Park Hill School District

Building Successful Futures • Each Student • Every Day

8th Grade Resource Science Curriculum

Course Description: Students will engage in units related to three core areas in science: matter and energy, Earth's processes, and living things. Throughout the units, students will develop models to describe their learning, construct scientific explanations based on evidence, analyze and interpret data and evidence, and construct, test, and modify a device to illustrate concepts.

Scope and Sequence:

Timeframe	Unit	Instructional Topics
19-32 Days	Chemical Reactions	Topic 1: Structure of Matter Topic 2: Physical and Chemical Properties Topic 3: Synthetic Materials Topic 4: Characteristics of Chemical Reactions Topic 5: Modeling Conservation of Mass
7-16 Days	Structure and Properties of Matter	Topic 1: Heat and Matter Topic 2: Changes in Energy on the Molecular Level Topic 3: Thermal Energy in Chemical Reactions
8-15 Days	Energy Transfer in Temperature	Topic 1: Thermal Energy Transfer Topic 2: Energy Transfer and Temperature
18-32 Days	Earth's Materials, Systems, and Natural Hazards	Topic 1: Earth's Materials Topic 2: Weathering and Erosion Topic 3: Geoscience Processes Topic 4: Natural Hazard Predictions
12-20 Days	Evidence of Common Ancestry and Diversity	Topic 1: Geologic History of Earth Topic 2: Fossil Record (From Life Bundle 5:

		Evidence of Common Ancestry and Diversity) Topic 3: Plate Tectonics Topic 4: Seafloor Spreading
15-26 Days	Structure, Function, and Information Processing	Topic 1: Cells Topic 2: Anatomy of a Cell Topic 3: Bodies and Systems Topic 4: Sensory Receptors

**This document contains the entire 8th Grade Science curriculum that is taught in a regular education setting. Items that are highlighted in yellow have been designated as priority information that should be taught in the 8th Grade Resource Science class.*

Unit 1: Physical Bundle 1 - Chemical Reactions

Subject: Science
Grade: 8th
Name of Unit: Chemical Reactions
Length of Unit: 19-29 days
Overview of Unit: Students create their own chemical reaction using fictional substances. They write a balanced chemical equations and then create a model of the atomic structure of the substances used. The final product will include a description of the properties of the reactants and products and how matter is conserved during the reaction.

Priority Standards for unit:

- 6-8.PS1.A.1 Develop models to describe the atomic composition of simple molecules and extended structures.
- 6-8.PS1.A.2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
- 6-8.PS1.A.3 Gather, analyze, and present information to describe that synthetic materials come from natural resources and how they impact society.
- 6-8.PS1.B.1 Develop and use a model to describe how the total number of atoms remains the same during a chemical reaction and thus mass is conserved.

Supporting Standards for unit:

- ISTE - KNOWLEDGE CONSTRUCTOR .3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- ISTE - INNOVATIVE DESIGNER.4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
- ISTE - COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
- ISTE - CREATIVE COMMUNICATOR.6: 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.
- 6-8.ETS1.A 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.
- 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.

- 6-8-ETS1.B.2 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- 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.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
models to describe the atomic composition of simple molecules	Develop	Create	3
models to describe the atomic composition of extended structures.	Develop	Create	3
data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	Analyze	Analyze	3
data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	Interpret	Evaluate	3
a device that either releases or absorbs thermal energy by chemical processes.	Construct	Create	3
a device that either releases or absorbs thermal energy by chemical processes.	Test	Apply	3
a device that either releases or absorbs thermal energy by chemical processes.	Modify	Analyze	4
a model to describe how the total number of atoms remains the same during a chemical reaction and thus mass is conserved.	Develop	Create	3
a model to describe how the total number of atoms remains the same during a chemical reaction and thus mass is conserved.	Use	Apply	3

Essential Questions:

1. What is all matter made of?
2. What is the difference between physical and chemical properties?
3. What happens to atoms in chemical reactions?
4. What are synthetic materials?
5. Describe the law of conservation of mass.

Enduring Understanding/Big Ideas:

1. Atoms are the basic structure of all matter. Atoms can be combined to form molecules of various substances. Atoms make up all of the different kinds of matter in the universe, either as molecules of a single type of atom or in combination with other atoms. Atoms are made of protons, neutrons, and electrons, in a specific arrangement for each element
2. The Periodic Table of Elements is a way of organizing all known elements by their physical and chemical properties.
3. A model in science is anything that can represent an object, law, or theory or that can be used as a tool for understanding. Every model is created for a purpose, and all models are imperfect.
4. Pure substances have physical and chemical properties that can be used to identify the substance. While many pure substances share one or more physical and/or chemical properties, a unique combination of properties identifies each pure substance. Any amount of a pure substance in the same given conditions will still have the same properties. This allows a substance to be identified by its properties. When properties change after two or more substances interact, a chemical reaction has taken place.
5. A chemical reaction occurs when the chemical identity of the reactants is different from that of the products. A new substance or substances form with properties different from the original reactants. Chemical equations represent chemical reactions. Often times chemical reactions result in changes easily observed. Evidence of chemical reactions includes energy changes such as a gain or loss of heat (temperature changes) or the production of light, formation of a precipitate, color changes, and gas production. Matter can undergo both physical and chemical changes. In a chemical change, bonding of atoms changes and new substances are formed. However, conservation of matter states that the number and type of atoms in the reactant(s) is exactly equal to the number and type of atoms in the product(s). The total mass of reactants is equal to the total mass of products.
6. Chemical reactions can be either exothermic or endothermic. The energy is stored in and released from chemical bonds. Exothermic reactions release more energy to the surroundings than was absorbed to initiate or maintain the reaction. Endothermic reactions are chemical reactions that take in energy from their surroundings, usually in the form of heat. Endothermic reactions cause the temperature to decrease in the surroundings.
7. Photosynthesis and cellular respiration are both important chemical reactions that cycle matter and energy through an organism.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
	Matter Atom Protons Neutrons Electrons Electron cloud Chemical symbol Atomic number Atomic mass Energy Levels Element Compound Molecule Periodic table Groups/Families Periods Chemically stable Physical property Physical changes Density Solubility Flammability Malleable Ductile Chemical property Chemical changes Chemical reaction Chemical equation Reactant Product Chemical formula Subscript Coefficient Balanced chemical equation Endothermic Exothermic Photosynthesis Cellular respiration Law of Conservation of Matter

