Park Hill School District

Building Successful Futures • Each Student • Every Day

7th Grade 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
21 blocks	1: Organisms & Nonliving Things are Made of Atoms	Topic 1: Competition in Ecosystems Topic 2: Organism Interactions in Ecosystems Topic 3: Human Dependence on Natural Resources Topic 4: Structure of Matter Topic 5: Changes in Energy on the Molecular Level Topic 6: Heat and Matter
21 blocks	2: Matter Cycles & Energy Flows Through Organisms & Rocks	Topic 1: Characteristics of Chemical Reactions Topic 2: Physical and Chemical Properties Topic 3: Modeling Conservation of Mass Topic 4: Thermal Energy in Chemical Reactions Topic 5: Introduction to Photosynthesis Topic 6: Earth Materials
14 blocks	3: Natural Processes & Human Activities Shape	Topic 1: Relationship in Ecosystems Topic 2: Flow of Energy in Ecosystems

	Earth's Resources & Ecosystems	Topic 3: Plate Tectonics Topic 4: Seafloor Spreading
21 blocks	4: Sustaining Biodiversity & Ecosystem Services in a Changing World	Topic 1: The Dynamic Nature of Ecosystems Topic 2: Ecosystem Biodiversity Topic 3: Geoscience Processes Topic 4: Weathering and Erosion Topic 5: Natural Hazard Predictions Topic 6: Synthetic Materials

Curriculum Revision Tracking

Spring 2023

- Units were reworked in order to align with the integrated bundles inside STEMScopes
- All units include DESE's new priority standards
- All priority standards have been unwrapped into learning targets
- Engaging Scenarios were shifted to the beginning of each unit in order to drive the learning for the unit and tie all the topics together with a fluid storyline
- Each topic and Engaging Experience within a unit is an entire scope in STEMscopes where teachers suggested an appropriate timeline and suggested which STEMscopes activities to use with students

Spring 2020

- Change Days to Blocks
- Change the order of topics in Unit 3
- Omit all Read Mission Briefings/Logs in each unit
- Omit Engage: Investigate Phenomena in each unit

Unit 1: Physical Science: Bundle 6

- Topic 1: Introduction to Properties of Waves Scope Bundle 6:
    - Omit Digital and Analog Signals in Unit Vocab
    - Omit Formative: Spring Wave CER
    - Omit Explore 3: Spinning & Strumming… Sound Energy
- Topic 3: Properties of Visible Light Scope Bundle 6
    - Omit Explore 2: Activity What Color is That?
    - Omit Explain: Choose activities that connect to Explore 2
- Topic 5 (Digital vs. Analog Signals): Delete

Unit 2: The Earth and the Solar System: Bundle 1

- Topic 1: Earth, Sun, and Moon System Scope Bundle 1
    - Omit Evaluate: CER
    - Omit Scope 2.0
- Topic 2: The Solar System Scope Bundle 1
    - Omit Explore 1: Activity Our Solar System
- Topic 3: Formation and Motion of Galaxies Scope Bundle 1
    - Omit Explore 3: To the Milky Way and Beyond

Unit 3: The Role of Water in the Earth's Surface, and Weather and Climate: Bundle 4

- Topic 2: Predicting Weather Scope Bundle 4
    - Omit Engage: Graphic Organizer

Unit 1: Organisms & Nonliving Things are Made of Atoms

Subject: Science
Grade: 7
Name of Unit: Organisms & Nonliving Things are Made of Atoms
Length of Unit: 20-21 blocks
Overview of Unit: Student Introduction Letter

Student Letter

7th Grade: Bundle 1
Organisms and Nonliving Things Are Made of Atoms

Mission Briefing

You are about to begin a new journey studying the matter of living and nonliving things and discovering how this knowledge can be applied to our world. Your mission will be to analyze soil samples taken by a rover on a recently discovered planet for evidence of life and other resources. You will use this analysis to persuade Congress to fund further research. As you work toward this goal, you will be learning the following concepts:

- Organisms are made mostly of molecules from six different elements.
- Earth materials are mostly made of eight different elements.
- Earth has mineral, energy, and water resources.
- The interaction and motions of atoms explain the properties of matter.
- Thermal energy affects particle motion and physical state.

