)

STRAND / COURSE	**IA.CC.RST.6-8.**	**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.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently. (RST.6-8.10.)

STRAND / COURSE	**IA.CC.WHST.6-8.**	**Writing Standards for Literacy Science, and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Text Types and Purposes**

DETAILED DESCRIPTOR	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
GRADE LEVEL EXPECTATION	WHST.6-8.2.d.	Use precise language and domain-specific vocabulary to inform about or explain the topic. (WHST.6-8.2.)
STRAND / COURSE	**IA.CC.WHST.6-8.**	**Writing Standards for Literacy Science, and Technical Subjects**
ESSENTIAL CONCEPT AND/OR SKILL		**Production and Distribution of Writing**
DETAILED DESCRIPTOR	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (WHST.6-8.4.)
DETAILED DESCRIPTOR	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently. (WHST.6-8.6.)

Iowa Student Standards
Technology Education
Grade **7** - Adopted: **2018**

STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.2.**	**Level 2 (Ages 11-14)**
DETAILED DESCRIPTOR	**2-DA.**	**Data & Analysis**
GRADE LEVEL EXPECTATION		**Inference & Models**
EXAMPLE	2-DA-09.	Refine computational models based on the data they have generated. (P5.3, P4.4)
STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.2.**	**Level 2 (Ages 11-14)**
DETAILED DESCRIPTOR	**2-AP.**	**Algorithms & Programming**
GRADE LEVEL EXPECTATION		**Variables**
EXAMPLE	2-AP-11.	Create clearly named variables that represent different data types and perform operations on their values. (P5.1, P5.2)
STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.2.**	**Level 2 (Ages 11-14)**
DETAILED DESCRIPTOR	**2-AP.**	**Algorithms & Programming**
GRADE LEVEL EXPECTATION		**Control**

EXAMPLE	2-AP-12.	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. (P5.1, P5.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.2.	Level 2 (Ages 11-14)
DETAILED DESCRIPTOR	2-AP.	Algorithms & Programming
GRADE LEVEL EXPECTATION		Modularity
EXAMPLE	2-AP-13.	Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. (P3.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.2.	Level 2 (Ages 11-14)
DETAILED DESCRIPTOR	2-AP.	Algorithms & Programming
GRADE LEVEL EXPECTATION		Program Development
EXAMPLE	2-AP-18.	Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts. (P2.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.2.	Level 2 (Ages 11-14)
DETAILED DESCRIPTOR	2-IC.	Impacts of Computing
GRADE LEVEL EXPECTATION		Social Interactions
EXAMPLE	2-IC-22.	Collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact. (P2.4, P5.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.2.	Level 2 (Ages 11-14)
DETAILED DESCRIPTOR	2-IC.	Impacts of Computing
GRADE LEVEL EXPECTATION		Safety, Law, & Ethics
EXAMPLE	2-IC-23.	Describe tradeoffs between allowing information to be public and keeping information private and secure. (P7.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.2.	Level 2 (Ages 11-14)
DETAILED DESCRIPTOR	2-DA.	Data & Analysis
GRADE LEVEL EXPECTATION		Inference & Models
EXAMPLE	2-DA-09.	Refine computational models based on the data they have generated. (P5.3, P4.4)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.2.	Level 2 (Ages 11-14)
DETAILED DESCRIPTOR	2-AP.	Algorithms & Programming
GRADE LEVEL EXPECTATION		Variables
EXAMPLE	2-AP-11.	Create clearly named variables that represent different data types and perform operations on their values. (P5.1, P5.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.2.	Level 2 (Ages 11-14)
DETAILED DESCRIPTOR	2-AP.	Algorithms & Programming
GRADE LEVEL EXPECTATION		Control
EXAMPLE	2-AP-12.	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. (P5.1, P5.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards
ESSENTIAL CONCEPT AND/OR SKILL	CSTA.2.	Level 2 (Ages 11-14)
DETAILED DESCRIPTOR	2-AP.	Algorithms & Programming
GRADE LEVEL EXPECTATION		Modularity
EXAMPLE	2-AP-13.	Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. (P3.2)

STRAND / COURSE		CSTA K-12 Computer Science Standards

ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.2.**	**Level 2 (Ages 11-14)**
DETAILED DESCRIPTOR	**2-AP.**	**Algorithms & Programming**
GRADE LEVEL EXPECTATION		**Program Development**
EXAMPLE	2-AP-18.	Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts. (P2.2)

STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.2.**	**Level 2 (Ages 11-14)**
DETAILED DESCRIPTOR	**2-IC.**	**Impacts of Computing**
GRADE LEVEL EXPECTATION		**Social Interactions**
EXAMPLE	2-IC-22.	Collaborate with many contributors through strategies such as crowdsourcing or surveys when creating a computational artifact. (P2.4, P5.2)

STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.2.**	**Level 2 (Ages 11-14)**
DETAILED DESCRIPTOR	**2-IC.**	**Impacts of Computing**
GRADE LEVEL EXPECTATION		**Safety, Law, & Ethics**
EXAMPLE	2-IC-23.	Describe tradeoffs between allowing information to be public and keeping information private and secure. (P7.2)

Kansas Academic Standards

Mathematics

Grade **7** - 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	**7.EE.**	**Expressions and Equations**
BENCHMARK		**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
INDICATOR / PROFICIENCY LEVEL	**7.EE.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct two-step equations and inequalities to solve problems by reasoning about the quantities.**
INDICATOR	7.EE.4a.	Solve word problems leading to equations of the form px + q = r, and p(x + q) = r where p, q, and r are specific rational numbers. Solve equations of these forms fluently (efficiently, accurately, and flexibly). Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Kansas Academic Standards

Mathematics

Grade **8** - 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	**8.EE.**	**Expressions and Equations**
BENCHMARK		**Understand the connections between proportional relationships, lines, and linear equations.**
INDICATOR / PROFICIENCY LEVEL	8.EE.4.	Graph proportional relationships, interpreting its unit rate as the slope (m) of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Kansas Academic Standards

Science

Grade **7** - Adopted: **2013**

STANDARD	**KS.MS-PS.**	**PHYSICAL SCIENCE**
BENCHMARK	**MS-PS3.**	**Energy**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
INDICATOR	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

STANDARD	KS.MS-LS.	LIFE SCIENCE
BENCHMARK	MS-LS2.	Ecosystems: Interactions, Energy, and Dynamics
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
INDICATOR	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
INDICATOR	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

STANDARD	KS.MS-ESS.	EARTH AND SPACE SCIENCE
BENCHMARK	MS-ESS2.	Earth's Systems
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
INDICATOR	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

STANDARD	KS.MS-ESS.	EARTH AND SPACE SCIENCE
BENCHMARK	MS-ESS3.	Earth and Human Activity
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
INDICATOR	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
INDICATOR	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
INDICATOR	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

STANDARD	KS.MS-ETS.	ENGINEERING DESIGN
BENCHMARK	MS-ETS1.	Engineering Design
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
INDICATOR	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

INDICATOR	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
INDICATOR	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **7** - Adopted: **2010**

STANDARD	**KS.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Key Ideas and Details**
INDICATOR / PROFICIENCY LEVEL	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
INDICATOR / PROFICIENCY LEVEL	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

STANDARD	**KS.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Craft and Structure**
INDICATOR / PROFICIENCY LEVEL	RST.6-8.4.	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 6-8 texts and topics.
INDICATOR / PROFICIENCY LEVEL	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

STANDARD	**KS.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Integration of Knowledge and Ideas**
INDICATOR / PROFICIENCY LEVEL	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

STANDARD	**KS.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Range of Reading and Level of Text Complexity**
INDICATOR / PROFICIENCY LEVEL	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

STANDARD	**KS.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Text Types and Purposes**
INDICATOR / PROFICIENCY LEVEL	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**

INDICATOR	WHST.6-8.2(d)	Use precise language and domain-specific vocabulary to inform about or explain the topic.
STANDARD	**KS.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Production and Distribution of Writing**
INDICATOR / PROFICIENCY LEVEL	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
INDICATOR / PROFICIENCY LEVEL	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Kansas Academic Standards

Science

Grade **8** - Adopted: **2013**

STANDARD	**KS.MS-PS.**	**PHYSICAL SCIENCE**
BENCHMARK	**MS-PS3.**	**Energy**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
INDICATOR	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
STANDARD	**KS.MS-LS.**	**LIFE SCIENCE**
BENCHMARK	**MS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
INDICATOR	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
INDICATOR	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
STANDARD	**KS.MS-ESS.**	**EARTH AND SPACE SCIENCE**
BENCHMARK	**MS-ESS2.**	**Earth's Systems**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
INDICATOR	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
STANDARD	**KS.MS-ESS.**	**EARTH AND SPACE SCIENCE**

BENCHMARK	**MS-ESS3.**	**Earth and Human Activity**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
INDICATOR	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
INDICATOR	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
INDICATOR	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
STANDARD	**KS.MS-ETS.**	**ENGINEERING DESIGN**
BENCHMARK	**MS-ETS1.**	**Engineering Design**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
INDICATOR	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
INDICATOR	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
INDICATOR	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **8** - Adopted: **2010**

STANDARD	**KS.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Key Ideas and Details**
INDICATOR / PROFICIENCY LEVEL	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
INDICATOR / PROFICIENCY LEVEL	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
STANDARD	**KS.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Craft and Structure**
INDICATOR / PROFICIENCY LEVEL	RST.6-8.4.	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 6-8 texts and topics.

INDICATOR / PROFICIENCY LEVEL	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

STANDARD	**KS.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Integration of Knowledge and Ideas**

INDICATOR / PROFICIENCY LEVEL	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

STANDARD	**KS.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Range of Reading and Level of Text Complexity**

INDICATOR / PROFICIENCY LEVEL	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

STANDARD	**KS.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Text Types and Purposes**
INDICATOR / PROFICIENCY LEVEL	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**

INDICATOR	WHST.6-8.2(d)	Use precise language and domain-specific vocabulary to inform about or explain the topic.

