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: 5, 6, Key Stage 2

Forward Education

How Wind Turbines Capture Kinetic Energy

Idaho Content Standards

Mathematics

Grade **5** - Adopted: **2022**

STANDARD / COURSE		Fifth 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.5.	Use appropriate tools strategically.
STANDARD / COURSE	**5.MD.**	**Measurement and Data**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**5.MD.B.**	**Represent and interpret data.**
GLE / BIG IDEA	**5.MD.B.2.**	**Collect, represent, and interpret numerical data, including whole numbers, and fractional and decimal values.**
OBJECTIVE	5.MD.B.2.a.	Interpret numerical data, with whole-number values, represented with tables or line plots.
OBJECTIVE	5.MD.B.2.b.	Use graphic displays of data (line plots (dot plots), tables, etc.) to solve real-world problems using fractional data.

Mathematics

Grade **6** - Adopted: **2022**

STANDARD / COURSE		Sixth 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.5.	Use appropriate tools strategically.

Idaho Content Standards

Science

Grade **6** - Adopted: **2022**

STANDARD / COURSE	MS-PS.	Physical Science
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-PS-3.**	**Energy**
GLE / BIG IDEA	MS-PS-3.1.	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
GLE / BIG IDEA	MS-PS-3.5.	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.

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-ESS.**	**Earth and Space Science**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**MS-ESS-3.**	**Earth and Human Activity**
GLE / BIG IDEA	MS-ESS-3.1.	Construct a scientific explanation based on evidence for how Earth's mineral, energy, and groundwater resources are unevenly distributed as a result of past and current geologic processes.
GLE / BIG IDEA	MS-ESS-3.4.	Construct an argument based on evidence for how changes in human population and per-capita consumption of natural resources positively and negatively affect Earth's systems.

Idaho Content Standards

Technology Education

Grade **5** - Adopted: **2017**

STANDARD / COURSE	**ID.ICT.3-5.4.**	**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.3-5.4.a.	Students explore and practice how a design process works to generate ideas, consider solutions, plan to solve a problem or create innovative products that are shared with others.
GLE / BIG IDEA	ICT.3-5.4.b.	Students use digital and non-digital tools to plan and manage a design process.
GLE / BIG IDEA	ICT.3-5.4.c.	Students engage in a cyclical design process to develop prototypes and reflect on the role that trial and error plays.

STANDARD / COURSE	**ID.CS.3-5.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**3-5.DA.**	**Data and Analysis (DA)**
GLE / BIG IDEA		**Recognizing and Defining Computational Problems**
OBJECTIVE	3-5.DA.01.	Use outcome data (results) from running a simulation to solve a problem or answer a question in a core subject area, either individually or collaboratively. (Grades 3-5)

STANDARD / COURSE	**ID.CS.3-5.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**3-5.IC.**	**Impacts of Computing (IC)**
GLE / BIG IDEA		**Fostering an Inclusive Computing Culture**
OBJECTIVE	3-5.IC.02.	Explore the connections between computer science and other fields. (Grades 3-5)

STANDARD / COURSE	**ID.CS.3-5.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**3-5.AP.**	**Algorithms and Programming (AP)**
GLE / BIG IDEA		**Creating Computational Artifacts**
OBJECTIVE	3-5.AP.02.	Construct and test problem solutions using a block-based visual programming language, both independently and collaboratively (e.g. pair programming). (Grades K-5)

STANDARD / COURSE	**ID.CS.3-5.**	**COMPUTER SCIENCE**
CONTENT KNOWLEDGE AND SKILLS / GOAL	**3-5.AP.**	**Algorithms and Programming (AP)**
GLE / BIG IDEA		**Creating Computational Artifacts**
OBJECTIVE	3-5.AP.06.	Construct and test problem solutions using a block-based visual programming language, both independently and collaboratively (e.g. pair programming). (Grades K-5)

Idaho Content Standards

Technology Education

Grade **6** - 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 **5** - 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.5.	Use appropriate tools strategically.

STATE GOAL / DISCIPLINARY CONCEPT	IL.5.MD.	Measurement and Data
LEARNING STANDARD / DISCIPLINE		**Represent and interpret data.**
DESCRIPTOR / CONTENT DISCIPLINE	CC.5.MD.2.	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Illinois Learning Standards

Mathematics

Grade **6** - 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.5.	Use appropriate tools strategically.

Illinois Learning Standards

Science

Grade **5** - Adopted: **2014**

STATE GOAL / DISCIPLINARY CONCEPT	**IL.3-5-ETS.**	**ENGINEERING DESIGN**
LEARNING STANDARD / DISCIPLINE	**3-5-ETS1.**	**Engineering Design**
DESCRIPTOR / CONTENT DISCIPLINE		**Students who demonstrate understanding can:**
STANDARD	3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
STANDARD	3-5-ETS1-2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
STANDARD	3-5-ETS1-3.	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Illinois Learning Standards

Science

Grade **6** - 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-PS3-1.	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
STANDARD	MS-PS3-5.	Construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object.
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-ESS3-1.	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
STANDARD	MS-ESS3-4.	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
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 **6** - 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 **5** - 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.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		Computer Science Standards
DESCRIPTOR / CONTENT DISCIPLINE	3-5.NI.	Networks and the Internet
STANDARD		Network Communication and Organization
EXPECTATION	3-5.NI.04.	Model how information is broken down into smaller pieces, transmitted as packets through multiple devices over networks and the internet, and reassembled at the destination.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		Computer Science Standards
DESCRIPTOR / CONTENT DISCIPLINE	3-5.DA.	Data and Analysis
STANDARD		Collection, Visualization, and Transformation
EXPECTATION	3-5.DA.06.	Organize and present collected data visually to highlight relationships and support a claim.

STATE GOAL / DISCIPLINARY CONCEPT		Illinois Computer Science Standards
LEARNING STANDARD / DISCIPLINE		Computer Science Standards
DESCRIPTOR / CONTENT DISCIPLINE	3-5.AP.	Algorithms and Programming
STANDARD		Variables

EXPECTATION	3-5.AP.09.	Create programs that use variables to store and modify data.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**3-5.AP.**	**Algorithms and Programming**
STANDARD		**Control**
EXPECTATION	3-5.AP.10.	Create programs that include sequences, events, loops, and conditionals.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**3-5.AP.**	**Algorithms and Programming**
STANDARD		**Modularity**
EXPECTATION	3-5.AP.12.	Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.