Topic 1: Structure of Matter

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS1.A.1	**Mission Briefing**	**5-10**	Page 1 only
6-8.PS1.A.1	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.PS1.A.1	**Engage: Accessing Prior Knowledge**	**15-20**	Pick one of these Engage activities
6-8.PS1.A.1	**Engage: Hook - The Smallest Bit**	**15-30**	
6-8.PS1.A.1	**Explore 1: Activity - Using Symbols**	**30-45**	
6-8.PS1.A.1	**Explore 2: Activity - Combining Atoms**	**30-45**	
6-8.PS1.A.1	**Explore 2: Activity - Combining Atoms Language Acquisition Strategy**	**15-30**	
6-8.PS1.A.1	**Explain 2: Linking Literacy and STEMScopedia**	***45-60**	Consider doing whole group or in small groups to assist with reading
6-8.PS1.A.1	**Explore 3: Activity - Atoms, Molecules, Extended Structures, and Substances**	**60-90**	
6-8.PS1.A.1	**Explore 3: Activity - Atoms, Molecules, Extended Structures, and Substances CER**	***45-60**	Consider doing whole group or in small groups to assist with reading
6-8.PS1.A.1	**Explore 4: Tuva - Attributes of Elements**	***60-80**	
6-8.PS1.A.1	**Mission Log**	**15-20**	Page 2 only

Topic 2: Physical and Chemical Properties

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS1.A.2	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.PS1.A.2	**Engage: Accessing Prior Knowledge**	**15-20**	*Pick one Engage Activity to use
6-8.PS1.A.2	**Engage: Hook - Identifying Objects**	**15-30**	
6-8.PS1.A.2	**Explore 1: Activity - Observing Density**	**15-30**	
6-8.PS1.A.2	**Explain: Linking Literacy with STEMScopedia**	**60-80**	Consider doing whole group or in small groups to assist with reading
6-8.PS1.A.2	**Explore 2: Activity - What's What?**	**60-120**	
6-8.PS1.A.2	**Intervention - Guided Practice**	**20-30**	
6-8.PS1.A.2	**Explore 3: Scientific Investigation - Identifying Liquids**	**45-90**	
6-8.PS1.A.2	**Explore 3: Identifying Liquids CER**	**30-45**	Consider doing whole group or in small groups
6-8.PS1.A.2	**Explore 4: Tuva - Densities of Materials**	**45-60**	
6-8.PS1.A.2	**Intervention - Independent Practice**	**30-45**	
6-8.PS1.A.2	**Mission Log**	**15-20**	Page 3 only

Topic 3: Synthetic Materials

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS1.A.3	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.PS1.A.3	**Engage: Accessing Prior Knowledge**	**15-20**	*Pick one Engage activity to use
6-8.PS1.A.3	**Engage: Hook - Natural or Synthetic?**	**15-30**	
6-8.PS1.A.3	**Explore 1: Activity - Natural/Synthetic Sort**	**30-45**	
6-8.PS1.A.3	**Explain - Linking Literacy and Stemscopedia**	**60-80**	*Consider doing whole group or in small groups to assist with reading
6-8.PS1.A.3	**Explore 2: Research - Natural and Synthetic Substances and CER**	**120-180**	*Consider reducing length or depth of assignment
6-8.PS1.A.3	**Engage - Graphic Organizer**	**30-45**	
6-8.PS1.A.3	**Mission Log**	**15-30**	Page 4

Topic 4: Characteristics of Chemical Reactions

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS1.A.2	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.PS1.A.2	**Engage: Accessing Prior Knowledge**	**15-20**	*Pick one Engage Activity to use
6-8.PS1.A.2	**Engage: Hook - Invisible Ink**	**15-20**	
6-8.PS1.A.2	**Explore 1: Scientific Investigation - Signs of a Chemical Reaction**	**45-90**	
6-8.PS1.A.2	**Explore 1: Signs of a Chemical Reaction CER**	**30-45**	*Consider doing whole group or in small groups
6-8.PS1.A.2	**Explore 2: Inquiry Investigation - Chemistry Clues**	**60-120**	
6-8.PS1.A.2	**Explain: Linking Literacy and STEMScopedia**	**60-80**	*Consider doing whole group or in small groups to assist with reading
6-8.PS1.A.2	**Explain: Content Connections Video - Chemical Reactions**	**10-15**	
6-8.PS1.A.2	**Explore 3: Scientific Investigation - Physical Properties of Products and Reactants**	**45-90**	
6-8.PS1.A.2	**Explore 3: Physical Properties of Product and Reactants CER**	**30-45**	*Consider doing whole group or in small groups
6-8.PS1.A.2	**Mission Log**	**15-20**	Page 5

Topic 5: Modeling Conservation of Mass

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS1.B.1	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.PS1.B.1	**Engage: Accessing Prior Knowledge**	**15-20**	*Pick one Engage Activity to use
6-8.PS1.B.1	**Engage: Hook - Glow Sticks**	**15-20**	
6-8.PS1.B.1	**Explore 1: Activity - Constructing Models**	**120-180**	
6-8.PS1.B.1	**Explain: Linking Literacy and STEMScopedia**	***60-80**	Consider doing whole group or in small groups to assist with reading
6-8.PS1.B.1	**Explore 2: Activity - Closing in on Chemical Reactions**	**20-30**	
6-8.PS1.B.1	**Explore 2: Closing in on Chemical Reactions CER**	**15-30**	*Do if time allows
6-8.PS1.B.1	**Intervention: Guided Practice**	**15-30**	
6-8.PS1.B.1	**Explore 3: Engineering Solutions - Speed Reactions**	***120-160**	
6-8.PS1.B.1	**Mission Log**	**15-20**	Page 6

Engaging Scenario

Engaging Scenario: Complete Action Plan for Physical Bundle 1: Chemical Reactions.