Many investigations will be done in class over several weeks to help you learn these concepts from first-hand experiences. After completing each investigation, take time to look for examples of these concepts in the world around you.

Sincerely,

Unit 1 Storyline Summary
Anchoring phenomena: Do soil samples taken from a newly discovered planet provide enough evidence of life and natural resources to support future explorations of this planet? Marathon runners need to drink a lot of water during their race. **Culminating mission:** Students analyze soil samples taken by a rover on a recently discovered planet for evidence of life and other resources. They create an infographic of their results and present this information to Congress during a budget meeting to persuade legislators to continue funding NASA so that more missions are sent to this planet.

Priority Standards for unit:

- 6-8.LS2.A.1 Analyze and interpret data to provide evidence for the effects of resource availability on individual Organisms and populations of Organisms in an ecosystem.
- 6-8.ESS3.A 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.
- 6-8.PS1.A.1 Develop models to describe the atomic composition of simple molecules and extended structures.
- 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.

Priority Standards Unwrapped

Priority Standard: 6-8.LS2.A.1 Analyze and interpret data to provide evidence for the effects of resource availability on individual Organisms and populations of Organisms in an ecosystem.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will analyze and interpret data to determine what, if any, relationship exists between populations and resource availability.	3 Analyzing
Students will predict the relationship between resource availability and individual or population growth.	3 Analyzing

Priority Standard: 6-8.ESS3.A 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.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will explain how non-renewable resources (ores, fossil fuels, soil, and groundwater) are unevenly distributed and are formed from specific geologic processes (volcanic activity, sedimentary processes, weathering)	2 Applying
Students will evaluate evidence of human impact on the uneven distribution of resources.	3 Analyzing
Students will combine evidence with scientific reasoning to construct an argument for how human activity impacts nonrenewable resource availability.	3 Analyzing

Priority Standard: 6-8.PS1.A.1 Develop models to describe the atomic composition of simple molecules and extended structures.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will differentiate between pure substances and compounds.	2 Applying
Students will differentiate between subatomic particles (electrons, neutrons, and protons) and explain how an imbalance of charge causes atoms to combine into molecules.	2 Applying
Students will develop models of atoms, molecules, and chains of repeating subunits that display the appropriate number of subunits.	4 Creating

Priority Standard: 6-8.LS2.A.1 Analyze and interpret data to provide evidence for the effects of resource availability on individual Organisms and populations of Organisms in an ecosystem.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will analyze and interpret data to determine what, if any, relationship exists between populations and resource availability.	3 Analyzing
Students will predict the relationship between resource availability and individual or population growth.	3 Analyzing

Priority Standard: 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.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will develop a model demonstrating the particles in the three main states of matter (solid, liquid, gas).	3 Analyzing
Students will develop a model demonstrating how the behavior of particles in each state of matter changes when thermal energy is added or removed.	3 Analyzing
Students will describe temperature, kinetic energy, particle motion, and thermal energy within a given model.	3 Analyzing

Essential Question:

1. How do changes in resource availability affect population sizes within an ecosystem?
2. How does human interaction with natural resources affect ecosystems and human communities?
3. Where do new things come from?
4. What happens to substances when we change the amount of available thermal energy?

Enduring Understanding/Big Idea:

1. Limited resources limit the growth of individuals and populations within an ecosystem.
2. Often an increase in human consumption negatively impacts ecosystems apart from thoughtful, engineered approaches.
3. All substances are made from different types of atoms, combined in various ways.
4. Thermal energy affects the kinetic energy of matter, causing predictable changes in temperature and the state of the matter.