STATE GOAL / DISCIPLINARY CONCEPT		**Illinois Computer Science Standards**
LEARNING STANDARD / DISCIPLINE		**Computer Science Standards**
DESCRIPTOR / CONTENT DISCIPLINE	**3-5.ET.**	**Emerging and Future Technologies**
STANDARD	3-5.ET.E.	Create new or original work by applying emerging technologies.

Grade **5** - 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.

Illinois Learning Standards

Technology Education

Grade **6** - 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.

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 **6** - 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 **5** - 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.5:	Use appropriate tools strategically.
STANDARD / STRAND		**Grade 5 Mathematics**
PROFICIENCY STATEMENT / SUBSTRAND		**Data Analysis – Learning Outcome: Students create questions appropriate to the data and answer the questions using multiple representations.**
INDICATOR / STANDARD	5.DA.1.	Formulate questions that can be addressed with categorical and numerical data and make predictions about the data. Collect, organize, and graph data from observations, surveys, and experiments using line plots with fractional intervals, histograms, or other graphical representations that appropriately represent the data set. (E)

Indiana Academic Standards

Mathematics

Grade **6** - 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.5:	Use appropriate tools strategically.
STANDARD / STRAND		**Grade 6 Mathematics**
PROFICIENCY STATEMENT / SUBSTRAND		**Data Analysis – Learning Outcome: Students represent data using line plots, histograms, and box plots.**
INDICATOR / STANDARD	6.DA.1.	Select, create, and interpret graphical representations of numerical data, including line plots, histograms, and box plots.
INDICATOR / STANDARD	6.DA.2.	Formulate statistical questions; collect and organize the data (e.g., using technology), and display and interpret the data with graphical representations (e.g., using technology). (E)

Indiana Academic Standards

Science

Grade **5** - Adopted: **2023**

STANDARD / STRAND		Science and Engineering Practices
PROFICIENCY STATEMENT / SUBSTRAND	SEP.2.	Developing and using models
PROFICIENCY STATEMENT / SUBSTRAND	SEP.5.	Using mathematics and computational thinking
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 5
PROFICIENCY STATEMENT / SUBSTRAND	**3-5-ETS1-1.**	**Engineering Design**
INDICATOR / STANDARD	3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

STANDARD / STRAND		Grade 5
PROFICIENCY STATEMENT / SUBSTRAND	**3-5-ETS1-2.**	**Engineering Design**
INDICATOR / STANDARD	3-5-ETS1-2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

STANDARD / STRAND		Grade 5
PROFICIENCY STATEMENT / SUBSTRAND	**3-5-ETS1-3.**	**Engineering Design**
INDICATOR / STANDARD	3-5-ETS1-3.	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Indiana Academic Standards

Science

Grade **6** - Adopted: **2023**

STANDARD / STRAND		Science and Engineering Practices

PROFICIENCY STATEMENT / SUBSTRAND	SEP.2.	Developing and using models
PROFICIENCY STATEMENT / SUBSTRAND	SEP.5.	Using mathematics and computational thinking
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 6**
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 6**
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 6**
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 **5** - Adopted: **2023**

STANDARD / STRAND		**Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Data & Information**
INDICATOR / STANDARD		**Learning Outcome: Students select aspects and portions of data to be transformed, clustered, and categorized to provide views and insights about the data.**

EXPECTATION / INDICATOR	3-5.DI.3.	Demonstrate how variables can represent data and are used to store and modify information.

STANDARD / STRAND		**Computer Science**
PROFICIENCY STATEMENT / SUBSTRAND		**Programs & Algorithms**
INDICATOR / STANDARD		**Learning Outcome: Students collaboratively engage in computer program development with consideration of documenting design choices and giving appropriate attributions.**

EXPECTATION / INDICATOR	3-5.PA.2.	Design programs that incorporate sequences, events, loops, and conditionals. (E)

Indiana Academic Standards

Technology Education

Grade **6** - 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 **5** - 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	5	Use appropriate tools strategically.

STRAND / COURSE	5.MD.	Measurement and Data 5.MD
ESSENTIAL CONCEPT AND/OR SKILL	**5.MD.B.**	**Represent and interpret data. (5.MD.B)**
DETAILED DESCRIPTOR	5.MD.B.2.	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally. (5.MD.B.2) (DOK 1,2)

Iowa Student Standards

Mathematics

Grade **6** - 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	5	Use appropriate tools strategically.

Iowa Student Standards

Science

Grade **5** - Adopted: **2015**

STRAND / COURSE	IA.3-5-ETS1.	Engineering Design
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
DETAILED DESCRIPTOR	3-5-ETS1-2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
DETAILED DESCRIPTOR	3-5-ETS1-3.	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Iowa Student Standards

Science

Grade **6** - Adopted: **2015**

STRAND / COURSE	IA.MS-ESS3.	Earth and Human Activity
ESSENTIAL CONCEPT AND/OR SKILL		**Students who demonstrate understanding can:**
DETAILED DESCRIPTOR	MS-ESS3-1.	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

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 **6** - 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 **5** - Adopted: **2018**

STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.1B.**	**Level 1B (Ages 8-11)**
DETAILED DESCRIPTOR	**1B-NI.**	**Networks & The Internet**
GRADE LEVEL EXPECTATION		**Cybersecurity**
EXAMPLE	1B-NI-05.	Discuss real-world cybersecurity problems and how personal information can be protected. (P3.1)

STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.1B.**	**Level 1B (Ages 8-11)**
DETAILED DESCRIPTOR	**1B-AP.**	**Algorithms & Programming**
GRADE LEVEL EXPECTATION		**Variables**
EXAMPLE	1B-AP-09.	Create programs that use variables to store and modify data. (P5.2)

STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.1B.**	**Level 1B (Ages 8-11)**
DETAILED DESCRIPTOR	**1B-AP.**	**Algorithms & Programming**
GRADE LEVEL EXPECTATION		**Control**
EXAMPLE	1B-AP-10.	Create programs that include sequences, events, loops, and conditionals. (P5.2)

STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.1B.**	**Level 1B (Ages 8-11)**
DETAILED DESCRIPTOR	**1B-AP.**	**Algorithms & Programming**

GRADE LEVEL EXPECTATION		**Program Development**
EXAMPLE	1B-AP-13.	Use an iterative process to plan the development of a program by including others'' perspectives and considering user preferences. (P1.1, P5.1)
EXAMPLE	1B-AP-16.	Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of program development. (P2.2)
STRAND / COURSE		**CSTA K-12 Computer Science Standards**
ESSENTIAL CONCEPT AND/OR SKILL	**CSTA.1B.**	**Level 1B (Ages 8-11)**
DETAILED DESCRIPTOR	**1B-IC.**	**Impacts of Computing**
GRADE LEVEL EXPECTATION		**Social Interactions**
EXAMPLE	1B-IC-20.	Seek diverse perspectives for the purpose of improving computational artifacts. (P1.1)

Iowa Student Standards
Technology Education
Grade **6** - 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)

Kansas Academic Standards
Mathematics
Grade **5** - 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.5.	Use appropriate tools strategically.
BENCHMARK	MP.7.	Look for and make use of structure.
STANDARD	**5.MD.**	**Measurement and Data**
BENCHMARK		**Represent and interpret data.**
INDICATOR / PROFICIENCY LEVEL	5.MD.2.	Make a data display (line plot, bar graph, pictograph) to show a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations (add, subtract, multiply) on fractions for this grade to solve problems involving information presented in the data display. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally. After lunch everyone measured how much milk they had left in their containers. Make a line plot showing data to the nearest 1/4 cup. Which value has the greatest amount? What is the total?

Kansas Academic Standards
Mathematics
Grade **6** - 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.5.	Use appropriate tools strategically.
BENCHMARK	MP.7.	Look for and make use of structure.

Kansas Academic Standards
Science
Grade **5** - Adopted: **2013**

STANDARD	KS.3-5-ETS.	ENGINEERING DESIGN
BENCHMARK	3-5-ETS1.	Engineering Design
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
INDICATOR	3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
INDICATOR	3-5-ETS1-2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
INDICATOR	3-5-ETS1-3.	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Kansas Academic Standards

Science

Grade **6** - Adopted: **2013**

STANDARD	KS.MS-PS.	PHYSICAL SCIENCE
BENCHMARK	MS-PS3.	Energy
INDICATOR / PROFICIENCY LEVEL		Students who demonstrate understanding can:
INDICATOR	MS-PS3-1.	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
INDICATOR	MS-PS3-5.	Construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object.

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-ESS3-1.	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
INDICATOR	MS-ESS3-4.	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

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 **6** - 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 **5** - Adopted: **2019**

STANDARD		**Computer Science Standards – Grade 5**
BENCHMARK		**Algorithms and Programming**
INDICATOR / PROFICIENCY LEVEL		**Variables**
INDICATOR	5.AP.V.01.	Utilize, create, and modify programs that use, modify, and combine variables with grade level appropriate data.
STANDARD		**Computer Science Standards – Grade 5**
BENCHMARK		**Algorithms and Programming**
INDICATOR / PROFICIENCY LEVEL		**Control**
INDICATOR	5.AP.C.01.	Create programs using a programming language that utilize sequencing, repetition, conditionals, event handlers, and variables to solve a problem or express ideas both independently and collaboratively.
STANDARD		**Computer Science Standards – Grade 5**
BENCHMARK		**Algorithms and Programming**
INDICATOR / PROFICIENCY LEVEL		**Program Development**
INDICATOR	5.AP.PD.03.	Analyze, debug (identify/fix errors), and create a program that includes sequencing, repetition and variables in a programming language.
STANDARD		**Computer Science Standards – Grade 5**
BENCHMARK		**Impacts of Computing**

INDICATOR / PROFICIENCY LEVEL		**Culture**
INDICATOR	5.IC.C.01.	Develop, test, and refine digital artifacts to improve accessibility and usability for a computing device or program.

Kansas Academic Standards

Technology Education

Grade **6** - 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 **5** - 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.5.	Use appropriate tools strategically.
CATEGORY / GOAL	MP.7.	Look for and make use of structure.

Kentucky Academic Standards

Mathematics

Grade **6** - 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.5.	Use appropriate tools strategically.
CATEGORY / GOAL	MP.7.	Look for and make use of structure.
STRAND		**The Number System**
CATEGORY / GOAL		**Cluster: Compute fluently with multi-digit numbers and find common factors and multiples.**
STANDARD / ORGANIZER	**KY.6.NS.2.**	**Fluently divide multi-digit numbers using an algorithm. (MP.7, MP.8)**
EXPECTATION	KY.6.NS.2.a.	Convert a rational number to a decimal using long division.

Kentucky Academic Standards

Science

Grade **5** - Adopted: **2022**

STRAND		**3-5 Engineering Design**

CATEGORY / GOAL	3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
CATEGORY / GOAL	3-5-ETS1-2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
CATEGORY / GOAL	3-5-ETS1-3.	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Kentucky Academic Standards

Science

Grade **6** - Adopted: **2022**

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 **5** - Adopted: **2018**

STRAND		Kentucky Academic Standards (KAS) for Computer Science
CATEGORY / GOAL		Algorithms and Programming
STANDARD / ORGANIZER	E-AP-02.	Explore and use variables in a program. Information in the real world can be represented in computer programs. Additionally, different actions are available for different kinds of information. Students should demonstrate the understanding that variables are not just used for numbers; they can also hold text, including whole sentences (strings) or logical values (true or false). Students should also demonstrate that a variable has a data type and is associated with a data storage location.
EXPECTATION		Variables
INDICATOR	E-AP-02.5.	Create a program that uses a variable.