STANDARD	**KS.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
BENCHMARK		**Production and Distribution of Writing**

INDICATOR / PROFICIENCY LEVEL	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

INDICATOR / PROFICIENCY LEVEL	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Kansas Academic Standards

Technology Education

Grade **7** - Adopted: **2019**

STANDARD		**Computer Science Standards - Middle Grades**
BENCHMARK		**Computing Systems**
INDICATOR / PROFICIENCY LEVEL		**Hardware & Software**

INDICATOR	MG.CS.HS.01.	Model a computing system involving multiple considerations and potential tradeoffs of software and hardware, such as functionality, cost, size, speed, accessibility, and aesthetics

STANDARD		**Computer Science Standards - Middle Grades**
BENCHMARK		**Data Analysis**
INDICATOR / PROFICIENCY LEVEL		**Inference & Models**
INDICATOR	MG.DA.IM.01.	Refine computational models based on the data generated by the models.

STANDARD		**Computer Science Standards - Middle Grades**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Variables**
INDICATOR	MG.AP.V.01.	Create programs using variables with purposeful and thoughtful naming conventions for identifiers to improve program readability.

STANDARD		**Computer Science Standards - Middle Grades**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Control**
INDICATOR	MG.AP.C.01.	Develop programs that utilize combinations of nested repetition, compound conditionals, procedures without parameters, and the manipulation of variables representing different data types.

Kansas Academic Standards

Technology Education

Grade **8** - Adopted: **2019**

STANDARD		**Computer Science Standards - Middle Grades**
BENCHMARK		**Computing Systems**
INDICATOR / PROFICIENCY LEVEL		**Hardware & Software**
INDICATOR	MG.CS.HS.01.	Model a computing system involving multiple considerations and potential tradeoffs of software and hardware, such as functionality, cost, size, speed, accessibility, and aesthetics

STANDARD		**Computer Science Standards - Middle Grades**
BENCHMARK		**Data Analysis**
INDICATOR / PROFICIENCY LEVEL		**Inference & Models**
INDICATOR	MG.DA.IM.01.	Refine computational models based on the data generated by the models.

STANDARD		**Computer Science Standards - Middle Grades**
BENCHMARK		**Algorithms and Programing**

INDICATOR / PROFICIENCY LEVEL		**Variables**
INDICATOR	MG.AP.V.01.	Create programs using variables with purposeful and thoughtful naming conventions for identifiers to improve program readability.
STANDARD		**Computer Science Standards - Middle Grades**
BENCHMARK		**Algorithms and Programing**
INDICATOR / PROFICIENCY LEVEL		**Control**
INDICATOR	MG.AP.C.01.	Develop programs that utilize combinations of nested repetition, compound conditionals, procedures without parameters, and the manipulation of variables representing different data types.

Kentucky Academic Standards

Mathematics

Grade **7** - 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		**Expressions and Equations**
CATEGORY / GOAL		**Cluster: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
STANDARD / ORGANIZER	**KY.7.EE.4.**	**Use variables to represent quantities in a real-world or mathematical problem and construct equations and inequalities to solve problems by reasoning about the quantities. (MP.2, MP.4)**
EXPECTATION	KY.7.EE.4.a.	Solve word problems leading to equations of the form px+q=r and p(x+q)=r, where p, q and r are specific rational numbers. Solve equations of these forms. Graph the solution set of the equality and interpret it in context of the problem.

Kentucky Academic Standards

Mathematics

Grade **8** - 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		**Expressions and Equations**
CATEGORY / GOAL		**Cluster: Understand the connections between proportional relationships, lines and linear equations.**
STANDARD / ORGANIZER	KY.8.EE.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. (MP.2, MP.3, MP.4)

Kentucky Academic Standards

Science

Grade **7** - Adopted: **2022**

STRAND		Seventh Grade
CATEGORY / GOAL	7-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
STRAND		**6-8 Engineering Design**
CATEGORY / GOAL	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
CATEGORY / GOAL	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
CATEGORY / GOAL	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Kentucky Academic Standards

Science

Grade **8** - Adopted: **2022**

STRAND		Eighth Grade
CATEGORY / GOAL	8-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
CATEGORY / GOAL	8-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
CATEGORY / GOAL	8-ESS3-2.	Analyze and interpret data to forecast future catastrophic events to inform the development of technologies to mitigate the effects of natural hazards.
CATEGORY / GOAL	8-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
CATEGORY / GOAL	8-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
STRAND		**6-8 Engineering Design**
CATEGORY / GOAL	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
CATEGORY / GOAL	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
CATEGORY / GOAL	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Kentucky Academic Standards

Technology Education

Grade **7** - Adopted: **2018**

STRAND		Kentucky Academic Standards (KAS) for Computer Science
CATEGORY / GOAL		**Data and Analysis**
STANDARD / ORGANIZER		**Inference & Models**
EXPECTATION	M-DA-03.	Refine computational models based on the data they have generated. A model may be a programmed simulation of events or a representation of how various data is related. Refining a model involves choosing relevant data points, analyzing how data points relate to each other, and evaluating the accuracy of the data.
STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Algorithms and Programming**
STANDARD / ORGANIZER		**Variables**

EXPECTATION	M-AP-05.	Create clearly named variables that represent different data types and perform operations on their values. A variable is like a container with a name, in which the contents may change, but the name (identifier) does not. When planning and developing programs decide when and how to declare and name new variables. Determine the appropriate type and size of variable to use. Use naming conventions to improve program readability.

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Algorithms and Programming**
STANDARD / ORGANIZER		**Control**

EXPECTATION	M-AP-07.	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. Control structures can be combined in many ways. Nested loops are loops placed within other loops. Compound conditional statements use two or more conditions (e.g., AND, OR, and NOT) in a logical relationship. Nesting conditionals within one another allows the result of one conditional to lead to another.

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

EXPECTATION	M-AP-12.	Develop a process creating a computational artifact that leads to a minimum viable product followed by reflection, analysis, and iteration. Complex programs are designed as systems of interacting modules, each with a specific role, coordinating for a common overall purpose. These modules can be procedures within a program; combinations of data and procedures; or independent, but interrelated, programs. The development of complex programs is aided by resources such as libraries and tools to edit and manage parts of the program.

Kentucky Academic Standards
Technology Education
Grade **8** - Adopted: **2018**

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Data and Analysis**
STANDARD / ORGANIZER		**Inference & Models**

EXPECTATION	M-DA-03.	Refine computational models based on the data they have generated. A model may be a programmed simulation of events or a representation of how various data is related. Refining a model involves choosing relevant data points, analyzing how data points relate to each other, and evaluating the accuracy of the data.

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Algorithms and Programming**
STANDARD / ORGANIZER		**Variables**

EXPECTATION	M-AP-05.	Create clearly named variables that represent different data types and perform operations on their values. A variable is like a container with a name, in which the contents may change, but the name (identifier) does not. When planning and developing programs decide when and how to declare and name new variables. Determine the appropriate type and size of variable to use. Use naming conventions to improve program readability.

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**

CATEGORY / GOAL		**Algorithms and Programming**
STANDARD / ORGANIZER		**Control**
EXPECTATION	M-AP-07.	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. Control structures can be combined in many ways. Nested loops are loops placed within other loops. Compound conditional statements use two or more conditions (e.g., AND, OR, and NOT) in a logical relationship. Nesting conditionals within one another allows the result of one conditional to lead to another.
STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Algorithms and Programming**
STANDARD / ORGANIZER		**Program Development**
EXPECTATION	M-AP-12.	Develop a process creating a computational artifact that leads to a minimum viable product followed by reflection, analysis, and iteration. Complex programs are designed as systems of interacting modules, each with a specific role, coordinating for a common overall purpose. These modules can be procedures within a program; combinations of data and procedures; or independent, but interrelated, programs. The development of complex programs is aided by resources such as libraries and tools to edit and manage parts of the program.

Louisiana Academic Standards

Mathematics

Grade **7** - 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	**7.EE.**	**Expressions and Equations**
TITLE	**7.EE.B.**	**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
PERFORMANCE EXPECTATION	**7.EE.B.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
INDICATOR	7.EE.B.4.a.	Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Mathematics

Grade **8** - 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	**8.EE.**	**Expressions and Equations**
TITLE	**8.EE.B.**	**Understand the connections between proportional relationships, lines, and linear equations.**
PERFORMANCE EXPECTATION	8.EE.B.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Louisiana Academic Standards

Science

Grade **7** - Adopted: **2017**

STRAND	LA.SC.7.	Science – Grade 7
TITLE	**7-MS-ESS3.**	**EARTH AND HUMAN ACTIVITY**
PERFORMANCE EXPECTATION	7-MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

STRAND	LA.SC.7.	Science – Grade 7
TITLE	**7-MS-LS2.**	**ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS**
PERFORMANCE EXPECTATION	7-MS-LS2-5.	Undertake a design project that assists in maintaining diversity and ecosystem services.
PERFORMANCE EXPECTATION	7-MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Louisiana Academic Standards

Science

Grade **8** - Adopted: **2017**

STRAND	LA.SC.8.	Science – Grade 8
TITLE	8-MS-PS3.	ENERGY
PERFORMANCE EXPECTATION	8-MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

STRAND	LA.SC.8.	Science – Grade 8
TITLE	8-MS-ESS2.	EARTH'S SYSTEMS
PERFORMANCE EXPECTATION	8-MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

STRAND	LA.SC.8.	Science – Grade 8
TITLE	8-MS-ESS3.	EARTH AND HUMAN ACTIVITY
PERFORMANCE EXPECTATION	8-MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
PERFORMANCE EXPECTATION	8-MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.