Rubric for Engaging Scenario: Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit 2: Physical Bundle 2- Structure and Properties of Matter

Subject: Science
Grade: 8th
Name of Unit: Structure and Properties of Matter
Length of Unit: 7-16 days
Overview of Unit: The universe is comprised of both matter and energy. Energy comes in many formats, including thermal energy. As heat moves into objects, it causes changes in the state and temperature. In this unit, students will evaluate how thermal energy impacts different objects. Students will create a model of a device that can be used to heat food on Mars. The device must use resources that are already found on Mars.

Priority Standards for unit:

- 6-8.PS1.A.4 Develop a model that describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
- 6-8-PS1-B.2 Construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Supporting Standards for unit:

- 6-8- ETS1.B.2 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- 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.
- ISTE- EMPOWERED LEARNER.1 Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning science.
- ISTE - KNOWLEDGE CONSTRUCTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- ISTE - INNOVATIVE DESIGNER.4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
- ISTE - COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
- ISTE - CREATIVE COMMUNICATOR.6: 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.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
a model that describes changes in particle motion of a pure substance when thermal energy is added or removed.	Develop	Create	3
a model that describes changes in temperature of a pure substance when thermal energy is added or removed.	Develop	Create	3
a model that describes changes in state of a pure substance when thermal energy is added or removed.	Develop	Create	3
a device that either releases or absorbs thermal energy by chemical processes	Construct	Create	3
a device that either releases or absorbs thermal energy by chemical processes	Test	Evaluate	4
a device that either releases or absorbs thermal energy by chemical processes	Modify	Create	3

Essential Questions:

1. In what direction does heat flow?
2. How does adding or removing thermal energy affect the kinetic energy of matter?
3. Describe the movement of molecules in a solid, liquid, and gas.
4. How are endothermic and exothermic reactions different?

Enduring Understanding/Big Ideas:

1. Kinetic Energy can be distinguished from the various forms of potential energy. Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter.
2. The Fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter.
3. Reacting substances rearrange to form different molecules, but the number of atoms is conserved. Some reactions release energy and others absorb energy.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
	Boiling point Celsius Condensation Conduction Convection Evaporation Freezing Endothermic Exothermic Product Reactant Absolute Zero Density Kinetic Energy Gas Heat transfer Law of Conservation of Energy Law of Conservation of Mass Liquid Molecule Amorphous Melting Solid Thermal energy

Topic 1: Heat and Matter

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS1.A.4	Mission Briefing	5-10	Page 1 only
6-8.PS1.A.4	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.PS1.A.4	**Engage: Accessing Prior Knowledge**	**15-20**	Pick one Engage Activity
6-8.PS1.A.4	**Engage: Hook- Thermal Energy**	**15-30**	
6-8.PS1.A.4	**Explore 1: Activity-modeling Temperature and Heat**	**15-30**	
6-8.PS1.A.4	**Explore 2: Scientific Investigation-Energy Transfer**	**60-120**	
6-8.PS1.A.4	**Explore 2: CER**	**20-30**	*Do if time allows
6-8.PS1.A.4	**Explain: Linking Literacy and STEMScopedia**	***45-60**	*Consider doing whole group or in small groups to assist with reading
6-8.PS1.A.4	**Explain: Picture Vocabulary**	**15-30**	
6-8.PS1.A.4	**Mission Log**	**15-20**	**Page 2 only**

Topic 2: Changes in Energy on the Molecular Level

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS1.A.4	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.PS1.A.4	**Engage: Accessing Prior Knowledge**	**15-20**	*Pick one Engage activity to use
6-8.PS1.A.4	**Engage: Hook- Writhing Rice**	**15-30**	
6-8.PS1.A.4	**Explore 1: Changes in State**	**30-45**	
6-8.PS1.A.4	**Explore 1: CER**	**30-45**	Consider doing whole group or in small groups
6-8.PS1.A.4	**Explore 2: Kinetic Energy and Temperature**	**30-45**	
6-8.PS1.A.4	**Explain: Linking Literacy and STEMScopedia**	***45-60**	Consider doing whole group or in small groups to assist with reading
6-8.PS1.A.4	**Explore 3: Activity- Changes with Pressure**	**30-45**	
6-8.PS1.A.4	**Mission Log**	**15-20**	**Page 3 only**

Topic 3: Thermal energy in Chemical Reactions

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8-PS1-B.2	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8-PS1-B.2	**Engage: Accessing Prior Knowledge**	**15-20**	*Pick one Engage Activity to use
6-8-PS1-B.2	**Engage: Hook- Hot Cold Science**	**15-30**	
6-8-PS1-B.2	**Explore 1: Endothermic and Exothermic Reactions**	**30-45**	
6-8-PS1-B.2	**Explore 1: CER**	**30-45**	*Consider doing whole group or in small groups
6-8-PS1-B.2	**Explore 2: Engineering solution- Portable Heater**	**60-120**	
6-8-PS1-B.2	**Explain: Linking Literacy and STEMScopedia**	**60-80**	Note-taking Guide
6-8-PS1-B.2	**Explain: Picture Vocabulary**	**15-30**	
6-8-PS1-B.2	**Mission Log**	**15-20**	**Page 4 only**

Engaging Scenario

Engaging Scenario: Complete Action Plan for Physical Bundle 2: Structure and Properties of Matter.