Unit Vocabulary: ***There are no Academic Cross-Curricular Words***

Content/Domain Specific Words			
Scope 1: Competition in Ecosystems			
Abiotic	Biotic	Competition	Dependent Interaction
Ecosystem	Limited Resources	Organism	Population
Primary Consumer	Secondary Consumer		
Scope 2: Organism Interactions in Ecosystems			
Unit 1 + Environmental Interactions			
Scope 3: Human Dependence on Natural Resources			
Atmosphere	Biosphere	Energy Resources	Geoscience Processes
Ground Water	Limited Resources	Natural Resources	Non-Renewable
Renewable			
Scope 4: Structure of Matter			
Atom	Crystal	Matter	Molecule
Pure Substance	Solid	Subscript	Compound
Scope 5: Changes in Energy on the Molecular Level			
Collide	Gas	Solid	Liquid
Inert	Kinetic Energy	Liquid	Pressure
Pure Substance			

Resources for Vocabulary Development:
STEMscopedia & Picture Vocabulary

Engaging Scenario

An Engaging Scenario is a culminating activity tied to the unit's priority standards, that includes the following components: situation, challenge, specific roles, audience, product or performance.

Engaging Scenario 2 blocks

Students analyze soil samples taken by a rover on a recently discovered planet for evidence of life and other resources. They create an infographic of their results and present this information to Congress during a budget meeting to persuade legislators to continue funding NASA so that more missions are sent to this planet.

Instructional Notes:

Action Plan

Teacher Guide - Print Files - Action Plan

Students will have been working on this mission and will add to their mission log after each scope. The focus of this bundle is to construct arguments and use cause and effect to explain your reasoning. The mission log will be complete before students have concluded their infographic that persuades legislators to continue funding NASA.

Exemplars:

Persuasive Infographics

Carbs Are Killing You

5 Benefits of Going Meatless on Mondays

Suggested Timeline for Engaging Scenario:

Block 1

- ½ block: complete Action Plan for Bundle 1 in small groups
- ½ block: students pair up and choose a format for creating their presentation to Congress - either an infographic or a CER (see CANVA example. Note: this example contains an example infographic on top and an example letter on the bottom). Begin constructing product.

Block 2

- ½ block: finish complete of product
- ½ block: gallery walk, inviting other adults in the building as intended audience. Email teams/Encore teachers on plan and ask them to participate for 20 minutes. Consider having adult participants use the following protocol for providing feedback to student presentations. For CERs, have students read their CER out loud and provide a printed copy for adults to look over. For Infographics, have students print ahead of time and talk through their infographic. For each pair, provide copies of the soil samples and have students have their completed mission logs out as well as their finished product.

Adult Feedback

Scenario: You are members of Congress and these students are petitioning you to continue to fund space exploration of a planet. They are constructing their argument from 3 soil samples taken from this planet.

1. What was their most convincing argument for you? Share the statement that best supported their argument with them.
2. What were you hoping to hear? Share what could help them build arguments in the future.
3. *Infographic only: how did the visualizations support their arguments? *

Rubric for Engaging Scenario

Scope 1: Competition in Ecosystems

Engaging Experience

Title: Competition in Ecosystems

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 6-8.LS2.A.1 Analyze and interpret data to provide evidence for the effects of resource availability on individual Organisms and populations of Organisms in an ecosystem.

Learning Targets	Webb's DOK Level Bloom's Level
Students will analyze and interpret data to determine what, if any, relationship exists between populations and resource availability.	3 Analyzing
Students will predict the relationship between resource availability and individual or population growth.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
Introduce the Mission Log Accessing Prior Knowledge **Graphic Organizer**- as students move through this scope, students are focused on cause and effect as we move through the scope.	Choose Explore 1 or Explore 2 based on information gained during the APK, Hook, or PreAssessment *Explore 1*- identifying the relationships between abiotic and biotic and if they have a dependent relationship.	**-Stemscopedia** - *Picture Vocabulary* -*Content Connections Video* -*Concept Review Game*	**Math Connections** (This is located in Evaluate tab, but is recommended as an elaborate to teach the CER process as the beginning of the year) **Claim Evidence Reasoning**	Choose 1: **-Open Ended Assessment** **-Multiple Choice Assessment** **Add to Mission Log - Teacher Guide - Mission Log**

Hook	(after activity, revisit graphic organizer) **Explore 2** - What happens when organisms rely on limited resources?			