Louisiana Academic Standards

Technology Education

Grade **7** - Adopted: **2008**

STRAND	LA.ET.	Educational Technology
TITLE		Performance Indicators for Grades 6-8
PERFORMANCE EXPECTATION	ET.B.	Describe and illustrate a grade level appropriate concept or process using a model, simulation, or concept-mapping software (1, 2)

Louisiana Academic Standards

Technology Education

Grade **8** - Adopted: **2008**

STRAND	LA.ET.	Educational Technology
TITLE		Performance Indicators for Grades 6-8
PERFORMANCE EXPECTATION	ET.B.	Describe and illustrate a grade level appropriate concept or process using a model, simulation, or concept-mapping software (1, 2)

Maine Learning Results

Mathematics

Grade **7** - 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 – Expressions and Equations**
CATEGORY / PERFORMANCE INDICATOR	**AR.EA.5**	**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
STANDARD	**7.EE.B.4:**	**Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
EXPECTATION	7.EE.B.4a:	Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Maine Learning Results

Mathematics

Grade **8** - 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 – Expressions and Equations**
CATEGORY / PERFORMANCE INDICATOR	**AR.EA.7**	**Understand the connections between proportional relationships, lines, and linear equations.**
STANDARD	8.EE.B.5:	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Maine Learning Results

Science

Grade **7** - Adopted: **2019**

STRAND / DOMAIN	**NGSS.MS-PS.**	**PHYSICAL SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**MS-PS3.**	**Energy**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
STRAND / DOMAIN	**NGSS.MS-LS.**	**LIFE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**MS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

EXPECTATION	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

STRAND / DOMAIN	**NGSS.MS-ESS.**	**EARTH AND SPACE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**MS-ESS2.**	**Earth's Systems**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

STRAND / DOMAIN	**NGSS.MS-ESS.**	**EARTH AND SPACE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**MS-ESS3.**	**Earth and Human Activity**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
EXPECTATION	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
EXPECTATION	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

STRAND / DOMAIN	**NGSS.MS-ETS.**	**ENGINEERING DESIGN**
CATEGORY / PERFORMANCE INDICATOR	**MS-ETS1.**	**Engineering Design**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
EXPECTATION	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
EXPECTATION	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Maine Learning Results

Science

Grade **8** - Adopted: **2019**

STRAND / DOMAIN	**NGSS.MS-PS.**	**PHYSICAL SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**MS-PS3.**	**Energy**

STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
STRAND / DOMAIN	**NGSS.MS-LS.**	**LIFE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**MS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
EXPECTATION	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
STRAND / DOMAIN	**NGSS.MS-ESS.**	**EARTH AND SPACE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**MS-ESS2.**	**Earth's Systems**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
STRAND / DOMAIN	**NGSS.MS-ESS.**	**EARTH AND SPACE SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**MS-ESS3.**	**Earth and Human Activity**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
EXPECTATION	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
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STRAND / DOMAIN	**NGSS.MS-ETS.**	**ENGINEERING DESIGN**
CATEGORY / PERFORMANCE INDICATOR	**MS-ETS1.**	**Engineering Design**
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EXPECTATION	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Maryland College and Career-Ready Standards

Mathematics

Grade **7** - Adopted: **2010**

STRAND / TOPIC / STANDARD		**Grade 7 Math**
TOPIC / INDICATOR	**7.EE.**	**Expressions and Equations**
INDICATOR / PROFICIENCY LEVEL	**7.EE.B.**	**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
OBJECTIVE	**7.EE.B.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
EXPECTATION	7.EE.B.4.a.	Solve word problems leading to equations of the form px + q = r and p(x + q) = r , where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Maryland College and Career-Ready Standards

Mathematics

Grade **8** - Adopted: **2010**

STRAND / TOPIC / STANDARD		**Grade 8 Math**
TOPIC / INDICATOR	**8.EE.**	**Expressions and Equations**
INDICATOR / PROFICIENCY LEVEL	**8.EE.B.**	**Understand the connections between proportional relationships, lines, and linear equations.**
OBJECTIVE	8.EE.B.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Maryland College and Career-Ready Standards

Science

Grade **7** - Adopted: **2013**

STRAND / TOPIC / STANDARD	**NGSS.MS-PS.**	**PHYSICAL SCIENCE**
TOPIC / INDICATOR	**MS-PS3.**	**Energy**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

STRAND / TOPIC / STANDARD	NGSS.MS-LS.	LIFE SCIENCE
TOPIC / INDICATOR	MS-LS2.	Ecosystems: Interactions, Energy, and Dynamics
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
OBJECTIVE	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
OBJECTIVE	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

STRAND / TOPIC / STANDARD	NGSS.MS-ESS.	EARTH AND SPACE SCIENCE
TOPIC / INDICATOR	MS-ESS2.	Earth's Systems
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
OBJECTIVE	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

STRAND / TOPIC / STANDARD	NGSS.MS-ESS.	EARTH AND SPACE SCIENCE
TOPIC / INDICATOR	MS-ESS3.	Earth and Human Activity
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
OBJECTIVE	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
OBJECTIVE	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
OBJECTIVE	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

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

OBJECTIVE	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
OBJECTIVE	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
OBJECTIVE	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Maryland College and Career-Ready Standards

Science

Grade **8** - Adopted: **2013**

STRAND / TOPIC / STANDARD	**NGSS.MS-PS.**	**PHYSICAL SCIENCE**
TOPIC / INDICATOR	**MS-PS3.**	**Energy**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
STRAND / TOPIC / STANDARD	**NGSS.MS-LS.**	**LIFE SCIENCE**
TOPIC / INDICATOR	**MS-LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
OBJECTIVE	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
STRAND / TOPIC / STANDARD	**NGSS.MS-ESS.**	**EARTH AND SPACE SCIENCE**
TOPIC / INDICATOR	**MS-ESS2.**	**Earth's Systems**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
STRAND / TOPIC / STANDARD	**NGSS.MS-ESS.**	**EARTH AND SPACE SCIENCE**

TOPIC / INDICATOR	**MS-ESS3.**	**Earth and Human Activity**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
OBJECTIVE	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
OBJECTIVE	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
STRAND / TOPIC / STANDARD	**NGSS.MS-ETS.**	**ENGINEERING DESIGN**
TOPIC / INDICATOR	**MS-ETS1.**	**Engineering Design**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
OBJECTIVE	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
OBJECTIVE	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Maryland College and Career-Ready Standards

Technology Education

Grade **7** - Adopted: **2018**

STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Data and Analysis**
INDICATOR / PROFICIENCY LEVEL		**Subconcept: Inference & Models**
OBJECTIVE	7.DA.IM.01.	Verify a model's accuracy by comparing the results with observed data.
STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Algorithms and Programming**

INDICATOR / PROFICIENCY LEVEL		**Subconcept: Variables**
OBJECTIVE	7.AP.V.01.	Create clearly named variables that represent different types of data.
STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Algorithms and Programming**
INDICATOR / PROFICIENCY LEVEL		**Subconcept: Control**
OBJECTIVE	7.AP.C.01.	Develop secure programs that utilize combinations of loops, compound conditionals, and the manipulation of variables representing different data types.

Grade **7** - Adopted: **2016**

STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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		Design a model that demonstrates how subsystems and system elements interact within systems.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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		**Explain how the design process is an iterative, systematic approach to problem solving that includes collaboratively:**
EXPECTATION		Making a Model or a Prototype – students will be able to develop conceptual, mathematical, or physical models and/or a prototype that performs the final solution and can be used for testing/evaluating. This includes the creation of two and three dimensional scale drawings.
EXPECTATION		Testing and Evaluating Design Using Specifications – students will be able to use establish specifications to assess their design product.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**

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 the design process to develop solutions to real-world problems.
OBJECTIVE		Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of a problem (MS-ETS1-2).
OBJECTIVE		Discriminate between ethical and unethical engineering practices.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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		**Analyze the function of select core technologies in the designed world.**
OBJECTIVE		**Energy and Power Technologies**
EXPECTATION		Design, construct, and test a device that either minimizes or maximizes energy transfer (MS-PS3-3).
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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		**Analyze the function of select core technologies in the designed world.**
OBJECTIVE		**Construction Technologies**
EXPECTATION		Analyze the type of and purpose for a variety of structures.
EXPECTATION		Analyze factors used in the selection of designs for structures (e.g. laws, codes, style, cost, climate, function) (STL, 20F).
EXPECTATION		Examine different subsystems within buildings.
EXPECTATION		Analyze the maintenance of structures and subsystems.
EXPECTATION		Assess the role that community planning, laws, and regulation have in the development and maintenance of structures.
EXPECTATION		Design, use, and assess building material.

EXPECTATION		Design and create models of structures.

STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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		Use modeling and simulation to represent and understand natural phenomena.

Maryland College and Career-Ready Standards

Technology Education

Grade **8** - Adopted: **2018**

STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Data and Analysis**
INDICATOR / PROFICIENCY LEVEL		**Subconcept: Inference & Models**
OBJECTIVE	8.DA.IM.01.	Refine existing or develop and implement new computational models based on observed and generated data.

STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Algorithms and Programming**
INDICATOR / PROFICIENCY LEVEL		**Subconcept: Variables**
OBJECTIVE	8.AP.V.01.	Create clearly named variables of different data types that utilize naming conventions to improve program readability; perform operations on variable values.

STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Algorithms and Programming**
INDICATOR / PROFICIENCY LEVEL		**Subconcept: Control**
OBJECTIVE	8.AP.C.01.	Develop secure programs that utilize combinations of nested loops, compound conditionals, procedures with and without parameters, and the manipulation of variables representing different data types.

Grade **8** - Adopted: **2016**

STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**

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		Design a model that demonstrates how subsystems and system elements interact within systems.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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		**Explain how the design process is an iterative, systematic approach to problem solving that includes collaboratively:**
EXPECTATION		Making a Model or a Prototype – students will be able to develop conceptual, mathematical, or physical models and/or a prototype that performs the final solution and can be used for testing/evaluating. This includes the creation of two and three dimensional scale drawings.
EXPECTATION		Testing and Evaluating Design Using Specifications – students will be able to use establish specifications to assess their design product.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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 the design process to develop solutions to real-world problems.
OBJECTIVE		Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of a problem (MS-ETS1-2).
OBJECTIVE		Discriminate between ethical and unethical engineering practices.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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		**Analyze the function of select core technologies in the designed world.**
OBJECTIVE		**Energy and Power Technologies**
EXPECTATION		Design, construct, and test a device that either minimizes or maximizes energy transfer (MS-PS3-3).
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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		**Analyze the function of select core technologies in the designed world.**
OBJECTIVE		**Construction Technologies**
EXPECTATION		Analyze the type of and purpose for a variety of structures.
EXPECTATION		Analyze factors used in the selection of designs for structures (e.g. laws, codes, style, cost, climate, function) (STL, 20F).
EXPECTATION		Examine different subsystems within buildings.
EXPECTATION		Analyze the maintenance of structures and subsystems.
EXPECTATION		Assess the role that community planning, laws, and regulation have in the development and maintenance of structures.
EXPECTATION		Design, use, and assess building material.
EXPECTATION		Design and create models of structures.
STRAND / TOPIC / STANDARD		**Maryland Technology Education Standards: Grades 6-8**
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		Use modeling and simulation to represent and understand natural phenomena.