STRAND		Kentucky Academic Standards (KAS) for Computer Science
CATEGORY / GOAL		Algorithms and Programming
STANDARD / ORGANIZER	E-AP-03.	Routinely create programs using a variety of tools to express ideas, address a problem or create an artifact, individually and collaboratively. Programming is used as a tool to create products that reflect a wide range of interests, including to solve a problem, express and idea or create an artifact. People work together to plan, create and test programs within a context that is relevant to the programmer and those who will use the program. When creating programs, students need to have opportunities to work both individually and with peers. For young learners, collaboration through programming should be encouraged. Student should begin exploring the use of simple sequences and simple loops in Kindergarten and progress to using more complex sequences, loops, events, variables and conditionals by 5th grade.
EXPECTATION		Control

INDICATOR	E-AP-03.5.	Routinely create simple programs with sequences, events, loops, variables or conditionals routinely using a variety of tools, independently and collaboratively.

STRAND		**Kentucky Academic Standards (KAS) for Computer Science**
CATEGORY / GOAL		**Algorithms and Programming**
STANDARD / ORGANIZER	**E-AP-05.**	**Use a process when creating programs or computational artifacts. Students demonstrate the use of formal and informal processes for creating computational artifacts or programs include processes to: ask, imagine, plan, create, test and improve, share; or a creative thinking spiral (i.e. imagine, create, play, share, reflect); and design thinking (empathize, define, ideate, prototype, test). Students demonstrate understanding that these processes are iterative: designed for students to cycle through more than once in order to improve or modify the design and reach the best possible result.**
EXPECTATION		**Modularity**

INDICATOR	E-AP-05.5.	Use a process to create programs that include loops, sequences, events, variables or conditions.

Grade **5** - Adopted: **2015**

STRAND		**Technology – Intermediate**
CATEGORY / GOAL		**Big Idea: Information, Communication and Productivity – Students demonstrate a sound understanding of the nature and operations of technology systems. Students use technology to learn, to communicate, increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.**
STANDARD / ORGANIZER		**Academic Expectations**

EXPECTATION	I.BI1.AE.6.1.	Students connect knowledge and experiences from different subject areas.

STRAND		**Technology – Intermediate**
CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**Academic Expectations**

EXPECTATION	I.BI3.AE.6.1.	Students connect knowledge and experiences from different subject areas.

STRAND		**Technology – Intermediate**
CATEGORY / GOAL		**Big Idea: Research, Inquiry/Problem-Solving and Innovation – Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.**
STANDARD / ORGANIZER		**Intermediate Skills and Concepts – Research**

EXPECTATION	I.BI3.SC1.5.	Use content-specific tools to enhance understanding of content (e.g., environmental probes, sensors, robotics, simulation software and measuring devices).

Kentucky Academic Standards

Technology Education

Grade **6** - 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.

Grade **6** - Adopted: **2015**

STRAND		**Technology – Middle**
CATEGORY / GOAL		**Big Idea: Information, Communication and Productivity – Students demonstrate a sound understanding of the nature and operations of technology systems. Students use technology to learn, to communicate, increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.**
STANDARD / ORGANIZER		**Academic Expectations**

EXPECTATION	M.BI1.AE.6.1.	Students connect knowledge and experiences from different subject areas.

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

Louisiana Academic Standards

Mathematics

Grade **5** - 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.5.	Use appropriate tools strategically.
STRAND	**5.MD.**	**Measurement and Data**
TITLE	**5.MD.B.**	**Represent and interpret data.**
PERFORMANCE EXPECTATION	5.MD.B.2.	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Louisiana Academic Standards

Mathematics

Grade **6** - 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.5.	Use appropriate tools strategically.

Louisiana Academic Standards

Science

Grade **6** - Adopted: **2017**

STRAND	LA.SC.6.	Science – Grade 6
TITLE	6-MS-PS3.	ENERGY
PERFORMANCE EXPECTATION	6-MS-PS3-1.	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

STRAND	LA.SC.6.	Science – Grade 6
TITLE	6-MS-ESS1.	EARTH'S PLACE IN THE UNIVERSE
PERFORMANCE EXPECTATION	6-MS-ESS3-4.	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

Louisiana Academic Standards

Technology Education

Grade **6** - 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 **5** - 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	MP5.	Use appropriate tools strategically: Students will use math tools such as tables, diagrams, and technology to explore and deepen their understanding of concepts.
STRAND / DOMAIN		Statistical Reasoning – Measurement & Data

CATEGORY / PERFORMANCE INDICATOR	**SR.C.6**	**Represent and interpret data.**
STANDARD	5.MD.B.2:	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Maine Learning Results

Mathematics

Grade **6** - 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	MP5.	Use appropriate tools strategically: Students will use math tools such as tables, diagrams, and technology to explore and deepen their understanding of concepts.

Maine Learning Results

Science

Grade **5** - Adopted: **2019**

STRAND / DOMAIN	**NGSS.3-5-ETS.**	**ENGINEERING DESIGN**
CATEGORY / PERFORMANCE INDICATOR	**3-5-ETS1.**	**Engineering Design**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
EXPECTATION	3-5-ETS1-2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
EXPECTATION	3-5-ETS1-3.	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Maine Learning Results

Science

Grade **6** - Adopted: **2019**

STRAND / DOMAIN	**NGSS.MS-PS.**	**PHYSICAL SCIENCE**
CATEGORY / PERFORMANCE INDICATOR	**MS-PS3.**	**Energy**
STANDARD		**Students who demonstrate understanding can:**
EXPECTATION	MS-PS3-1.	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
EXPECTATION	MS-PS3-5.	Construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object.

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-ESS3-1.	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
EXPECTATION	MS-ESS3-4.	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

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.