Rubric for Engaging Scenario: Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit 3: Physical Bundle 5 - Energy Transfer in Temperature

Subject: Science
Grade: 8th
Name of Unit: Energy Transfer in Temperature
Length of Unit: 8-15 days
Overview of Unit: The universe is comprised of both matter and energy. Energy comes in many formats, including thermal energy. As heat moves into objects, it causes changes in the state and temperature. In this unit, students will evaluate how thermal energy impacts different objects. The culminating project has students designing and evaluating a device to minimize or maximize thermal energy transfer.

Priority Standards for unit:

- 6-8.PS3.A.3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
- 6-8.PS3.A.4 Plan and conduct an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the temperature of the sample

Supporting Standards for unit:

- ISTE - INNOVATIVE DESIGNER.4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
- ISTE - COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
- 6-8.ETS1.A 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.
- 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.
- 6-8-ETS1.B.2 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- 6-8.ETS1.B.3 Develop a model to generate data for interactive testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
a device that either minimizes or maximizes thermal energy transfer.	design	Apply	3
a device that either minimizes or maximizes thermal energy transfer	construct	Create	2
a device that either minimizes or maximizes thermal energy transfer	test	Evaluate	4
an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the temperature of the sample.	plan	Create	3
an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the temperature of the sample.	conduct	Apply	3

Essential Questions:

1. What is the relationship between temperature and thermal energy?
2. Does energy transfer from hot to cold or cold to hot?
3. What is the difference between conduction, convection, and radiation?
4. What factors affect the amount of energy transfer needed to change the temperature of matter?

Enduring Understanding/Big Ideas:

1. Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed. A system of objects may also contain stored (potential) energy, depending on their relative positions. For example, energy is stored in gravitational interaction with Earth when an object is raised, and energy is released when the object falls or is lowered.
2. Energy is also stored in the electric fields between charged particles and the magnetic fields between magnets, and it changes when these objects are moved relative to one another.

3. Stored energy is decreased in some chemical reactions and increased in others. The term "heat as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and energy transfers by convection, conduction, and radiation (particularly infrared and light).
4. In science, heat is used only for this second meaning; it refers to energy transferred when two objects or systems are at different temperatures.
5. Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.
6. When the motion energy of an object changes, there is inevitably some other change in energy at the same time. For example, the friction that causes a moving object to stop also results in an increase in the thermal energy in both surfaces; eventually, heat energy is transferred to the surrounding environment as the surfaces cool. Similarly, to make an object start moving or to keep it moving when friction forces transfer energy away from it, energy must be provided from, say, chemical (e.g., burning fuel) or electrical (e.g., an electric motor and a battery) processes.
7. The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. Energy is transferred out of hotter regions or objects and into colder ones by the processes of conduction, convection, and radiation.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
	Convection Conduction Radiation Heat Thermal energy Temperature Law of Conservation of Energy Conductors Insulators Specific Heat Energy transfer

Topic 1: Thermal Energy Transfer

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS3.A.3	**Mission Briefing**		
6-8.PS3.A.3	**Engage: Investigative Phenomena**	**10-15**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.PS3.A.3	**Engage: Accessing Prior Knowledge**	**10-15**	*Pick one Engage Activity to Use
6-8.PS3.A.3	**Engage: Hook - Ice Melt**	**15-30**	
6-8.PS3.A.3	**Explore 1: Activity - Three Types of Thermal Energy Transfer**	**45-90**	
6-8.PS3.A.3	**Explain: Content Connections Video - Heat Transport**	**10-15**	
6-8.PS3.A.3	**Explore 1: Activity - Three Types of Thermal Energy Transfer CER**	**45-60**	Consider doing whole group or in small groups
6-8.PS3.A.3	**Explore 2: Scientific Investigation - Energy Transfer and Matter**	**60-120**	
6-8.PS3.A.3	**Explore 2: Scientific Investigation - Energy Transfer and Matter Language Acquisition Strategy**	**45-60**	
6-8.PS3.A.3	**Explain: Linking Literacy and STEMScopedia**	**60-120**	*Consider doing whole group or in small groups to assist with reading
6-8.PS3.A.3	**Explore 3: Engineering Solution - Build a Medicine Container**	**120-180**	*choose between Explore 3 or Explore 4

6-8.PS3.A.3	**Explore 4: Inquiry Investigation-Inquiry Investigation** *Teacher can choose the question investigated or students can select their own.	**120-180**	
6-8.PS3.A.3	**Mission Log**	**15-20**	Page 2

Topic 2: Energy Transfer and Temperature

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS3.A.4	**Engage: Investigative Phenomena**	**10-15**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.PS3.A.4	**Engage: Accessing Prior Knowledge**	**10-15**	*Pick one Engage activity to use
6-8.PS3.A.4	**Engage: Hook - Heat It Up!**	**15-30**	
6-8.PS3.A.4	**Explore 1: Scientific Investigation - Materials Matter and CER**	**30-45**	*Pick Explore 1 or Explore 3 to do the CER
6-8.PS3.A.4	**Explore 2: Scientific Investigation - Amounts Matter**	**30-45**	
6-8.PS3.A.4	**Explore 3: Scientific Investigation - Environment Matters and CER**	**30-45**	*Pick Explore 1 or Explore 3 to do the CER
6-8.PS3.A.4	**Explain: Linking Literacy and STEMscopedia**	***60-80**	*Consider doing whole group or in small groups to assist with reading
6-8.PS3.A.4	**Engage: Graphic Organizer**	**30-45**	
6-8.PS3.A.4	**Explore 4: Inquiry Investigation - Inquiry Investigation**	**60-90**	Teacher can choose the question investigated or students can select their own.
6-8.PS3.A.4	**Mission Log**	**15-20**	Page 3

Engaging Scenario

Engaging Scenario - Complete Action Plan for Physical Bundle 5: Energy Transfer in Temperature.