Massachusetts Curriculum Frameworks

Mathematics

Grade **7** - 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.7.EE.**	**Expressions and Equations**
STRAND	**7.EE.B.**	**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
STANDARD / CONCEPT / SKILL	**7.EE.B.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
INDICATOR	7.EE.B.4.a.	Solve word problems leading to equations of the form px + q = r and p(x ÷ q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Massachusetts Curriculum Frameworks

Mathematics

Grade **8** - 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.8.EE.**	**Expressions and Equations**
STRAND	**8.EE.B.**	**Understand the connections between proportional relationships, lines, and linear equations.**

STANDARD / CONCEPT / SKILL	8.EE.B.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Massachusetts Curriculum Frameworks

Science

Grade **7** - Adopted: **2016**

FOCUS / COURSE	**MA.7-ESS.**	**Grade 7: Earth and Space Sciences**
STRAND	**ESS2.**	**Earth's Systems**
STANDARD / CONCEPT / SKILL	7.MS-ESS2-2.	Construct an explanation based on evidence for how Earth's surface has changed over scales that range from local to global in size.

FOCUS / COURSE	**MA.7-ESS.**	**Grade 7: Earth and Space Sciences**
STRAND	**ESS3.**	**Earth and Human Activity**
STANDARD / CONCEPT / SKILL	7.MS-ESS3-2.	Obtain and communicate information on how data from past geologic events are analyzed for patterns and used to forecast the location and likelihood of future catastrophic events.
STANDARD / CONCEPT / SKILL	7.MS-ESS3-4.	Construct an argument supported by evidence that human activities and technologies can mitigate the impact of increases in human population and per capita consumption of natural resources on the environment.

FOCUS / COURSE	**MA.7-LS.**	**Grade 7: Life Science**
STRAND	**LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
STANDARD / CONCEPT / SKILL	7.MS-LS2-4.	Analyze data to provide evidence that disruptions (natural or human-made) to any physical or biological component of an ecosystem can lead to shifts in all its populations.
STANDARD / CONCEPT / SKILL	7.MS-LS2-5.	Evaluate competing design solutions for protecting an ecosystem. Discuss benefits and limitations of each design.

FOCUS / COURSE	**MA.7-PS.**	**Grade 7: Physical Science**
STRAND	**PS3.**	**Energy**
STANDARD / CONCEPT / SKILL	7.MS-PS3-3.	Apply scientific principles of energy and heat transfer to design, construct, and test a device to minimize or maximize thermal energy transfer.
STANDARD / CONCEPT / SKILL	7.MS-PS3-6(MA).	Use a model to explain how thermal energy is transferred out of hotter regions or objects and into colder ones by convection, conduction, and radiation.

FOCUS / COURSE	**MA.7-ETS.**	**Grade 7: Technology/Engineering**

STRAND	**ETS1.**	**Engineering Design**
STANDARD / CONCEPT / SKILL	7.MS-ETS1-2.	Evaluate competing solutions to a given design problem using a decision matrix to determine how well each meets the criteria and constraints of the problem. Use a model of each solution to evaluate how variations in one or more design features, including size, shape, weight, or cost, may affect the function or effectiveness of the solution.
STANDARD / CONCEPT / SKILL	7.MS-ETS1-4.	Generate and analyze data from iterative testing and modification of a proposed object, tool, or process to optimize the object, tool, or process for its intended purpose.
STANDARD / CONCEPT / SKILL	7.MS-ETS1-7(MA).	Construct a prototype of a solution to a given design problem.

Grade **7** - Adopted: **2010**

FOCUS / COURSE	**MA.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND		**Key Ideas and Details**
STANDARD / CONCEPT / SKILL	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
STANDARD / CONCEPT / SKILL	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

FOCUS / COURSE	**MA.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND		**Craft and Structure**
STANDARD / CONCEPT / SKILL	RST.6-8.4.	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 6-8 texts and topics.
STANDARD / CONCEPT / SKILL	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

FOCUS / COURSE	**MA.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND		**Integration of Knowledge and Ideas**
STANDARD / CONCEPT / SKILL	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

FOCUS / COURSE	**MA.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND		**Range of Reading and Level of Text Complexity**
STANDARD / CONCEPT / SKILL	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

FOCUS / COURSE	**MA.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND		**Text Types and Purposes**
STANDARD / CONCEPT / SKILL	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
INDICATOR	WHST.6-8.2(d)	Use precise language and domain-specific vocabulary to inform about or explain the topic.

FOCUS / COURSE	**MA.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND		**Production and Distribution of Writing**
STANDARD / CONCEPT / SKILL	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
STANDARD / CONCEPT / SKILL	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Massachusetts Curriculum Frameworks

Science

Grade **8** - Adopted: **2016**

FOCUS / COURSE	**MA.8-ESS.**	**Grade 8: Earth and Space Sciences**
STRAND	**ESS3.**	**Earth and Human Activity**
STANDARD / CONCEPT / SKILL	8.MS-ESS3-5.	Examine and interpret data to describe the role that human activities have played in causing the rise in global temperatures over the past century.

Grade **8** - Adopted: **2010**

FOCUS / COURSE	**MA.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND		**Key Ideas and Details**
STANDARD / CONCEPT / SKILL	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
STANDARD / CONCEPT / SKILL	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

FOCUS / COURSE	**MA.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND		**Craft and Structure**
STANDARD / CONCEPT / SKILL	RST.6-8.4.	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 6-8 texts and topics.

STANDARD / CONCEPT / SKILL	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

FOCUS / COURSE	**MA.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND		**Integration of Knowledge and Ideas**
STANDARD / CONCEPT / SKILL	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

FOCUS / COURSE	**MA.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STRAND		**Range of Reading and Level of Text Complexity**
STANDARD / CONCEPT / SKILL	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

FOCUS / COURSE	**MA.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND		**Text Types and Purposes**
STANDARD / CONCEPT / SKILL	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
INDICATOR	WHST.6-8.2(d)	Use precise language and domain-specific vocabulary to inform about or explain the topic.

FOCUS / COURSE	**MA.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
STRAND		**Production and Distribution of Writing**
STANDARD / CONCEPT / SKILL	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
STANDARD / CONCEPT / SKILL	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Massachusetts Curriculum Frameworks

Technology Education

Grade **7** - Adopted: **2016**

FOCUS / COURSE	**MA.6-8.CT.**	**Grades 6 – 8: Computational Thinking (CT)**
STRAND	**6-8.CT.b.**	**Algorithms**
STANDARD / CONCEPT / SKILL	6-8.CT.b.1.	Design solutions that use repetition and conditionals.

FOCUS / COURSE	MA.6-8.CT.	Grades 6 – 8: Computational Thinking (CT)
STRAND	**6-8.CT.d.**	**Programming and Development**
STANDARD / CONCEPT / SKILL	6-8.CT.d.4.	Implement problem solutions using a programming language, including all of the following: looping behavior, conditional statements, expressions, variables, and functions.

FOCUS / COURSE	MA.6-8.CT.	Grades 6 – 8: Computational Thinking (CT)
STRAND	**6-8.CT.e.**	**Modeling and Simulation**
STANDARD / CONCEPT / SKILL	6-8.CT.e.1.	Create a model of a real-world system and explain why some details, features and behaviors were required in the model and why some could be ignored.
STANDARD / CONCEPT / SKILL	6-8.CT.e.3.	Select and use computer simulations, individually and collaboratively, to gather, view, analyze, and report results for content-related problems (e.g., migration, trade, cellular function).

Massachusetts Curriculum Frameworks

Technology Education

Grade **8** - Adopted: **2016**

FOCUS / COURSE	MA.6-8.CT.	Grades 6 – 8: Computational Thinking (CT)
STRAND	**6-8.CT.b.**	**Algorithms**
STANDARD / CONCEPT / SKILL	6-8.CT.b.1.	Design solutions that use repetition and conditionals.

FOCUS / COURSE	MA.6-8.CT.	Grades 6 – 8: Computational Thinking (CT)
STRAND	**6-8.CT.d.**	**Programming and Development**
STANDARD / CONCEPT / SKILL	6-8.CT.d.4.	Implement problem solutions using a programming language, including all of the following: looping behavior, conditional statements, expressions, variables, and functions.

FOCUS / COURSE	MA.6-8.CT.	Grades 6 – 8: Computational Thinking (CT)
STRAND	**6-8.CT.e.**	**Modeling and Simulation**
STANDARD / CONCEPT / SKILL	6-8.CT.e.1.	Create a model of a real-world system and explain why some details, features and behaviors were required in the model and why some could be ignored.
STANDARD / CONCEPT / SKILL	6-8.CT.e.3.	Select and use computer simulations, individually and collaboratively, to gather, view, analyze, and report results for content-related problems (e.g., migration, trade, cellular function).

Michigan Academic Standards

Mathematics

Grade **7** - Adopted: **2010**

STRAND / STANDARD CATEGORY	MI.CC.MP.7.	Mathematical Practices
STANDARD	MP.7.1.	Make sense of problems and persevere in solving them.
STANDARD	MP.7.2.	Reason abstractly and quantitatively.
STANDARD	MP.7.3.	Construct viable arguments and critique the reasoning of others.
STANDARD	MP.7.4.	Model with mathematics.
STANDARD	MP.7.6.	Attend to precision.
STANDARD	MP.7.7.	Look for and make use of structure.
STANDARD	MP.7.8.	Look for and express regularity in repeated reasoning.

STRAND / STANDARD CATEGORY	MI.CC.EE.7.	Expressions and Equations
STANDARD		**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
GRADE LEVEL EXPECTATION	**EE.7.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
EXPECTATION	EE.7.4(a)	Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Michigan Academic Standards

Mathematics

Grade **8** - Adopted: **2010**

STRAND / STANDARD CATEGORY	MI.CC.MP.8.	Mathematical Practices
STANDARD	MP.8.1.	Make sense of problems and persevere in solving them.
STANDARD	MP.8.2.	Reason abstractly and quantitatively.
STANDARD	MP.8.3.	Construct viable arguments and critique the reasoning of others.
STANDARD	MP.8.4.	Model with mathematics.
STANDARD	MP.8.6.	Attend to precision.
STANDARD	MP.8.7.	Look for and make use of structure.