Maryland College and Career-Ready Standards

Mathematics

Grade **5** - Adopted: **2010**

STRAND / TOPIC / STANDARD		**Grade 5 Math**
TOPIC / INDICATOR	**5.MD.**	**Measurement and Data**

INDICATOR / PROFICIENCY LEVEL	**5.MD.B.**	**Represent and interpret data.**
OBJECTIVE	5.MD.B.2.	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4,1/8), Use operations for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally. (4.MD.B.4)

Maryland College and Career-Ready Standards

Science

Grade **5** - Adopted: **2013**

STRAND / TOPIC / STANDARD	**NGSS.3-5-ETS.**	**ENGINEERING DESIGN**
TOPIC / INDICATOR	**3-5-ETS1.**	**Engineering Design**
INDICATOR / PROFICIENCY LEVEL		**Students who demonstrate understanding can:**
OBJECTIVE	3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
OBJECTIVE	3-5-ETS1-2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
OBJECTIVE	3-5-ETS1-3.	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Maryland College and Career-Ready Standards

Science

Grade **6** - 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-PS3-1.	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
OBJECTIVE	MS-PS3-5.	Construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object.
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-ESS3-1.	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
OBJECTIVE	MS-ESS3-4.	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
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 **5** - Adopted: **2018**

STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Algorithms and Programming**
INDICATOR / PROFICIENCY LEVEL		**Subconcept: Variables**
OBJECTIVE	5.AP.V.01.	Create programs that use variables to store and modify grade-level appropriate data.
STRAND / TOPIC / STANDARD		**Maryland's K-12 Computer Science Standards**
TOPIC / INDICATOR		**Concept: Algorithms and Programming**
INDICATOR / PROFICIENCY LEVEL		**Subconcept: Control**
OBJECTIVE	5.AP.C.01.	Using a programming language, create programs that include sequences, loops, conditionals, event handlers, and variables that utilize mathematics operations to manipulate values in order to solve a problem or express an idea.

Maryland College and Career-Ready Standards

Technology Education

Grade **6** - Adopted: **2018**

STRAND / TOPIC / STANDARD		Maryland's K-12 Computer Science Standards
TOPIC / INDICATOR		Concept: Algorithms and Programming
INDICATOR / PROFICIENCY LEVEL		Subconcept: Variables
OBJECTIVE	6.AP.V.01.	Decide when and how to declare and name new variables.

STRAND / TOPIC / STANDARD		Maryland's K-12 Computer Science Standards
TOPIC / INDICATOR		Concept: Algorithms and Programming
INDICATOR / PROFICIENCY LEVEL		Subconcept: Control
OBJECTIVE	6.AP.C.01.	Develop secure programs that utilize combinations of loops, conditionals, and the manipulation of variables representing different data types.

Grade **6** - 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		Analyze how power systems are used to drive and provide propulsion to other technological products and systems (STL, 16H).
EXPECTATION		Design, construct, and test a device that either minimizes or maximizes energy transfer (MS-PS3-3).
EXPECTATION		Explore ways to conserve energy.
EXPECTATION		Assess advantages and disadvantages of different forms of renewable and nonrenewable energy.
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		**Transportation Technologies**

EXPECTATION		Design and develop a model of a new energy efficient vehicle to be use on land, in the sea, in the air, or in space.
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 **5** - 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.5.	Use appropriate tools strategically.
FOCUS / COURSE	**MA.5.MD.**	**Measurement and Data**
STRAND	**5.MD.B.**	**Represent and interpret data.**
STANDARD / CONCEPT / SKILL	5.MD.B.2.	Make a line plot (dot plot) to display a data set of measurements in fractions of a unit. Use operations on fractions for this grade to solve problems involving information presented in line plot (dot plot). For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Massachusetts Curriculum Frameworks

Mathematics

Grade **6** - 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.5.	Use appropriate tools strategically.

Massachusetts Curriculum Frameworks

Science

Grade **5** - Adopted: **2016**

FOCUS / COURSE	**MA.5-ETS.**	**Grade 5: Technology/Engineering**
STRAND	**ETS3.**	**Technological Systems**
STANDARD / CONCEPT / SKILL	5.3-5-ETS3-1(MA).	Use informational text to provide examples of improvements to existing technologies (innovations) and the development of new technologies (inventions). Recognize that technology is any modification of the natural or designed world done to fulfill human needs or wants.

Massachusetts Curriculum Frameworks

Science

Grade **6** - Adopted: **2016**

FOCUS / COURSE	**MA.6-ETS.**	**Grade 6: Technology/Engineering**
STRAND	**ETS1.**	**Engineering Design**
STANDARD / CONCEPT / SKILL	6.MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution. Include potential impacts on people and the natural environment that may limit possible solutions.

STANDARD / CONCEPT / SKILL	6.MS-ETS1-6(MA).	Communicate a design solution to an intended user, including design features and limitations of the solution.
FOCUS / COURSE	**MA.6-ETS.**	**Grade 6: Technology/Engineering**
STRAND	**ETS2.**	**Materials, Tools, and Manufacturing**
STANDARD / CONCEPT / SKILL	6.MS-ETS2-2(MA).	Given a design task, select appropriate materials based on specific properties needed in the construction of a solution.
STANDARD / CONCEPT / SKILL	6.MS-ETS2-3(MA).	Choose and safely use appropriate measuring tools, hand tools, fasteners, and common hand-held power tools used to construct a prototype.

Grade **6** - 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 **5** - Adopted: **2016**

FOCUS / COURSE	**MA.3-5.CT.**	**Grades 3 – 5: Computational Thinking (CT)**
STRAND	**3-5.CT.d.**	**Programming and Development**
STANDARD / CONCEPT / SKILL	3-5.CT.d.1.	Individually and collaboratively create, test, and modify a program in a graphical environment (e.g., block-based visual programming language).
STANDARD / CONCEPT / SKILL	3-5.CT.d.2.	Use arithmetic operators, conditionals, and repetition in programs.

FOCUS / COURSE	**MA.3-5.CT.**	**Grades 3 – 5: Computational Thinking (CT)**
STRAND	**3-5.CT.e.**	**Modeling and Simulation**
STANDARD / CONCEPT / SKILL	3-5.CT.e.1.	Individually and collaboratively create a simple model of a system (e.g., water cycle, solar system) and explain what the model shows and does not show.
STANDARD / CONCEPT / SKILL	3-5.CT.e.2.	Identify the concepts, features, and behaviors illustrated by a simulation (e.g., object motion, weather, ecosystem, predator/prey) and those that were not included.