Rubric for Engaging Scenario: - Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit 4: Earth Bundle 3- Earth's Materials, Systems, and Natural Hazards

Subject: Science
Grade: 8th
Name of Unit: Earth's Materials, Systems, and Natural Hazards
Length of Unit: 18-32 days
Overview of Unit: In this unit, students will immerse themselves in topics such as Earth's resources, and natural hazard predictions. They will learn how minerals can be identified based on their physical and chemical properties, how Earth's internal and external processes change rocks and the Earth's features, and how geoscience processes have changed the Earth's surface over time. They will also explore how past and current geoscience processes and human activity affect natural resource distribution, and why some countries are more predisposed to natural hazards than others. Students will create an emergency response plan for a community living near an active volcano. Include a before, during, and after volcano preparedness plan based on your knowledge of Earth's materials, systems, and natural hazards.

Priority Standards for unit:

- 6- 8.ESS2.A.1 Develop and use a model to illustrate that energy from the Earth's interior drives convection which cycles Earth's crust leading to melting, crystallization, weathering and deformation of large rock formations, including generation of ocean sea floor at ridges, submergence of ocean sea floor at trenches, mountain building and active volcanic chains.
- 6- 8.ESS2.A.2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales
- 6-8.ESS3.B Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

Supporting Standards for unit:

- ISTE- EMPOWERED LEARNER.1 Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning science.
- ISTE - KNOWLEDGE CONSTRUCTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- ISTE - INNOVATIVE DESIGNER.4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.

- ISTE - COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
- ISTE - CREATIVE COMMUNICATOR.6: 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.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
a model to illustrate that energy from the Earth's interior drives convection which cycles Earth's crust leading to melting, crystallization, weathering and deformation of large rock formations, including generation of ocean seafloor at ridges, submergence of ocean seafloor at trenches, mountain building and active volcanic chains.	Develop	Create	3
a model to illustrate that energy from the Earth's interior drives convection which cycles Earth's crust leading to melting, crystallization, weathering and deformation of large rock formations, including generation of ocean seafloor at ridges, submergence of ocean seafloor at trenches, mountain building and active volcanic chains.	Use	Apply	2
an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	Construct	Create	4
data on natural hazards to forecast future catastrophic events.	Analyse	Analyse	3
data on natural hazards to forecast future catastrophic events.	Interpret	Evaluate	3

Essential Questions:

1. Where does the energy that supplies Earth's processes come from?
2. Do Earth's processes occur quickly or slowly?
3. How does water change the land?
4. How can scientists predict the likelihood of natural hazards?

Enduring Understanding/Big Ideas:

1. All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.
2. Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation as well as downhill flows on land. The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. Global movements of water and its changes in form are propelled by sunlight and gravity. Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. Water's movements both on the land and underground cause weathering and erosion, which change the land's surface features and create underground formations.
3. Some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions. Others, such as earthquakes, occur suddenly and without notice, and thus they are not yet predictable. However, mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
	Mineral Rock Energy Chemical Change Physical Change Natural resources System Rock cycle Igneous rock Sedimentary rock Metamorphic rock Weathering Erosion Erosional Features

	Geoscience Process Sediment Surface Features Top Soil Aquifer Groundwater Sediment Deposition Underground Formations Plate tectonics Pyroclastic Flows Continental Crust Magma Mantle Inner core Outer core Atmospheric Conditions Catastrophic Events Flood Forecast Geologic Forces Natural Hazard Seismic Waves Volcanic Eruption Convection currents Lithosphere Asthenosphere Earthquake Microscope Crystallization Fossil Fuels

Topic 1: Earth's Materials

Standard	Topic & Section	Suggested # of Minutes	Notes
6- 8.ESS2.A.1	**Mission Briefing**	**5-10**	Page 1 only
6- 8.ESS2.A.1	Engage: Investigative Phenomena	10-15	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6- 8.ESS2.A.1	**Engage: Accessing Prior Knowledge**	**15-20**	***Pick one Engage activity to use**
6- 8.ESS2.A.1	**Engage: Hook- Rocks Are Classy**	**15-30**	
6- 8.ESS2.A.1	**Explore 1: Activity- The Rock Cycle**	**60-120**	
6- 8.ESS2.A.1	**Explore 2: Scientific Investigation- Crystallization of Igneous**	**60-120**	
6- 8.ESS2.A.1	**Explore 2: CER**	**30-45**	*Consider doing whole group or in small groups
6- 8.ESS2.A.1	**Explain: Linking Literacy and STEMscopedia**	***60-80**	Cause and Effect Comic Strip *Consider doing whole group or in small groups to assist with reading
6- 8.ESS2.A.1	**Explore 3: Activity- The Cycling of Earth Materials**	**60-120**	
6- 8.ESS2.A.1	**Mission Log**	**15-20**	Page 2

Topic 2: Weathering and Erosion

Standard	Topic & Section	Suggested # of Minutes	Notes
6- 8.ESS2.A.2	Engage: Investigative Phenomena	10-15	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6- 8.ESS2.A.2	**Engage: Accessing Prior Knowledge**	**15-20**	***Pick one Engage Activity to use**
6- 8.ESS2.A.2	**Engage: Hook**	**15-30**	
6- 8.ESS2.A.2	**Explore 1: Activity- Weathering and Erosion by Flowing Water and Wind**	**60-120**	
6- 8.ESS2.A.2	**Explore 1: CER**	**30-45**	*Consider doing whole group or in small groups to assist with reading
6- 8.ESS2.A.2	**Explore 2: Activity- Weathering and Erosion by ice**	**60-120**	
6- 8.ESS2.A.2	**Explain: Linking Literacy and STEMscopedia**	**60-80**	*Consider doing whole group or in small groups to assist with reading
6- 8.ESS2.A.2	**Explore 3: Scientific Investigation- Deposition and slope**	**60-120**	*if time allows
6- 8.ESS2.A.2	**Explain: Picture Vocabulary and Letter Scramble**	**30-60**	
6- 8.ESS2.A.2	**Explore 4: Research- Cave and Cavern Expedition Trip Travel Brochure**	**120-180**	
6- 8.ESS2.A.2	**Explore 5: Weathering and Erosion**	**30-45**	
6- 8.ESS2.A.2	**Mission Log**	**15-20**	Page 2