STANDARD	MP.8.8.	Look for and express regularity in repeated reasoning.
STRAND / STANDARD CATEGORY	**MI.CC.EE.8.**	**Expressions and Equations**
STANDARD		**Understand the connections between proportional relationships, lines, and linear equations.**
GRADE LEVEL EXPECTATION	EE.8.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Michigan Academic Standards

Science

Grade **7** - Adopted: **2015**

STRAND / STANDARD CATEGORY	**MI.SC.4.**	**Energy**
STANDARD	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
STRAND / STANDARD CATEGORY	**MI.SC.5.**	**Waves and Electromagnetic Radiation**
STANDARD	MS-PS4-3.	Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.
STRAND / STANDARD CATEGORY	**MI.SC.8.**	**Matter and Energy in Organisms and Ecosystems**
STANDARD	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
STRAND / STANDARD CATEGORY	**MI.SC.9.**	**Interdependent Relationships in Ecosystems**
STANDARD	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
STRAND / STANDARD CATEGORY	**MI.SC.14.**	**History of Earth**
STANDARD	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
STRAND / STANDARD CATEGORY	**MI.SC.16.**	**Weather and Climate**
STANDARD	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

STRAND / STANDARD CATEGORY	MI.SC.17.	Human Impacts
STANDARD	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
STANDARD	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

STRAND / STANDARD CATEGORY	MI.SC.18.	Engineering Design
STANDARD	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
STANDARD	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
STANDARD	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **7** - Adopted: **2010**

STRAND / STANDARD CATEGORY	MI.RST.6-8.	Reading Standards for Literacy in Science and Technical Subjects
STANDARD		**Key Ideas and Details**
GRADE LEVEL EXPECTATION	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
GRADE LEVEL EXPECTATION	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

STRAND / STANDARD CATEGORY	MI.RST.6-8.	Reading Standards for Literacy in Science and Technical Subjects
STANDARD		**Craft and Structure**
GRADE LEVEL EXPECTATION	RST.6-8.4.	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 6-8 texts and topics.
GRADE LEVEL EXPECTATION	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

STRAND / STANDARD CATEGORY	MI.RST.6-8.	Reading Standards for Literacy in Science and Technical Subjects
STANDARD		**Integration of Knowledge and Ideas**
GRADE LEVEL EXPECTATION	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

STRAND / STANDARD CATEGORY	**MI.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXPECTATION	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

STRAND / STANDARD CATEGORY	**MI.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION	WHST.6-8.2(d)	Use precise language and domain-specific vocabulary to inform about or explain the topic.

STRAND / STANDARD CATEGORY	**MI.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
STANDARD		**Production and Distribution of Writing**
GRADE LEVEL EXPECTATION	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GRADE LEVEL EXPECTATION	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Michigan Academic Standards

Science

Grade **8** - Adopted: **2015**

STRAND / STANDARD CATEGORY	**MI.SC.4.**	**Energy**
STANDARD	MS-PS3-3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

STRAND / STANDARD CATEGORY	**MI.SC.5.**	**Waves and Electromagnetic Radiation**
STANDARD	MS-PS4-3.	Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

STRAND / STANDARD CATEGORY	**MI.SC.8.**	**Matter and Energy in Organisms and Ecosystems**
STANDARD	MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

STRAND / STANDARD CATEGORY	**MI.SC.9.**	**Interdependent Relationships in Ecosystems**

STANDARD	MS-LS2-5.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
STRAND / STANDARD CATEGORY	**MI.SC.14.**	**History of Earth**
STANDARD	MS-ESS2-2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
STRAND / STANDARD CATEGORY	**MI.SC.16.**	**Weather and Climate**
STANDARD	MS-ESS3-5.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
STRAND / STANDARD CATEGORY	**MI.SC.17.**	**Human Impacts**
STANDARD	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
STANDARD	MS-ESS3-3.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
STRAND / STANDARD CATEGORY	**MI.SC.18.**	**Engineering Design**
STANDARD	MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
STANDARD	MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
STANDARD	MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **8** - Adopted: **2010**

STRAND / STANDARD CATEGORY	**MI.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD		**Key Ideas and Details**
GRADE LEVEL EXPECTATION	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
GRADE LEVEL EXPECTATION	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
STRAND / STANDARD CATEGORY	**MI.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**

STANDARD		**Craft and Structure**
GRADE LEVEL EXPECTATION	RST.6-8.4.	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 6-8 texts and topics.
GRADE LEVEL EXPECTATION	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
STRAND / STANDARD CATEGORY	**MI.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD		**Integration of Knowledge and Ideas**
GRADE LEVEL EXPECTATION	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
STRAND / STANDARD CATEGORY	**MI.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
STANDARD		**Range of Reading and Level of Text Complexity**
GRADE LEVEL EXPECTATION	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.
STRAND / STANDARD CATEGORY	**MI.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION	WHST.6-8.2(d)	Use precise language and domain-specific vocabulary to inform about or explain the topic.
STRAND / STANDARD CATEGORY	**MI.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
STANDARD		**Production and Distribution of Writing**
GRADE LEVEL EXPECTATION	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GRADE LEVEL EXPECTATION	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Michigan Academic Standards

Technology Education

Grade **7** - Adopted: **2017**

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.a.	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems.
GRADE LEVEL EXPECTATION	MITECS.4.c.	Develop, test, and refine prototypes as part of a cyclical design process.

Grade **7** - Adopted: **2019**

STRAND / STANDARD CATEGORY		Michigan Computer Science Standards
STANDARD		**LEVEL 2: MIDDLE SCHOOL (GRADES 6-8)**
GRADE LEVEL EXPECTATION		**DATA AND ANALYSIS**
EXPECTATION	2-DA-09.	Refine computational models based on the data they have generated. Subconcept: Inference & Models; Practice 5.3, 4.4

STRAND / STANDARD CATEGORY		Michigan Computer Science Standards
STANDARD		**LEVEL 2: MIDDLE SCHOOL (GRADES 6-8)**
GRADE LEVEL EXPECTATION		**ALGORITHMS AND PROGRAMMING**
EXPECTATION	2-AP-11.	Create clearly named variables that represent different data types and perform operations on their values. Subconcept: Variables; Practice 5.1, 5.2
EXPECTATION	2-AP-12.	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. Subconcept: Control; Practice 5.1, 5.2
EXPECTATION	2-AP-18.	Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts. Subconcept: Program Development; Practice 2.2

Michigan Academic Standards

Technology Education

Grade **8** - Adopted: **2017**

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.a.	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems.
GRADE LEVEL EXPECTATION	MITECS.4.c.	Develop, test, and refine prototypes as part of a cyclical design process.

Grade **8** - Adopted: **2019**

STRAND / STANDARD CATEGORY		Michigan Computer Science Standards
STANDARD		**LEVEL 2: MIDDLE SCHOOL (GRADES 6-8)**

GRADE LEVEL EXPECTATION		**DATA AND ANALYSIS**
EXPECTATION	2-DA-09.	Refine computational models based on the data they have generated. Subconcept: Inference & Models; Practice 5.3, 4.4

STRAND / STANDARD CATEGORY		**Michigan Computer Science Standards**
STANDARD		**LEVEL 2: MIDDLE SCHOOL (GRADES 6-8)**
GRADE LEVEL EXPECTATION		**ALGORITHMS AND PROGRAMMING**
EXPECTATION	2-AP-11.	Create clearly named variables that represent different data types and perform operations on their values. Subconcept: Variables; Practice 5.1, 5.2
EXPECTATION	2-AP-12.	Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals. Subconcept: Control; Practice 5.1, 5.2
EXPECTATION	2-AP-18.	Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts. Subconcept: Program Development; Practice 2.2

Minnesota Academic Standards

Mathematics

Grade **8** - Adopted: **2008**

CONTENT STANDARD / DOMAIN	**MN.8.2.**	**Algebra**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**8.2.2.**	**Recognize linear functions in real world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions and explain results in the original context.**
INDICATORS OF PROGRESS / STRAND	8.2.2.1.	Represent linear functions with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another.

CONTENT STANDARD / DOMAIN	**MN.8.2.**	**Algebra**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**8.2.4.**	**Represent real world and mathematical situations using equations and inequalities involving linear expressions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context.**
INDICATORS OF PROGRESS / STRAND	8.2.4.3.	Express linear equations in slope-intercept, point-slope and standard forms, and convert between these forms. Given sufficient information, find an equation of a line.

CONTENT STANDARD / DOMAIN	**MN.8.3.**	**Geometry & Measurement**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**8.3.2.**	**Solve problems involving parallel and perpendicular lines on a coordinate system.**

INDICATORS OF PROGRESS / STRAND	8.3.2.3.	Given a line on a coordinate system and the coordinates of a point not on the line, find lines through that point that are parallel and perpendicular to the given line, symbolically and graphically.

Minnesota Academic Standards

Science

Grade **7** - Adopted: **2010**

CONTENT STANDARD / DOMAIN	**MN.6.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Key Ideas and Details**
INDICATORS OF PROGRESS / STRAND	6.13.2.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
INDICATORS OF PROGRESS / STRAND	6.13.3.3.	Follow precisely a multistep procedure when carrying out experiments, designing solutions, taking measurements, or performing technical tasks.
CONTENT STANDARD / DOMAIN	**MN.6.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Craft and Structure**
INDICATORS OF PROGRESS / STRAND	6.13.4.4.	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 6-8 texts and topics.
INDICATORS OF PROGRESS / STRAND	6.13.5.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
INDICATORS OF PROGRESS / STRAND	6.13.6.6.	Analyze the author's purpose in describing phenomena, providing an explanation, describing a procedure, or discussing/reporting an experiment in a text.
CONTENT STANDARD / DOMAIN	**MN.6.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Integration of Knowledge and Ideas**
INDICATORS OF PROGRESS / STRAND	6.13.9.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
CONTENT STANDARD / DOMAIN	**MN.6.13.**	**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	6.13.10.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

CONTENT STANDARD / DOMAIN	**MN.6.14.**	**Writing Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Text Types and Purposes**
INDICATORS OF PROGRESS / STRAND	**6.14.2.2.**	**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	6.14.2.2.d.	Use precise language and domain-specific vocabulary to inform about or explain the topic.