STANDARD / CONCEPT / SKILL	3-5.CT.e.3.	Individually and collaboratively use data from a simulation to answer a question.

Massachusetts Curriculum Frameworks

Technology Education

Grade **6** - 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 **5** - Adopted: **2010**

STRAND / STANDARD CATEGORY	**MI.CC.MP.5.**	**Mathematical Practices**
STANDARD	MP.5.1.	Make sense of problems and persevere in solving them.
STANDARD	MP.5.2.	Reason abstractly and quantitatively.
STANDARD	MP.5.3.	Construct viable arguments and critique the reasoning of others.
STANDARD	MP.5.4.	Model with mathematics.

STANDARD	MP.5.5.	Use appropriate tools strategically.
STRAND / STANDARD CATEGORY	**MI.CC.MD.5.**	**Measurement and Data**
STANDARD		**Represent and interpret data.**
GRADE LEVEL EXPECTATION	MD.5.2.	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Michigan Academic Standards

Mathematics

Grade **6** - Adopted: **2010**

STRAND / STANDARD CATEGORY	**MI.CC.MP.6.**	**Mathematical Practices**
STANDARD	MP.6.1.	Make sense of problems and persevere in solving them.
STANDARD	MP.6.2.	Reason abstractly and quantitatively.
STANDARD	MP.6.3.	Construct viable arguments and critique the reasoning of others.
STANDARD	MP.6.4.	Model with mathematics.
STANDARD	MP.6.5.	Use appropriate tools strategically.

Michigan Academic Standards

Science

Grade **5** - Adopted: **2015**

STRAND / STANDARD CATEGORY	**MI.SC.5.**	**Engineering Design**
STANDARD	3-5-ETS1-1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
STANDARD	3-5-ETS1-2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
STANDARD	3-5-ETS1-3.	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Michigan Academic Standards

Science

Grade **6** - Adopted: **2015**

STRAND / STANDARD CATEGORY	**MI.SC.4.**	**Energy**

STANDARD	MS-PS3-1.	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
STANDARD	MS-PS3-5.	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
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.15.**	**Earth's Systems**
STANDARD	MS-ESS3-1.	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
STRAND / STANDARD CATEGORY	**MI.SC.17.**	**Human Impacts**
STANDARD	MS-ESS3-4.	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
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 **6** - 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 **5** - 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 **5** - Adopted: **2019**

STRAND / STANDARD CATEGORY		Michigan Computer Science Standards
STANDARD		LEVEL 1B: UPPER ELEMENTARY (GRADES 3-5)
GRADE LEVEL EXPECTATION		ALGORITHMS AND PROGRAMMING
EXPECTATION	1B-AP-09.	Create programs that use variables to store and modify data. Subconcept: Variables; Practice 5.2
EXPECTATION	1B-AP-10.	Create programs that include sequences, events, loops, and conditionals. Subconcept: Control; Practice 5.2
EXPECTATION	1B-AP-12.	Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features. Subconcept: Modularity; Practice 5.3

Michigan Academic Standards

Technology Education

Grade **6** - 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 **6** - 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 **5** - Adopted: **2008**

CONTENT STANDARD / DOMAIN	MN.5.1.	Numbers & Operation
PERFORMANCE INDICATOR / DOMAIN COMPONENT	5.1.1.	Divide multi-digit numbers; solve real-world and mathematical problems using arithmetic.
INDICATORS OF PROGRESS / STRAND	5.1.1.4.	Solve real-world and mathematical problems requiring addition, subtraction, multiplication and division of multi-digit whole numbers. Use various strategies, including the inverse relationships between operations, the use of technology, and the context of the problem to assess the reasonableness of results.

CONTENT STANDARD / DOMAIN	MN.5.1.	Numbers & Operation
PERFORMANCE INDICATOR / DOMAIN COMPONENT	5.1.2.	Read, write, represent and compare fractions and decimals; recognize and write equivalent fractions; convert between fractions and decimals; use fractions and decimals in real world and mathematical situations.
INDICATORS OF PROGRESS / STRAND	5.1.2.4.	Recognize and generate equivalent decimals, fractions, mixed numbers and improper fractions in various contexts.

Minnesota Academic Standards

Mathematics

Grade **6** - Adopted: **2008**

CONTENT STANDARD / DOMAIN	MN.6.1.	Number & Operation
PERFORMANCE INDICATOR / DOMAIN COMPONENT	6.1.1.	Read, write, represent and compare positive rational numbers expressed as fractions, decimals, percents and ratios; write positive integers as products of factors; use these representations in real-world and mathematical situations.
INDICATORS OF PROGRESS / STRAND	6.1.1.4.	Determine equivalences among fractions, decimals and percents; select among these representations to solve problems.
INDICATORS OF PROGRESS / STRAND	6.1.1.7.	Convert between equivalent representations of positive rational numbers.

Minnesota Academic Standards

Science

Grade **5** - Adopted: **2009**

CONTENT STANDARD / DOMAIN	**MN.5.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**5.1.3.**	**Interactions Among Science, Technology, Engineering, Mathematics, and Society**
INDICATORS OF PROGRESS / STRAND	**5.1.3.4.**	**The student will understand that tools and mathematics help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish.**
INDICATORS OF PROGRESS	5.1.3.4.1.	Use appropriate tools and techniques in gathering, analyzing and interpreting data.

CONTENT STANDARD / DOMAIN	**MN.5.2.**	**Physical Science**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**5.2.2.**	**Motion**
INDICATORS OF PROGRESS / STRAND	**5.2.2.1.**	**The student will understand that an object's motion is affected by forces and can be described by the object's speed and the direction it is moving.**
INDICATORS OF PROGRESS	5.2.2.1.1.	Give examples of simple machines and demonstrate how they change the input and output of forces and motion.

CONTENT STANDARD / DOMAIN	**MN.5.3.**	**Earth and Space Science**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**5.3.4.**	**Human Interaction with Earth Systems**
INDICATORS OF PROGRESS / STRAND	**5.3.4.1.**	**The student will understand that in order to maintain and improve their existence, humans interact with and influence Earth systems.**
INDICATORS OF PROGRESS	5.3.4.1.1.	Identify renewable and non-renewable energy and material resources that are found in Minnesota and describe how they are used.
INDICATORS OF PROGRESS	5.3.4.1.2.	Give examples of how mineral and energy resources are obtained and processed and how that processing modifies their properties to make them more useful.