<u>Instructional Notes:</u>
Scientists in lower grades have exposure to food webs. In 7th grade, we are exposing them to abiotic factors and the limitation of resources, and symbiotic relationships.

Instructional Focus: Describe examples of resources that organisms compete for.
Connection to the Mission: Were there any signs of biotic resources found in the soil samples? List them.

<u>What *could* a science workshop look like during each block?</u>

<u>Block 1</u>	<u>Block 2</u>	<u>Block 3</u>
Introduce the Mission Log Accessing Prior Knowledge Explore 1 or Explore 2 Stemscopedia Graphic Organizer	Hook Explore 1 or Explore 2 Math Connections Add to Graphic Organizer CER	Process Graphic Organizer Stemscopedia CER Revision Evaluate: Assessment **Add to Mission Log - Teacher Guide - Mission Log**

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Scope 2: Organism Interactions in Ecosystems

Engaging Experience

Title: Organism Interactions in Ecosystems

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 6-8.LS2.A.1 Analyze and interpret data to provide evidence for the effects of resource availability on individual Organisms and populations of Organisms in an ecosystem.

Learning Targets	Webb's DOK Level Bloom's Level
Students will analyze and interpret data to determine what, if any, relationship exists between populations and resource availability.	3 Analyzing
Students will predict the relationship between resource availability and individual or population growth.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
Accessing Prior Knowledge *Investigative Phenomenon Video* **Graphic Organizer** **Hook**	**Explore 1** *Explore 2* **Explore 3** Tutorial video how to do a Tuva (link)	Picture Vocabulary (same as last time, but one additional word: environmental interaction) **Content Connections Video** **Stemscopedia** *Linking Literacy* *Concept Review Game*	*Reading Science - The Desert Ecosystem* *Science Today* - Red Wolf (This could support the TUVA done) *Scientist Spotlight Hispanic Heritage Month is September 15-October 15 and could be a way to support our*	Choose 1: **-Open Ended Response** **-Multiple Choice Assessment** **Add to Mission Log - Teacher Guide - Mission Log**

			Culturally Responsive Education pillar.	

Instructional Notes:
Scientists in lower grades have exposure to food webs. In 7th grade, we are exposing them to abiotic factors and the limitation of resources, and symbiotic relationships.

Instructional Focus: Explain the effect resource availability has on populations in ecosystems.
Connection to the Mission: What effect would abundance or lack of resources have on the populations that may exist on this planet

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
Accessing Prior Knowledge Hook Graphic Organizer Explore 1 Content Connections Video or Stemscopedia	Explore 3 - Tuva Science Today - Red Wolf Revisit Cause and Effect graphic organizer from Scope 1	Stemscopedia & Linking Literacy Gallery Walk or Class Discussion to Review Evaluate: Assessment **Add to Mission Log - Teacher Guide - Mission Log**

In this scope there is a Linking Literacy task that could support scientific reasoning and building understanding in scaffolded levels while reading science text Stemscopedia.

Option 1	Option 2
While reading Stemscopedia sections, students could be differentiated based on teacher observations in prior workshops. Differentiated Groups would receive different documents. Level 1 learners: Marine Ecosystems Level 2 learners: one-word notes Level 3 learners: Design and Ecosystem	While reading Stemscopedia sections, students would build deeper understanding as "leveling up" All students would start with Marine Ecosystems and then move to a one word note activity, and then anchor their learning with the Design and Ecosystem.