CONTENT STANDARD / DOMAIN	**MN.6.14.**	**Writing Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Production and Distribution of Writing**
INDICATORS OF PROGRESS / STRAND	6.14.4.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Minnesota Academic Standards

Science

Grade **8** - Adopted: **2009**

CONTENT STANDARD / DOMAIN	**MN.8.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**8.1.3.**	**Interactions Among Science, Technology, Engineering, Mathematics, and Society**
INDICATORS OF PROGRESS / STRAND	**8.1.3.3.**	**The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.**
INDICATORS OF PROGRESS	8.1.3.3.2.	Understand that scientific knowledge is always changing as new technologies and information enhance observations and analysis of data.
INDICATORS OF PROGRESS	8.1.3.3.3.	Provide examples of how advances in technology have impacted the ways in which people live, work and interact.

Grade **8** - Adopted: **2010**

CONTENT STANDARD / DOMAIN	**MN.6.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**

PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Key Ideas and Details**
INDICATORS OF PROGRESS / STRAND	6.13.2.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
INDICATORS OF PROGRESS / STRAND	6.13.3.3.	Follow precisely a multistep procedure when carrying out experiments, designing solutions, taking measurements, or performing technical tasks.
CONTENT STANDARD / DOMAIN	**MN.6.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Craft and Structure**
INDICATORS OF PROGRESS / STRAND	6.13.4.4.	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 6-8 texts and topics.
INDICATORS OF PROGRESS / STRAND	6.13.5.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
INDICATORS OF PROGRESS / STRAND	6.13.6.6.	Analyze the author's purpose in describing phenomena, providing an explanation, describing a procedure, or discussing/reporting an experiment in a text.
CONTENT STANDARD / DOMAIN	**MN.6.13.**	**Reading Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Integration of Knowledge and Ideas**
INDICATORS OF PROGRESS / STRAND	6.13.9.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
CONTENT STANDARD / DOMAIN	**MN.6.13.**	**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	6.13.10.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.
CONTENT STANDARD / DOMAIN	**MN.6.14.**	**Writing Benchmarks: Literacy in Science and Technical Subjects 6-12**

PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Text Types and Purposes**
INDICATORS OF PROGRESS / STRAND	**6.14.2.2.**	**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	6.14.2.2.d.	Use precise language and domain-specific vocabulary to inform about or explain the topic.

CONTENT STANDARD / DOMAIN	**MN.6.14.**	**Writing Benchmarks: Literacy in Science and Technical Subjects 6-12**
PERFORMANCE INDICATOR / DOMAIN COMPONENT		**Production and Distribution of Writing**
INDICATORS OF PROGRESS / STRAND	6.14.4.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Mississippi College & Career Readiness Standards

Mathematics

Grade **7** - 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.7.**	**Grade 7**
SUBJECT	**7.EE.**	**Expressions and Equations (EE)**
STANDARD		**Solve real-life and mathematical problems using numerical and algebraic expressions and equations**
OBJECTIVE	**7.EE.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
OBJECTIVE	7.EE.4.a.	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

THEME	**MS.CM7.**	**Compacted Mathematics Grade 7**
SUBJECT	**CM7.EE.**	**Expressions and Equations**
STANDARD		**Solve real-life and mathematical problems using numerical and algebraic expressions and equations**
OBJECTIVE	**7.EE.4.**	**Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
OBJECTIVE	7.EE.4.a.	Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

THEME	**MS.CM7.**	**Compacted Mathematics Grade 7**
SUBJECT	**CM7.EE.**	**Expressions and Equations**
STANDARD		**Understand the connections between proportional relationships, lines, and linear equations**
OBJECTIVE	8.EE.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Mississippi College & Career Readiness Standards

Mathematics

Grade **8** - 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.8.**	**Grade 8**
SUBJECT	**8.EE.**	**Expressions and Equations (EE)**
STANDARD		**Understand the connections between proportional relationships, lines, and linear equations**
OBJECTIVE	8.EE.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

THEME	**MS.CM8AI.**	**Compacted Mathematics Grade 8 (with Algebra I)**

SUBJECT	**CM8AI.A-CED.**	**Algebra: Creating Equations (A-CED)**
STANDARD		**Create equations that describe numbers or relationships**
OBJECTIVE	A-CED.2.	Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. [Note this standard appears in future courses with a slight variation in the standard language.]

THEME	**MS.CM8AI.**	**Compacted Mathematics Grade 8 (with Algebra I)**
SUBJECT	**CM8AI.A-REI.**	**Algebra: Reasoning with Equations and Inequalities (A-REI)**
STANDARD		**Understand solving equations as a process of reasoning and explain the reasoning**
OBJECTIVE	A-REI.1.	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

THEME	**MS.CM8AI.**	**Compacted Mathematics Grade 8 (with Algebra I)**
SUBJECT	**CM8AI.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Analyze functions using different representations**
OBJECTIVE	**F-IF.7.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
OBJECTIVE	F-IF.7.a.	Graph functions (linear and quadratic) and show intercepts, maxima, and minima.

THEME	**MS.CM8AI.**	**Compacted Mathematics Grade 8 (with Algebra I)**
SUBJECT	**CM8AI.F-LE.**	**Functions: Linear, Quadratic, and Exponential Models (F-LE)**
STANDARD		**Construct and compare linear, quadratic, and exponential models and solve problems**
OBJECTIVE	**F-LE.1.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions.**
OBJECTIVE	F-LE.1.a.	Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.

THEME	**MS.CM8IM.**	**Compacted Mathematics Grade 8 (with Integrated Math I)**
SUBJECT	**CM8IM.A.CED.**	**Algebra: Creating Equations (A-CED)**
STANDARD		**Create equations that describe numbers or relationships**
OBJECTIVE	A-CED.2.	Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. [Note this standard appears in future courses with a slight variation in the standard language.]

THEME	**MS.CM8IM.**	**Compacted Mathematics Grade 8 (with Integrated Math I)**
SUBJECT	**CM8IM.F-IF.**	**Functions: Interpreting Functions (F-IF)**
STANDARD		**Analyze functions using different representations**

OBJECTIVE	**F-IF.7.**	**Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**
OBJECTIVE	F-IF.7.a.	Graph functions (linear and quadratic) and show intercepts, maxima, and minima.
THEME	**MS.CM8IM.**	**Compacted Mathematics Grade 8 (with Integrated Math I)**
SUBJECT	**CM8IM.F-LE.**	**Functions: Linear, Quadratic, and Exponential Models (F-LE)**
STANDARD		**Construct and compare linear, quadratic, and exponential models and solve problems**
OBJECTIVE	**F-LE.1.**	**Distinguish between situations that can be modeled with linear functions and with exponential functions.**
OBJECTIVE	F-LE.1.a.	Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.

Mississippi College & Career Readiness Standards

Science

Grade **7** - Adopted: **2018**

THEME	**MS.L.7.**	**GRADE SEVEN: Life Science**
SUBJECT		**Ecology and Interdependence**
STANDARD	**L.7.3.**	**Students will demonstrate an understanding of the importance that matter cycles between living and nonliving parts of the ecosystem to sustain life on Earth.**
OBJECTIVE	L.7.3.4.	Explain how disruptions in cycles (e.g., water, oxygen, carbon, and nitrogen) affect biodiversity and ecosystem services (e.g., water, food, and medications) which are needed to sustain human life on Earth.
OBJECTIVE	L.7.3.5.	Design solutions for sustaining the health of ecosystems to maintain biodiversity and the resources needed by humans for survival (e.g., water purification, nutrient recycling, prevention of soil erosion, and prevention or management of invasive species).
THEME	**MS.E.7.**	**GRADE SEVEN: Earth and Space Science**
SUBJECT		**Earth's Systems and Cycles**
STANDARD	**E.7.9B.**	**Students will demonstrate an understanding of the relationship between natural phenomena, human activity, and global climate change.**
OBJECTIVE	E.7.9B.1.	Read and evaluate scientific or technical information assessing the evidence and bias of each source to explain the causes and effects of climate change.
OBJECTIVE	E.7.9B.2.	Interpret data about the relationship between the release of carbon dioxide from burning fossil fuels into the atmosphere and the presence of greenhouse gases.
OBJECTIVE	E.7.9B.3.	Engage in scientific argument based on current evidence to determine whether climate change happens naturally or is being accelerated through the influence of man.

Mississippi College & Career Readiness Standards

Science

Grade **8** - Adopted: **2018**

THEME	**MS.E.8.**	**GRADE EIGHT: Earth and Space Science**
SUBJECT		**Earth's Systems and Cycles**

STANDARD	**E.8.9A.**	**Students will demonstrate an understanding that physical processes and major geological events (e.g., plate movement, volcanic activity, mountain building, weathering, erosion) are powered by the Sun and the Earth's internal heat and have occurred over millions of years.**
OBJECTIVE	E.8.9A.4.	Research and assess the credibility of scientific ideas to debate and discuss how Earth's constructive and destructive processes have changed Earth's surface at varying time and spatial scales.

THEME	**MS.E.8.**	**GRADE EIGHT: Earth and Space Science**
SUBJECT		**Earth's Systems and Cycles**
STANDARD	**E.8.9B.**	**Students will demonstrate an understanding of natural hazards (volcanic eruptions, severe weather, earthquakes) and construct explanations for why some hazards are predictable and others are not.**
OBJECTIVE	E.8.9B.1.	Research and map various types of natural hazards to determine their impact on society.
OBJECTIVE	E.8.9B.2.	Compare and contrast technologies that predict natural hazards to identify which types of technologies are most effective.
OBJECTIVE	E.8.9B.3.	Using an engineering design process, create mechanisms to improve community resilience, which safeguard against natural hazards (e.g., building restrictions in flood or tidal zones, regional watershed management, Firewise construction).