Topic 3: Geoscience Process

Standard	Topic & Section	Suggested # of Minutes	Notes
6- 8.ESS2.A.1	Engage: Investigative Phenomena	10-15	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6- 8.ESS2.A.1	**Engage: Accessing Prior knowledge**	**15-30**	***Pick one engage activity**
6- 8.ESS2.A.1	**Engage: Hook- Comparing Giants**	**15-30**	
6- 8.ESS2.A.1	**Explore 1: Activity- Big or Small**	**60-120**	
6- 8.ESS2.A.1	**Explore 2: Activity- Large or Small- Fast or Slow?**	**60-120**	
6- 8.ESS2.A.1	**Explain: Linking Literacy and STEMscopedia**	**60-80**	Interactive Note chart *Consider doing whole group or in small groups to assist with reading
6- 8.ESS2.A.1	**Explore 3: Activity- Holes in Earth**	**120-180**	
6- 8.ESS2.A.1	**Explore 3: CER**	**30-45**	*Consider doing whole group or in small groups
6- 8.ESS2.A.1	**Mission Log**	**15-20**	Page 3 only

Topic 4: Natural Hazard Predictions

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.ESS3.B	Engage: Investigative Phenomena	10-15	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.ESS3.B	**Engage: Accessing Prior Knowledge**	**20-30**	**Pick One Engage activity to use**
6-8.ESS3.B	**Engage: Hook-Natural Disasters**	**15-30**	
6-8.ESS3.B	**Explore 1: Activity- Volcanoes and Earthquake Patterns**	**60-120**	
6-8.ESS3.B	**Explore 1: CER**	**30-45**	*Consider doing whole group or in small groups to assist with reading
6-8.ESS3.B	**Explore 2: Research- Keeping Me Safe**	**120-180**	*if time allows
6-8.ESS3.B	**Explain: Linking Literacy and STEMscopedia**	**60-80**	*Consider doing whole group or in small groups to assist with reading
6-8.ESS3.B	**Explore 3: Tuva- Mitigating Hurricane Damage**	**120-180**	
6-8.ESS3.B	**Mission Log**	**15-20**	Page 4

Engaging Scenario

Engaging Scenario - Complete Action Plan for:Earth & Space Bundle 3: Earth's Materials, System, and Natural Hazards.

Rubric for Engaging Scenario: - Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit 5
Earth & Space Bundle 2: The History of Planet Earth
Life Bundle 5: Evidence of Common Ancestry and Diversity

Subject: Science
Grade: 8th
Name of Unit: The History of Planet Earth
Length of Unit: 12-19 days
Overview of Unit: In this unit, students will learn how Earth's internal and external processes change rocks and the Earth's features, and how geoscience processes have changed the Earth's surface over time. They will also explore what past and current evidence supports tectonic plate movement and how the seafloor has changed over time.

Priority Standards for unit:

- 6-8.ESS1.C Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's history.
- 6-8.ESS2.B Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

Supporting Standards for unit:

- ISTE- EMPOWERED LEARNER.1 Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning science.
- ISTE - COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
- ISTE - CREATIVE COMMUNICATOR.6: 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.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's history.	construct	Create	3
data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	Analyze	Analyze	3

data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	Interpret	Evaluate	3
evidence from the fossil record to infer patterns of environmental change resulting in extinction and change to life forms throughout the history of the Earth.	Analyze	Analyze	3
evidence from the fossil record to infer patterns of environmental change resulting in extinction and change to life forms throughout the history of the Earth.	Interpret	Evaluate	3

Essential Questions:

1. How can rock strata organize Earth's history?
2. Has Earth always looked the same as it does today?
3. What are some pieces of evidence that prove that the surface has changed?
4. How has the seafloor changed over time?

Enduring Understanding/Big Ideas:

1. The geological time scale interpreted from rock strata provides a way to organize Earth's history. Major historical events include the formation of mountain chains and ocean basins, the evolution and extinction of particular living organisms, volcanic eruptions, periods of massive glaciation, and development of watersheds and rivers through glaciation and water erosion. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.
2. Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geological history. Plate movements are responsible for most continental and ocean floor features and for the distribution of most rocks and minerals within Earth's crust. Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.
3. The geological time scale interpreted from rock strata provides a way to organize Earth's history. Major historical events include the formation of mountain chains and ocean basins, the evolution and extinction of particular living organisms, volcanic eruptions, periods of massive glaciation, and development of watersheds and rivers through glaciation and water erosion. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
	Fossils Stratigraphy Strata Index Fossils Fossil Record Extinction Law of Superposition Lithosphere Tectonic plates Continental drift Pangaea Asthenosphere Convection Plasticity Crust Mid-Ocean Ridge Divergent plate boundary Mantle Rifting Convergent Plate Boundaries Trench Seafloor Spreading

Topic 1: Geologic History of Earth

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.ESS1.C	**Mission Briefing**	**5-10**	Page 1 only
6-8.ESS1.C	**Engage: Investigative Phenomena**	**10-15**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.ESS1.C	**Engage: Accessing Prior Knowledge**	**10-15**	Pick One Engage activity to use
6-8.ESS1.C	**Engage: Hook - Solving a Mystery**	**15-30**	
6-8.ESS1.C	**Explore 1: Activity - Law of Superposition**	**30-45**	
6-8.ESS1.C	**Explore 2: Activity - The Geologic Time Scale**	**60-90**	
6-8.ESS1.C	**Explore 3: Activity - Index Fossils**	**45-90**	
6-8.ESS1.C	**Explore 3: Index Fossils CER**	**45-60**	*Consider doing whole group or in small groups
6-8.ESS1.C	**Explain: Linking Literacy and STEMScopedia**	**60-80**	*Consider doing whole group or in small groups to assist with reading
6-8.ESS1.C	**Mission Log**	**15-20**	Page 2