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Scope 3: Human Dependence on Natural Resources

Engaging Experience

Title: Human Dependence on Natural Resources

Suggested Length of Time: 3-4 blocks

Standards Addressed

Priority Standard: 6-8.ESS3.A 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will explain how non-renewable resources (ores, fossil fuels, soil, and groundwater) are unevenly distributed and are formed from specific geologic processes (volcanic activity, sedimentary processes, weathering)	2 Applying
Students will evaluate evidence of human impact on the uneven distribution of resources.	3 Analyzing
Students will combine evidence with scientific reasoning to construct an argument for how human activity impacts nonrenewable resource availability.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
Accessing Prior Knowledge **Hook** *Concept Attainment Quiz* Located in Intervention Tab and may be a way to pre assess	**Explore 1** *Explore 2* (This would need to be curated resources to shorten the time: reminder the goal is to construct	**Picture Vocabulary** **Linking Literacy During Reading- Natural Resources** *Science Rock - lyrics / video*	Streaming Tab from StemScopes ● Fracking a finite resource ● How fracking works ● The engineering of fracking OR	**Communicate Science - Student Debate** (located in Explain) Socratic Seminar Or **Open Ended Response**

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student understanding. *Science Rock - lyrics / video* (located in Explain tab)	explanations and design solutions, not research) *Explore 4* (This would be interesting to take a look at data and construct an explanation for why the data is looking the way that it is)	**Content Connections Video**	Reading Science A/B/C	**Add to Mission Log - Teacher Guide - Mission Log**

Instructional Notes:

Scientists in lower grades should know that all materials, energy, and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways. Some resources are renewable over time, while others are not. In 7th grade, we are exposing them to uneven distributions of Earth's mineral, energy, and groundwater resources that are the result of past and current geoscience processes.

Instructional Focus: Know that Earth has mineral, energy, and water resources
Connection to the Mission: What does the location of some of the abiotic resources tell you about geoscience processes that have taken place there? What does the location of some of the biotic resources tell you about geoscience processes that have taken place there?

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
Accessing Prior Knowledge Hook Explore 1	Explore 2 Content Connections Video Linking Literacy	Fracking Videos Socractic Seminar Prep AVID doc link Letter Writing Open Ended Assessment **Add to Mission Log - Teacher Guide - Mission Log**
Block 4 Socratic Seminar		

Explore 2:
With a focus being on constructing explanations and designing solutions, it would be beneficial to include explore 2 in this scope. However, to ensure pacing of the bundle, you may want to curate resources for students through the use of a Padlet, OneNote resource or other curated resource. The resources should include information that would answer these questions for students.

Gold Ore
• What geologic processes caused gold ore to form?
• Where is gold ore found around the world?
• How do humans use gold (recovered from gold ore) in daily life?

Oil
• What geologic processes caused oil to form?
• Where is oil found around the world?
• How do humans use oil in daily life?

Aquifers
• What geologic processes caused aquifers to form?
• Where are aquifers found around the world?
• How do humans use aquifers in daily life

Evaluate Idea: Communicate Science - Student Debate
Socratic Seminar connects to our AVID pillar. To prepare for a Socratic Seminar students will need additional resources during the elaborate phase. These resources can be found on the StemScopes Streaming tab and are listed below. The goal of this socratic seminar would be to construct an explanation to answer the question: Should fracking be used to release natural gasses and oil? This routine would support the overall mission because students would be able to practice constructing scientific explanations (which they will do when they are presenting to a Congress member at the end of this bundle). If you choose the socratic seminar as an evaluation piece, you'll plan for 4 blocks.

3 Fracking Videos (Click on "STREAMING" on top menu bar. Search "fracking" to find the videos listed below.)

- Fracking a finite resource
- How fracking works
- The engineering of fracking

May Include (if time or support is needed)
Must Include to ensure skill and content is present.

Scope 4: Structure of Matter

Engaging Experience

Title: Structure of Matter

Suggested Length of Time: 4 blocks

Standards Addressed

Priority Standard: 6-8.PS1.A.1 Develop models to describe the atomic composition of simple molecules and extended structures.