THEME	**MS.E.8.**	**GRADE EIGHT: Earth and Space Science**
SUBJECT		**Earth's Resources**
STANDARD	**E.8.10.**	**Students will demonstrate an understanding that a decrease in natural resources is directly related to the increase in human population on Earth and must be conserved.**
OBJECTIVE	E.8.10.2.	Create and defend a proposal for reducing the environmental effects humans have on Earth (e.g., population increases, consumer demands, chemical pollution, deforestation, and change in average annual temperature).

Mississippi College & Career Readiness Standards

Technology Education

Grade **7** - Adopted: **2018**

THEME		**Mississippi College- and Career-Readiness Standards for Computer Science**
SUBJECT		**Level 2: GRADES 6-8 - Algorithms and Programming**
STANDARD	**AP.2.**	**Algorithms and Programming (AP.2)**
OBJECTIVE	**AP.2.2.**	**Create clearly named variables that represent different data types and perform operations on their values. [VARIABLES] (P5.1, P5.2)**
OBJECTIVE	AP.2.2a.	When planning and developing programs, students should decide when and how to declare and name new variables.
OBJECTIVE	AP.2.2b.	Students should use naming conventions to improve program readability.

Mississippi College & Career Readiness Standards

Technology Education

Grade **8** - Adopted: **2018**

THEME		**Mississippi College- and Career-Readiness Standards for Computer Science**
SUBJECT		**Level 2: GRADES 6-8 - Algorithms and Programming**
STANDARD	**AP.2.**	**Algorithms and Programming (AP.2)**

OBJECTIVE	**AP.2.2.**	**Create clearly named variables that represent different data types and perform operations on their values. [VARIABLES] (P5.1, P5.2)**
OBJECTIVE	AP.2.2a.	When planning and developing programs, students should decide when and how to declare and name new variables.
OBJECTIVE	AP.2.2b.	Students should use naming conventions to improve program readability.

Missouri Learning Standards

Science

Grade **7** - Adopted: **2016**

STRAND: BIG IDEA / STANDARD	**MO.6-8.PS.**	**Physical Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.PS3.**	**Energy**
GLE / COMPONENT	**6-8.PS3.A.**	**Definitions of Energy**
INDICATOR / PROFICIENCY	6-8.PS3.A.3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. [Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.]

STRAND: BIG IDEA / STANDARD	**MO.6-8.LS.**	**Life Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / COMPONENT	**6-8.LS2.C.**	**Ecosystem Dynamics, Functioning and Resilience**
INDICATOR / PROFICIENCY	6-8.LS2.C.1.	Construct an argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making inferences about changes in populations, defining the boundaries of the system, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]
INDICATOR / PROFICIENCY	6-8.LS2.C.2.	Evaluate benefits and limitations of differing design solutions for maintaining an ecosystem. [Clarification Statement: Examples of design solutions could include water, land, and species protection, and the prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.ESS2.**	**Earth's Systems**
GLE / COMPONENT	**6-8.ESS2.A.**	**Earth Materials and Systems**

INDICATOR / PROFICIENCY	6-8.ESS2.A.2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. [Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.ESS3.**	**Earth and Human Activity**
GLE / COMPONENT	**6-8.ESS3.B.**	**Natural Hazards**

INDICATOR / PROFICIENCY	6-8.ESS3.B.1.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.ESS3.**	**Earth and Human Activity**
GLE / COMPONENT	**6-8.ESS3.C.**	**Human Impacts on Earth's Systems**

INDICATOR / PROFICIENCY	6-8.ESS3.C.2.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.ESS3.**	**Earth and Human Activity**
GLE / COMPONENT	**6-8.ESS3.D.**	**Global Climate Change**

INDICATOR / PROFICIENCY	6-8.ESS3.D.1.	Analyze evidence of the factors that have caused the change in global temperatures over the past century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities.]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ETS.**	**Engineering, Technology, and Application of Science**
CONCEPT: GLE / BENCHMARK	**6-8.ETS1.**	**Engineering Design**
GLE / COMPONENT	**6-8.ETS1.A.**	**Defining and Delimiting Engineering Problems**
INDICATOR / PROFICIENCY	6-8.ETS1.A.1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

STRAND: BIG IDEA / STANDARD	**MO.6-8.ETS.**	**Engineering, Technology, and Application of Science**
CONCEPT: GLE / BENCHMARK	**6-8.ETS1.**	**Engineering Design**
GLE / COMPONENT	**6-8.ETS1.B.**	**Developing Possible Solutions**
INDICATOR / PROFICIENCY	6-8.ETS1.B.1.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
INDICATOR / PROFICIENCY	6-8.ETS1.B.3.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **7** - Adopted: **2010**

STRAND: BIG IDEA / STANDARD	**MO.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Key Ideas and Details**
GLE / COMPONENT	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
GLE / COMPONENT	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

STRAND: BIG IDEA / STANDARD	**MO.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Craft and Structure**
GLE / COMPONENT	RST.6-8.4.	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 6-8 texts and topics.
GLE / COMPONENT	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

STRAND: BIG IDEA / STANDARD	**MO.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Integration of Knowledge and Ideas**
GLE / COMPONENT	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

STRAND: BIG IDEA / STANDARD	**MO.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Range of Reading and Level of Text Complexity**
GLE / COMPONENT	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

STRAND: BIG IDEA / STANDARD	**MO.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Text Types and Purposes**
GLE / COMPONENT	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
INDICATOR / PROFICIENCY	WHST.6-8.2(d)	Use precise language and domain-specific vocabulary to inform about or explain the topic.

STRAND: BIG IDEA / STANDARD	**MO.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Production and Distribution of Writing**
GLE / COMPONENT	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GLE / COMPONENT	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Missouri Learning Standards

Science

Grade **8** - Adopted: **2016**

STRAND: BIG IDEA / STANDARD	**MO.6-8.PS.**	**Physical Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.PS3.**	**Energy**
GLE / COMPONENT	**6-8.PS3.A.**	**Definitions of Energy**

INDICATOR / PROFICIENCY	6-8.PS3.A.3.	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. [Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.]

STRAND: BIG IDEA / STANDARD	**MO.6-8.LS.**	**Life Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.LS2.**	**Ecosystems: Interactions, Energy, and Dynamics**
GLE / COMPONENT	**6-8.LS2.C.**	**Ecosystem Dynamics, Functioning and Resilience**
INDICATOR / PROFICIENCY	6-8.LS2.C.1.	Construct an argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making inferences about changes in populations, defining the boundaries of the system, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]
INDICATOR / PROFICIENCY	6-8.LS2.C.2.	Evaluate benefits and limitations of differing design solutions for maintaining an ecosystem. [Clarification Statement: Examples of design solutions could include water, land, and species protection, and the prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.ESS2.**	**Earth's Systems**
GLE / COMPONENT	**6-8.ESS2.A.**	**Earth Materials and Systems**
INDICATOR / PROFICIENCY	6-8.ESS2.A.2.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. [Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.ESS3.**	**Earth and Human Activity**
GLE / COMPONENT	**6-8.ESS3.B.**	**Natural Hazards**
INDICATOR / PROFICIENCY	6-8.ESS3.B.1.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.ESS3.**	**Earth and Human Activity**
GLE / COMPONENT	**6-8.ESS3.C.**	**Human Impacts on Earth's Systems**
INDICATOR / PROFICIENCY	6-8.ESS3.C.2.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ESS.**	**Earth and Space Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.ESS3.**	**Earth and Human Activity**
GLE / COMPONENT	**6-8.ESS3.D.**	**Global Climate Change**
INDICATOR / PROFICIENCY	6-8.ESS3.D.1.	Analyze evidence of the factors that have caused the change in global temperatures over the past century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities.]

STRAND: BIG IDEA / STANDARD	**MO.6-8.ETS.**	**Engineering, Technology, and Application of Science**
CONCEPT: GLE / BENCHMARK	**6-8.ETS1.**	**Engineering Design**
GLE / COMPONENT	**6-8.ETS1.A.**	**Defining and Delimiting Engineering Problems**
INDICATOR / PROFICIENCY	6-8.ETS1.A.1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

STRAND: BIG IDEA / STANDARD	**MO.6-8.ETS.**	**Engineering, Technology, and Application of Science**
CONCEPT: GLE / BENCHMARK	**6-8.ETS1.**	**Engineering Design**
GLE / COMPONENT	**6-8.ETS1.B.**	**Developing Possible Solutions**

INDICATOR / PROFICIENCY	6-8.ETS1.B.1.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
INDICATOR / PROFICIENCY	6-8.ETS1.B.3.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Grade **8** - Adopted: **2010**

STRAND: BIG IDEA / STANDARD	**MO.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Key Ideas and Details**
GLE / COMPONENT	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
GLE / COMPONENT	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
STRAND: BIG IDEA / STANDARD	**MO.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Craft and Structure**
GLE / COMPONENT	RST.6-8.4.	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 6-8 texts and topics.
GLE / COMPONENT	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
STRAND: BIG IDEA / STANDARD	**MO.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Integration of Knowledge and Ideas**
GLE / COMPONENT	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
STRAND: BIG IDEA / STANDARD	**MO.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Range of Reading and Level of Text Complexity**
GLE / COMPONENT	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

STRAND: BIG IDEA / STANDARD	**MO.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Text Types and Purposes**
GLE / COMPONENT	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
INDICATOR / PROFICIENCY	WHST.6-8.2(d)	Use precise language and domain-specific vocabulary to inform about or explain the topic.

STRAND: BIG IDEA / STANDARD	**MO.WHST.6-8.**	**Writing Standards for Literacy in Science and Technical Subjects**
CONCEPT: GLE / BENCHMARK		**Production and Distribution of Writing**
GLE / COMPONENT	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GLE / COMPONENT	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Missouri Learning Standards

Technology Education

Grade **7** - Adopted: **2019**

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Variables**
INDICATOR / PROFICIENCY	6-8.AP.V.01.	Create clearly named variables to store and manipulate information.

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Control**
INDICATOR / PROFICIENCY	6-8.AP.C.01.	Design and develop combinations of control structures, nested loops and compound conditionals.

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

CONCEPT: GLE / BENCHMARK		**Impacts of Computing**
GLE / COMPONENT		**Social Interaction**
INDICATOR / PROFICIENCY	6-8.IC.SI.01.	Collaborate through strategies such as crowdsourcing or surveys when creating a computational artifact.