Minnesota Academic Standards

Science

Grade **6** - Adopted: **2009**

CONTENT STANDARD / DOMAIN	**MN.6.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**6.1.2.**	**The Practice of Engineering**

INDICATORS OF PROGRESS / STRAND	**6.1.2.1.**	**The student will understand that engineers create, develop and manufacture machines, structures, processes and systems that impact society and may make humans more productive.**
INDICATORS OF PROGRESS	6.1.2.1.2.	Recognize that there is no perfect design and that new technologies have consequences that may increase some risks and decrease others.
CONTENT STANDARD / DOMAIN	**MN.6.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**6.1.2.**	**The Practice of Engineering**
INDICATORS OF PROGRESS / STRAND	**6.1.2.2.**	**The student will understand that engineering design is the process of devising products, processes and systems that address a need, capitalize on an opportunity, or solve a specific problem.**
INDICATORS OF PROGRESS	6.1.2.2.1.	Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system that solves a problem.
CONTENT STANDARD / DOMAIN	**MN.6.1.**	**The Nature of Science and Engineering**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**6.1.3.**	**Interactions Among Science, Technology, Engineering, Mathematics, and Society**
INDICATORS OF PROGRESS / STRAND	**6.1.3.4.**	**The student will understand that current and emerging technologies have enabled humans to develop and use models to understand and communicate how natural and designed systems work and interact.**
INDICATORS OF PROGRESS	6.1.3.4.1.	Determine and use appropriate safe procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in a physical science context.
CONTENT STANDARD / DOMAIN	**MN.6.2.**	**Physical Science**
PERFORMANCE INDICATOR / DOMAIN COMPONENT	**6.2.3.**	**Energy**
INDICATORS OF PROGRESS / STRAND	**6.2.3.2.**	**The student will understand that energy can be transformed within a system or transferred to other systems or the environment.**
INDICATORS OF PROGRESS	6.2.3.2.1.	Differentiate between kinetic and potential energy and analyze situations where kinetic energy is converted to potential energy and vice versa.
INDICATORS OF PROGRESS	6.2.3.2.2.	Trace the changes of energy forms, including thermal, electrical, chemical, mechanical or others as energy is used in devices.
INDICATORS OF PROGRESS	6.2.3.2.3.	Describe how energy is transferred in conduction, convection and radiation.

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 **5** - 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.5.	Use appropriate tools strategically.

THEME	**MS.5.MD.**	**Measurement and Data (MD)**
SUBJECT		**Represent and interpret data**
STANDARD	5.MD.2.	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Mississippi College & Career Readiness Standards

Mathematics

Grade **6** - 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.5.	Use appropriate tools strategically.

Mississippi College & Career Readiness Standards
Science
Grade **5** - Adopted: **2018**

THEME	**MS.P.5.**	**GRADE FIVE: Physical Science**
SUBJECT		**Organization of Matter and Chemical Interactions**
STANDARD	**P.5.5A.**	**Students will demonstrate an understanding of the physical properties of matter.**
OBJECTIVE	P.5.5A.5.	Design a vessel that can safely transport a dense substance (e.g., syrup, coins, marbles) through water at various distances and under variable conditions. Use an engineering design process to define the problem, design, construct, evaluate, and improve the vessel.

Mississippi College & Career Readiness Standards
Science
Grade **6** - Adopted: **2018**

THEME	**MS.P.6.**	**GRADE SIX: Physical Science**
SUBJECT		**Motions, Forces, and Energy**
STANDARD	**P.6.6.**	**Students will demonstrate an understanding of Newton's laws of motion using real world models and examples.**
OBJECTIVE	P.6.6.7.	Determine the relationships between the concepts of potential, kinetic, and thermal energy.

Mississippi College & Career Readiness Standards
Technology Education
Grade **5** - Adopted: **2018**

THEME		**Mississippi College- and Career-Readiness Standards for Computer Science**
SUBJECT		**Level 1B: GRADES 3-5 - Algorithms and Programming**
STANDARD	**AP.1B.**	**Algorithms and Programming (AP.1B)**
OBJECTIVE	**AP.1B.2.**	**Create programs that use variables to store and modify data. [VARIABLES] (P5.2)**
OBJECTIVE	AP.1B.2a.	Students should understand how to use variables to store and modify data.

THEME		**Mississippi College- and Career-Readiness Standards for Computer Science**
SUBJECT		**Level 1B: GRADES 3-5 - Algorithms and Programming**
STANDARD	**AP.1B.**	**Algorithms and Programming (AP.1B)**
OBJECTIVE	**AP.1B.3.**	**Create programs that include sequences, events, loops, and conditionals. [CONTROL] (P5.2)**
OBJECTIVE	AP.1B.3a.	Students should be able to create programs that include sequences, events, loops, and conditionals.

Mississippi College & Career Readiness Standards

Technology Education

Grade **6** - 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

Mathematics

Grade **5** - Adopted: **2016**

STRAND: BIG IDEA / STANDARD	**MO.5.NBT.**	**Number Sense and Operations in Base Ten**
CONCEPT: GLE / BENCHMARK	**5.NBT.A.**	**Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.**
GLE / COMPONENT	5.NBT.A.6.	Add and subtract multi-digit whole numbers and decimals to the thousandths place, and justify the solution.

STRAND: BIG IDEA / STANDARD	**MO.5.NF.**	**Number Sense and Operations in Fractions**
CONCEPT: GLE / BENCHMARK	**5.NF.A.**	**Understand the relationship between fractions and decimals (denominators that are factors of 100).**
GLE / COMPONENT	5.NF.A.2.	Convert decimals to fractions and fractions to decimals.