Learning Targets	Webb's DOK Level Bloom's Level
Students will differentiate between pure substances and compounds.	2 Applying
Students will differentiate between subatomic particles (electrons, neutrons, and protons) and explain how an imbalance of charge causes atoms to combine into molecules.	2 Applying
Students will develop models of atoms, molecules, and chains of repeating subunits that display the appropriate number of subunits.	4 Creating

Engage	Explore	Explain	Elaborate	Evaluate
Investigative Phenomenon **Graphic Organizer** **Hook**	**Explore 1** **Explore 2** **Explore 3**	**Picture Vocabulary** **Content Connections Video** **Linking Literacy -Guide with Evidence pdf**	*PhETSimulation Build an Atom*	**Open Ended Response** **And** **Park Hill Created Assessment (see instructional notes below)**

Instructional Notes:
Scientists in lower grades understand that matter of any type can be subdivided into particles that are too small to see, but even then, the matter still exists and can be detected by other means (e.g., by weighing it or observing its effects on other objects. In 7th grade, we are exposing them to developing models to describe the atomic composition of simple molecules and extended structures, properties of substances, and conservation of matter.

Instructional Focus: Know that organisms are made mostly of molecules from six different elements and that Earth materials are mostly made of eight different elements.
Connection to the Mission: Know that organisms are made mostly of molecules from six different elements and that Earth materials are mostly made of eight different elements.

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3	Block 4
Investigative Phenomena Graphic Organizer Explore 1 Content Connections Video	Hook Explore 2 Linking Literacy Stemscopedia	Explore 3 PhET Simulation - Build an Atom Linking Literacy	Open Ended Assessment and Park Hill Created Model Assessment **Add to Mission Log - Teacher Guide - Mission Log**

Graphic Organizer can be paired with periodicvideos.com, which plays short, explanatory videos on any element in the periodic table.

Evaluate: **Park Hill Created Model Assessment**
Rationale: (This is a must do Evaluate. The reason this is teacher-created is because StemScopes is lacking in an assessment option that has students developing a model.
Procedure: Teacher will provide a list of 25 simple molecules and assign a unique molecule to each student. Students will have a sandwich baggie of interlocking cubes of 3 different colors. Students must create a model for their assigned molecule then (a) verbally explain the model to the teacher or (b) provide a written explanation along with a picture of the model created.

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Scope 5: Changes in Energy on the Molecular Level

Engaging Experience

Title: Changes in Energy on the Molecular Level

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will develop a model demonstrating the particles in the three main states of matter (solid, liquid, gas).	3 Analyzing
Students will develop a model demonstrating how the behavior of particles in each state of matter changes when thermal energy is added or removed.	3 Analyzing
Students will describe temperature, kinetic energy, particle motion, and thermal energy within a given model.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
Accessing Prior Knowledge **Graphic Organizer** Hook	**Explore 1** Explore 3	Picture Vocabulary Content Connections Video StemScopedia **Linking Literacy** (see instructional notes)	*Reading Science A/B/C* **Science Today Watch It!** *PhET Simulation - States of Matter Basics*	**Multiple Choice Assessment** **Add to Mission Log - Teacher Guide - Mission Log**

Instructional Notes:
Scientists in lower grades understand that matter of any type can be subdivided into particles that are too small to see, but even then, the matter still exists and can be detected by other means (e.g., by weighing it or observing its effects on other objects). In 7th grade, students should be able to develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

Instructional Focus: Describe how the interaction and motions of atoms explain the properties of matter.
Connection to the Mission: What does the atomic structure of the water in Sample A tell you about its state of matter? What does the atomic structure of the water in Sample C tell you about its state of matter?

What *could* a science workshop look like during each block?

The following scopes (Changes in Energy on the Molecular Level and Heat and Matter) have a lot of repeated information and seem to address similar information. If you would like to separate each of these scopes, you may want to follow the workshop suggestions below. If you'd like to combine these scopes, you will want to follow the workshop suggestions in the Heat and Matter Scope documents. (Bundle 1, Scope 6) This will show an instructional approach that would combine Scope 5 and 6 together.