Missouri Learning Standards

Technology Education

Grade **8** - Adopted: **2019**

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Variables**
INDICATOR / PROFICIENCY	6-8.AP.V.01.	Create clearly named variables to store and manipulate information.

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Control**
INDICATOR / PROFICIENCY	6-8.AP.C.01.	Design and develop combinations of control structures, nested loops and compound conditionals.

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Impacts of Computing**
GLE / COMPONENT		**Social Interaction**
INDICATOR / PROFICIENCY	6-8.IC.SI.01.	Collaborate through strategies such as crowdsourcing or surveys when creating a computational artifact.

Montana Content Standards

Mathematics

Grade **7** - 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.7.EE.**	**Expressions and Equations**
BENCHMARK / STANDARD		**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
GRADE LEVEL EXPECTATION / BENCHMARK	**7.EE.4.**	**Use variables to represent quantities in a real-world or mathematical problem, including those represented in Montana American Indian cultural contexts, and construct simple equations and inequalities to solve problems by reasoning about the quantities.**
EXPECTATION	7.EE.4.a.	Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Montana Content Standards

Mathematics

Grade **8** - 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.8.EE.**	**Expressions and Equations**
BENCHMARK / STANDARD		**Understand the connections between proportional relationships, lines, and linear equations.**
GRADE LEVEL EXPECTATION / BENCHMARK	8.EE.5.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Montana Content Standards

Science

Grade **7** - Adopted: **2016**

CONTENT STANDARD / DOMAIN	**MT.6-8.PS.**	**PHYSICAL SCIENCE content standards for sixth through eighth grades are that each student will:**
BENCHMARK / STANDARD	6-8.PS.14.	Apply scientific principles to design, construct, and test a device that minimizes or maximizes thermal energy transfer
CONTENT STANDARD / DOMAIN	**MT.6-8.LS.**	**LIFE SCIENCE content standards for sixth through eighth grades are that each student will:**
BENCHMARK / STANDARD	6-8.LS.9.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services
CONTENT STANDARD / DOMAIN	**MT.6-8.ESS.**	**EARTH AND SPACE SCIENCE content standards for sixth through eighth grades are that students will:**
BENCHMARK / STANDARD	6-8.ESS.12.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century
BENCHMARK / STANDARD	6-8.ESS.13.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects
BENCHMARK / STANDARD	6-8.ESS.14.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

Grade **7** - Adopted: **2011**

CONTENT STANDARD / DOMAIN	**MT.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Key Ideas and Details**

GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
CONTENT STANDARD / DOMAIN	**MT.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Craft and Structure**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.4.	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 6–8 texts and topics.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
CONTENT STANDARD / DOMAIN	**MT.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Integration of Knowledge and Ideas**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
CONTENT STANDARD / DOMAIN	**MT.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Range of Reading Level of Text Complexity**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
CONTENT STANDARD / DOMAIN	**MT.WHST.6-8.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION / BENCHMARK	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION	WHST.6-8.2.d.	Use precise language and domain-specific vocabulary to inform about or explain the topic.
CONTENT STANDARD / DOMAIN	**MT.WHST.6-8.**	**Writing Standards for Literacy in Science, and Technical Subjects**

BENCHMARK / STANDARD		**Production and Distribution of Writing**
GRADE LEVEL EXPECTATION / BENCHMARK	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
GRADE LEVEL EXPECTATION / BENCHMARK	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Montana Content Standards

Science

Grade **8** - Adopted: **2016**

CONTENT STANDARD / DOMAIN	**MT.6-8.PS.**	**PHYSICAL SCIENCE content standards for sixth through eighth grades are that each student will:**
BENCHMARK / STANDARD	6-8.PS.14.	Apply scientific principles to design, construct, and test a device that minimizes or maximizes thermal energy transfer
CONTENT STANDARD / DOMAIN	**MT.6-8.LS.**	**LIFE SCIENCE content standards for sixth through eighth grades are that each student will:**
BENCHMARK / STANDARD	6-8.LS.9.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services
CONTENT STANDARD / DOMAIN	**MT.6-8.ESS.**	**EARTH AND SPACE SCIENCE content standards for sixth through eighth grades are that students will:**
BENCHMARK / STANDARD	6-8.ESS.12.	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century
BENCHMARK / STANDARD	6-8.ESS.13.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects
BENCHMARK / STANDARD	6-8.ESS.14.	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

Grade **8** - Adopted: **2011**

CONTENT STANDARD / DOMAIN	**MT.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Key Ideas and Details**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.2.	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.3.	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

CONTENT STANDARD / DOMAIN	**MT.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Craft and Structure**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.4.	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 6–8 texts and topics.
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.5.	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

CONTENT STANDARD / DOMAIN	**MT.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Integration of Knowledge and Ideas**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.9.	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

CONTENT STANDARD / DOMAIN	**MT.RST.6-8.**	**Reading Standards for Literacy in Science and Technical Subjects**
BENCHMARK / STANDARD		**Range of Reading Level of Text Complexity**
GRADE LEVEL EXPECTATION / BENCHMARK	RST.6-8.10.	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.

CONTENT STANDARD / DOMAIN	**MT.WHST.6-8.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Text Types and Purposes**
GRADE LEVEL EXPECTATION / BENCHMARK	**WHST.6-8.2.**	**Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.**
EXPECTATION	WHST.6-8.2.d.	Use precise language and domain-specific vocabulary to inform about or explain the topic.

CONTENT STANDARD / DOMAIN	**MT.WHST.6-8.**	**Writing Standards for Literacy in Science, and Technical Subjects**
BENCHMARK / STANDARD		**Production and Distribution of Writing**
GRADE LEVEL EXPECTATION / BENCHMARK	WHST.6-8.4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

GRADE LEVEL EXPECTATION / BENCHMARK	WHST.6-8.6.	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Montana Content Standards

Technology Education

Grade **7** - Adopted: **2020/Effective 2021**

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR SIXTH THROUGH EIGHTH GRADE
BENCHMARK / STANDARD	**(4)**	**The innovative designer content standards for sixth-eighth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(a)	select and use digital tools to support design processes, identify constraints and trade-offs and weigh risks;
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(b)	engage in design process to develop, test and revise prototypes or create innovative products; and

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR SIXTH THROUGH EIGHTH GRADE
BENCHMARK / STANDARD	**(5)**	**The computational thinker content standards for sixth-eighth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(a)	investigate and practice solving problems by using data analysis, modeling or algorithmic thinking;

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR SIXTH THROUGH EIGHTH GRADE
BENCHMARK / STANDARD	**(6)**	**The creative communicator content standards for sixth-eighth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(6)(a)	select appropriate platforms and tools to create, share, and communicate work;
GRADE LEVEL EXPECTATION / BENCHMARK	(6)(b)	create original works or responsibly remix and repurpose other digital resources into new creative works; and

CONTENT STANDARD / DOMAIN		COMPUTER SCIENCE CONTENT STANDARDS FOR SIXTH THROUGH EIGHTH GRADE
BENCHMARK / STANDARD	**(1)**	**Computer science algorithms and programming standards for sixth through eighth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(b)	create clearly named variables that represent different data types and perform operations on their values;

GRADE LEVEL EXPECTATION / BENCHMARK	(1)(c)	develop programs that combine control structures, including nested loops and compound conditionals;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(d)	decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(i)	distribute tasks and maintain a project timeline when collaboratively developing computational artifacts; and
CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR SIXTH THROUGH EIGHTH GRADE**
BENCHMARK / STANDARD	**(3)**	**Computer science data and analysis standards for sixth through eighth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(3)(c)	refine computational models based on the data they have generated.
CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR SIXTH THROUGH EIGHTH GRADE**
BENCHMARK / STANDARD	**(4)**	**Computer science impacts of computing standards for sixth through eighth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(c)	collaborate with other contributors when creating a computational artifact; and

Montana Content Standards

Technology Education

Grade **8** - Adopted: **2020/Effective 2021**

CONTENT STANDARD / DOMAIN		**CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR SIXTH THROUGH EIGHTH GRADE**
BENCHMARK / STANDARD	**(4)**	**The innovative designer content standards for sixth-eighth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(a)	select and use digital tools to support design processes, identify constraints and trade-offs and weigh risks;
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(b)	engage in design process to develop, test and revise prototypes or create innovative products; and
CONTENT STANDARD / DOMAIN		**CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR SIXTH THROUGH EIGHTH GRADE**
BENCHMARK / STANDARD	**(5)**	**The computational thinker content standards for sixth-eighth grade are that each student will:**

GRADE LEVEL EXPECTATION / BENCHMARK	(5)(a)	investigate and practice solving problems by using data analysis, modeling or algorithmic thinking;
CONTENT STANDARD / DOMAIN		**CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR SIXTH THROUGH EIGHTH GRADE**
BENCHMARK / STANDARD	**(6)**	**The creative communicator content standards for sixth-eighth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(6)(a)	select appropriate platforms and tools to create, share, and communicate work;
GRADE LEVEL EXPECTATION / BENCHMARK	(6)(b)	create original works or responsibly remix and repurpose other digital resources into new creative works; and
CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR SIXTH THROUGH EIGHTH GRADE**
BENCHMARK / STANDARD	**(1)**	**Computer science algorithms and programming standards for sixth through eighth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(b)	create clearly named variables that represent different data types and perform operations on their values;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(c)	develop programs that combine control structures, including nested loops and compound conditionals;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(d)	decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(i)	distribute tasks and maintain a project timeline when collaboratively developing computational artifacts; and
CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR SIXTH THROUGH EIGHTH GRADE**
BENCHMARK / STANDARD	**(3)**	**Computer science data and analysis standards for sixth through eighth grades are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(3)(c)	refine computational models based on the data they have generated.
CONTENT STANDARD / DOMAIN		**COMPUTER SCIENCE CONTENT STANDARDS FOR SIXTH THROUGH EIGHTH GRADE**
BENCHMARK / STANDARD	**(4)**	**Computer science impacts of computing standards for sixth through eighth grades are that each student will:**

GRADE LEVEL EXPECTATION / BENCHMARK	(4)(c)	collaborate with other contributors when creating a computational artifact; and