Topic 2: Fossil Record
(from Life Bundle 5: Evidence of Common Ancestry and Diversity)

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS4.A	**Engage: Investigative Phenomena**	**10-15**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.LS4.A	**Engage: Accessing Prior Knowledge**	**10-15**	Pick one Engage Activity to use
6-8.LS4.A	**Engage: Hook - Story in a Sandwich**	**15-30**	
6-8.LS4.A	**Explore 1: Activity - Millions of Years Ago**	**60-120**	
6-8.LS4.A	**Explore 2: Scientific Investigation - Digging Through the Past**	**45-90**	
6-8.LS4.A	**Explore 2: Digging Through the Past**	**15-30**	
6-8.LS4.A	**Explain: Linking Literacy and STEMScopedia**	**60-80**	*Consider doing whole group or in small groups to assist with reading
6-8.LS4.A	**Mission Log**	**15-20**	Use page 2 from Life Bundle 5: Evidence of Common Ancestry and Diversity Mission Log

Topic 3: Plate Tectonics

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.ESS2.B	**Engage: Investigative Phenomena**	**10-15**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.ESS2.B	**Engage: Accessing Prior Knowledge**	**10-15**	
6-8.ESS2.B	**Engage: Hook - Trilobite Mystery**	**15-30**	
6-8.ESS2.B	**Explore 1: Activity - Global Puzzle**	**30-45**	
6-8.ESS2.B	**Explore 2: Activity - Super Evidence**	**45-90**	
6-8.ESS2.B	**Explore 2: Super Evidence CER**	**30-45**	*Consider doing whole group or in small groups to assist with reading
6-8.ESS2.B	**Explain: Linking Literacy and STEMScopedia**	**60-80**	*Consider doing whole group or in small groups to assist with reading
6-8.ESS2.B	**Explore 3: Activity - Show Me the Facts**	**60-120**	
6-8.ESS2.B	**Mission Log**	**15-20**	Page 3

Topic 4: Seafloor Spreading

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.ESS2.B	**Engage: Investigative Phenomena**	**10-15**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns.
6-8.ESS2.B	**Engage: Accessing Prior Knowledge**	**10-15**	*Pick one Engage Activity to use
6-8.ESS2.B	**Engage: Hook - Look at That Ridge**	**15-30**	
6-8.ESS2.B	**Explore 1: Activity - Seafloor Spreading Model**	**45-90**	
6-8.ESS2.B	**Explore 1:Seafloor Spreading CER**	**30-45**	*Consider doing whole group or in small groups to assist with reading
6-8.ESS2.B	**Explain: Linking Literacy and STEMScopedia**	**45-60**	*Consider doing whole group or in small groups to assist with reading
6-8.ESS2.B	**Intervention: Guided Practice**	**5-10**	
6-8.ESS2.B	**Explore 2: Tuva - Atlantic Seafloor**	**60-120**	
6-8.ESS2.B	**Mission Log**	**15-20**	Page 4

Engaging Scenario

Engaging Scenario Complete Action Plan for Earth & Space Bundle 2: The History of Planet Earth

Rubric for Engaging Scenario: - Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit 6: Life Bundle- Structure, Function, and Information Processing

Subject: Science
Grade: 8th
Name of Unit: Structure, Function, and Information Processing
Length of Unit: 15-25 days
Overview of Unit: Topics within this unit include: cells, energy flow in organisms, and body system organization and interactions. Students will explore how unicellular and multicellular organisms are similar and different in their functions and organization, how a cell and its parts compare to a manufacturing system, and how body systems interact to carry out key body functions.

Priority Standards for unit:

- 6-8.LS1.A.1 Provide evidence that organisms (unicellular and multicellular) are made of cells and that a single cell must carry out all of the basic functions of life.
- 6-8.LS1.A.2 Develop and use a model to describe the function of a cell as a whole and ways parts of the cells contribute to that function.
- 6-8.LS1.A.3 Develop an argument supported by evidence for how multicellular organisms are organized by varying levels of complexity; cells, tissue, organs, organ systems.
- MS-LS1-8 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories

Supporting Standards for unit:

- ISTE- EMPOWERED LEARNER.1 Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning science.
- ISTE - KNOWLEDGE CONSTRUCTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- ISTE - INNOVATIVE DESIGNER.4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.
- ISTE - COMPUTATIONAL THINKER.5: Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

- ISTE - CREATIVE COMMUNICATOR.6: 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.

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
evidence that organisms (unicellular and multicellular) are made of cells and that a single cell must carry out all of the basic functions of life.	Provide	Remember	1
a model to describe the function of a cell as a whole and ways parts of the cells contribute to that function.	Develop	Create	3
a model to describe the function of a cell as a whole and ways parts of the cells contribute to that function.	Use	Apply	2
an argument supported by evidence for how multicellular organisms are organized by varying levels of complexity; cells, tissue, organs, organ systems.	Develop	Create	2

Essential Questions:

1. What are living things made of?
2. What does a cell need to live?
3. How do body systems work together?
4. How do organisms respond to stimuli?

Enduring Understanding/Big Ideas:

1. All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). Unicellular organisms (microorganisms), like multicellular organisms, need food, water, a way to dispose of waste, and an environment in which they can live. Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues or organs that are specialized for particular body functions.

2. Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. Changes in the structure and functioning of many millions of interconnected nerve cells allow combined inputs to be stored as memories for long periods of time.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
	Cell Prokaryotic Eukaryotic ATP Archaea Bacteria Cell Cycle Cell Division Compound Microscope Mitosis Cytoplasm Unicellular Multicellular Agar Enzyme Protein Receptor Ribosomes RNA DNA Photosynthesis Organelles Nucleus Function Mitochondria Chloroplast Cell wall Cell membrane Tissue Organ Organ system

	Organism Specialized Subsystem System Respiration Behavior Brain Chemical input Electromagnetic Input Mechanical input Nerve Cell Sensory Receptor Stimulus

Topic 1: Cells

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS1.A.1	**Mission Briefing**	**5-10**	Page 1 only
6-8.LS1.A.1	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns
6-8.LS1.A.1	**Engage: Accessing Prior Knowledge**	**15-20**	Pick one Engage Activity to use
6-8.LS1.A.1	**Engage: Hook- Living vs. Nonliving: Sort It Out!**	**15-30**	
6-8.LS1.A.1	**Explore 1: Activity- Single or Multi**	**15-30**	
6-8.LS1.A.1	**Explain- Picture Vocabulary**	**30-60**	Word in a Picture
6-8.LS1.A.1	**Explore 2: Scientific Investigation- Cells Equal Living**	**60-120**	
6-8.LS1.A.1	**Explain: Linking Literacy and STEMscopedia**	**60-80**	3-2-1 notes *Consider doing whole group or in small groups to assist with reading
6-8.LS1.A.1	**Mission Log**	**15-20**	Page 1 only

Topic 2: Anatomy of a Cell

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS1.A.2	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns
6-8.LS1.A.2	**Engage: Accessing Prior Knowledge**	**15-20**	Pick one Engage Activity to use
6-8.LS1.A.2	**Engage: Hook- Cell Organelle Scavenger Hunt**	**30-45**	
6-8.LS1.A.2	**Explore 1: Functions of a Cell**	**30-45**	
6-8.LS1.A.2	**Explain- Linking Literacy and STEMscopedia**	**30-60**	The Building Blocks of Cells
6-8.LS1.A.2	**Explore 2: Engineering Solution- Cell Architect, Inc.**	**60-120**	
6-8.LS1.A.2	**Mission Log**	**15-20**	Page 2 only

Topic 3: Bodies and Systems

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS1.A.3	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns
6-8.LS1.A.3	**Engage: Accessing Prior Knowledge**	**15-20**	Pick one Engage Activity to use
6-8.LS1.A.3	**Engage: Hook- Levels of Organization**	**30-45**	
6-8.LS1.A.3	**Explore 1: Subsystem Match Up**	**30-45**	
6-8.LS1.A.3	**Explore 2: Activity- Body System**	**60-120**	
6-8.LS1.A.3	**Explain: Linking Literacy and STEMscopedia**	**60-80**	*Consider doing whole group or in small groups to assist with reading
6-8.LS1.A.3	**Explore 3: Research- System, Inc.**	**120-180**	
6-8.LS1.A.3	**Explore 3: CER**	**30-45**	*Consider doing whole group or in small groups to assist with reading
6-8.LS1.A.3	**Explore 4: Inquiry Investigation- Subsystem Interactions**	**120-180**	
6-8.LS1.A.3	**Explore 5: Tuva- The Effects of Exercise**	**30-45**	
6-8.LS1.A.3	**Frog Dissection**	**60-120**	
6-8.LS1.A.2	**Mission Log**	**15-20**	Page 3 only

Topic 4: Sensory Receptors

Standard	Topic & Section	Suggested # of Minutes	Notes
MS-LS1-8	**Engage: Investigative Phenomena**	**15-20**	Complete Before Instruction column and then revisit throughout topic to complete During and After Instruction columns
MS-LS1-8	**Engage: Accessing Prior Knowledge**	**15-20**	
MS-LS1-8	**Engage: Hook- Are There Really Only Five?**	**15-30**	
MS-LS1-8	**Explore 1: Activity-The Traditional Senses**	**60-120**	
MS-LS1-8	**Explain- Linking Literacy and STEMscopedia**	**30-60**	Categorize It!
MS-LS1-8	**Explore 2: Activity- Scents and Memory**	**30-45**	
MS-LS1-8	**Explore 2: CER**	**20-30**	
MS-LS1-8	**Explore 3: Research- How Do we Remember?**	**120-180**	
MS-LS1-8	**Mission Log**	**15-20**	Page 4 only

Engaging Scenario

Engaging Scenario Complete Action Plan for Life Bundle 1: Structure, Function, and Information Processing

Rubric for Engaging Scenario: - Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit of Study Terminology

Appendices: All Appendices and supporting material can be found in this course's shell course in the District's Learning Management System.

Assessment Leveling Guide: A tool to use when writing assessments in order to maintain the appropriate level of rigor that matches the standard.

Big Ideas/Enduring Understandings: Foundational understandings teachers want students to be able to discover and state in their own words by the end of the unit of study. These are answers to the essential questions.

Engaging Experience: Each topic is broken into a list of engaging experiences for students. These experiences are aligned to priority and supporting standards, thus stating what students should be able to do. An example of an engaging experience is provided in the description, but a teacher has the autonomy to substitute one of their own that aligns to the level of rigor stated in the standards.

Engaging Scenario: This is a culminating activity in which students are given a role, situation, challenge, audience, and a product or performance is specified. Each unit contains an example of an engaging scenario, but a teacher has the ability to substitute with the same intent in mind.

Essential Questions: Engaging, open-ended questions that teachers can use to engage students in the learning.

Priority Standards: What every student should know and be able to do. These were chosen because of their necessity for success in the next course, the state assessment, and life.

Supporting Standards: Additional standards that support the learning within the unit.

Topic: These are the main teaching points for the unit. Units can have anywhere from one topic to many, depending on the depth of the unit.

Unit of Study: Series of learning experiences/related assessments based on designated priority standards and related supporting standards.

Unit Vocabulary: Words students will encounter within the unit that are essential to understanding. Academic Cross-Curricular words (also called Tier 2 words) are those that can be found in multiple content areas, not just this one. Content/Domain Specific vocabulary words are those found specifically within the content.

Symbols:


This symbol depicts an experience that can be used to assess a student's 21st Century Skills using the rubric provided by the district.


This symbol depicts an experience that integrates professional skills, the development of professional communication, and/or the use of professional mentorships in authentic classroom learning activities.