STRAND: BIG IDEA / STANDARD	**MO.5.DS.**	**Data and Statistics**
CONCEPT: GLE / BENCHMARK	**5.DS.A.**	**Represent and analyze data.**
GLE / COMPONENT	5.DS.A.2.	Create a line plot to represent a given or generated data set, and analyze the data to answer questions and solve problems, recognizing the outliers and generating the median.

Missouri Learning Standards

Mathematics

Grade **6** - Adopted: **2016**

STRAND: BIG IDEA / STANDARD	**MO.6.NS.**	**Number Sense and Operations**

CONCEPT: GLE / BENCHMARK	**6.NS.C.**	**Apply and extend previous understandings of numbers to the system of rational numbers.**
GLE / COMPONENT	6.NS.C.8.	Extend prior knowledge to generate equivalent representations of rational numbers between fractions, decimals and percentages (limited to terminating decimals and/or benchmark fractions of 1/3 and 2/3).

Missouri Learning Standards

Science

Grade **5** - Adopted: **2016**

STRAND: BIG IDEA / STANDARD	**MO.5.ETS1.**	**Engineering Design**
CONCEPT: GLE / BENCHMARK	**5.ETS1.A.**	**Defining and Delimiting Engineering Problems**
GLE / COMPONENT	5.ETS1.A.1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

STRAND: BIG IDEA / STANDARD	**MO.5.ETS1.**	**Engineering Design**
CONCEPT: GLE / BENCHMARK	**5.ETS1.B.**	**Developing Possible Solutions**
GLE / COMPONENT	5.ETS1.B.1.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

STRAND: BIG IDEA / STANDARD	**MO.5.ETS1.**	**Engineering Design**
CONCEPT: GLE / BENCHMARK	**5.ETS1.C.**	**Optimizing the Solution Process**
GLE / COMPONENT	5.ETS1.C.1.	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Missouri Learning Standards

Science

Grade **6** - 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.1.	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. [Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a whiffle ball versus a tennis ball.]

STRAND: BIG IDEA / STANDARD	**MO.6-8.PS.**	**Physical Sciences**
CONCEPT: GLE / BENCHMARK	**6-8.PS3.**	**Energy**
GLE / COMPONENT	**6-8.PS3.B.**	**Conservation of Energy and Energy Transfer**
INDICATOR / PROFICIENCY	6-8.PS3.B.1.	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. [Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.]

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.A.**	**Natural Resources**
INDICATOR / PROFICIENCY	6-8.ESS3.A.1.	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes and human activity. [Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering and/or deposition of rock).]

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.1.	Analyze data to define the relationship for how increases in human population and per-capita consumption of natural resources impact Earth's systems. [Clarification Statement: Examples of data include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change.]

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 **6** - 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 **5** - Adopted: **2019**

STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Variables**
INDICATOR / PROFICIENCY	5.AP.V.01.	Create programs that use variables to store and modify grade level appropriate data.

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

CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Control**
INDICATOR / PROFICIENCY	5.AP.C.01.	Create a program using control structures (e.g., sequence, conditionals, interactive-looping), event handlers and variables to solve a problem or express ideas both independently and collaboratively.
STRAND: BIG IDEA / STANDARD		**Computer Science Performance Standards**
CONCEPT: GLE / BENCHMARK		**Algorithms & Programming**
GLE / COMPONENT		**Program Development**
INDICATOR / PROFICIENCY	5.AP.PD.03.	Analyze, examine, create and debug a program that includes sequencing, repetition, conditionals and variables in a programming language.
INDICATOR / PROFICIENCY	5.AP.PD.04.	Communicate and explain your program development using comments, presentations and interactive demonstrations.

Missouri Learning Standards

Technology Education

Grade **6** - 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 **5** - 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.5.	Use appropriate tools strategically.
CONTENT STANDARD / DOMAIN	**MT.CC.5.MD.**	**Measurement and Data**
BENCHMARK / STANDARD		**Represent and interpret data.**
GRADE LEVEL EXPECTATION / BENCHMARK	5.MD.2.	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Montana Content Standards

Mathematics

Grade **6** - 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.5.	Use appropriate tools strategically.

Montana Content Standards

Science

Grade **6** - 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.12.	Construct and interpret graphic displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object
BENCHMARK / STANDARD	6-8.PS.16.	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object
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.9.	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes
BENCHMARK / STANDARD	6-8.ESS.15.	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems including indigenous populations

Grade **6** - 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.

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR FIFTH GRADE
BENCHMARK / STANDARD	**(4)**	**The innovative designer content standards for fifth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(a)	use digital and non-digital tools to plan and manage a design process; and
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(b)	use design process to develop and test prototypes.

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR FIFTH GRADE
BENCHMARK / STANDARD	**(5)**	**The computational thinker content standards for fifth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(5)(a)	explore or solve problems by selecting technology for data analysis, modeling and algorithmic thinking;

CONTENT STANDARD / DOMAIN		CONTENT STANDARDS FOR TECHNOLOGY INTEGRATION FOR FIFTH GRADE
BENCHMARK / STANDARD	**(6)**	**The creative communicator content standards for fifth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(6)(b)	use a variety of strategies for remixing or repurposing to create new works; and
GRADE LEVEL EXPECTATION / BENCHMARK	(6)(c)	create digital objects to communicate ideas visually and graphically.

CONTENT STANDARD / DOMAIN		COMPUTER SCIENCE CONTENT STANDARDS FOR FIFTH GRADE
BENCHMARK / STANDARD	**(1)**	**Computer science algorithms and programming standards for fifth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(b)	create programs that use variables to store and modify data;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(c)	create programs that include sequences, events, loops, and conditionals;
GRADE LEVEL EXPECTATION / BENCHMARK	(1)(d)	modify, remix, or incorporate portions of an existing program to develop something new or add more advanced features; and

CONTENT STANDARD / DOMAIN		COMPUTER SCIENCE CONTENT STANDARDS FOR FIFTH GRADE
BENCHMARK / STANDARD	**(4)**	**Computer science impacts of computing standards for fifth grade are that each student will:**
GRADE LEVEL EXPECTATION / BENCHMARK	(4)(c)	utilize diverse perspectives for the purpose of improving computational artifacts;

Montana Content Standards

Technology Education

Grade **6** - 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