Block 1	Block 2	Block 3
Accessing Prior Knowledge Graphic Organizer	Explore 1 Linking Literacy - Picturesque Descriptions	Science Today Watch It! Multiple Choice Assessment **Add to Mission Log - Teacher Guide - Mission Log**

Explore 1 pairs well with Linking Literacy
Explore 1 and Linking Literacy Picturesque Descriptions
Explore 1 and Linking Literacy Key Point Connections and Real-World Implications
You may want to print Linking Literacy as a 2-sided document so you can refer back to it throughout Explore 1 and as students are building understanding through StemScopedia.

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Scope 6: Heat and Matter

Engaging Experience

Title: Heat and Matter

Suggested Length of Time: 2 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will develop a model demonstrating the particles in the three main states of matter (solid, liquid, gas).	3 Analyzing
Students will develop a model demonstrating how the behavior of particles in each state of matter changes when thermal energy is added or removed.	3 Analyzing
Students will describe temperature, kinetic energy, particle motion, and thermal energy within a given model.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
Investigative Phenomena **Hook**	Explore 2	**Linking Literacy - Heat and Matter Before and During** **Stemscopedia**	*Math Connections* *Reading Science A/B/C*	Choose 1: **-Multiple Choice Assessment** **-Open Ended Response** **Add to Mission Log - Teacher Guide - Mission Log**

Instructional Notes:
Scientists in lower grades students should understand that the faster a given object is moving, the more energy it possesses. In 7th grade, students should be able to develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

Instructional Focus: Explain how thermal energy affects particle motion and physical state.
Connection to the Mission: Explain why the water in Sample A was found in its current phase. Explain why the water in Sample C was found in its current phase.

If you are **splitting up** Scope 5 and 6, here is an option for instructional blocks.

Block 1	Block 2
Investigative Phenomena or Hook Explore 2 Linking Literacy with Stemscopedia	Math Connections Evaluate Choose 1: - Multiple Choice Assessment - Open Ended Response Assessment **Add to Mission Log - Teacher Guide - Mission Log**

If you are choosing to **combine** Scope 5 and Scope 6, here is an option for instructional blocks.

Block 1	Block 2	Block 3	Block 4
APK Scope 6 Graphic Organizer Scope 5	Explore 1 Scope 5 Linking Literacy - Picturesque Descriptions Scope 5	Explore 2 Scope 6 Linking Literacy - Heat and Matter Before and During Scope 5 Stemscopedia Scope 5	Scope 5 & 6 Multiple Choice Scope 6 Open Ended **Add to Mission Log - Teacher Guide - Mission Log**

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Summary of Engaging Learning Experiences for Scopes

Scope	Engaging Experience Title	Description	Suggested Length of Time
1	Competition in Ecosystems	Instructional Focus: Describe examples of resources that organisms compete for. Connection to the Mission: Were there any signs of biotic resources found in the soil samples? List them.	3 blocks
2	Organism Interactions in Ecosystems	Instructional Focus: Explain the effect resource availability has on populations in ecosystems. Connection to the Mission: What effect would abundance or lack of resources have on the populations that may exist on this planet?	3 blocks
3	Human Dependence on Natural Resources	Instructional Focus: Know that Earth has mineral, energy, and water resources. Connection to the Mission: What does the location of some of the abiotic resources tell you about geoscience processes that have taken place there? What does the location of some of the biotic resources tell you about geoscience processes that have taken place there?	4 blocks
4	Structure of Matter	Instructional Focus: Know that organisms are made mostly of molecules from six different elements and that Earth materials are mostly made of eight different elements. Connection to the Mission: Know that organisms are made mostly of molecules from six different elements and that Earth materials are mostly made of eight different elements.	4 blocks
5	Changes in Energy on the Molecular Level	Instructional Focus: Describe how the interaction and motions of atoms explain the properties of matter. Connection to the Mission: What does the atomic structure of the water in Sample A tell you about its state of matter? What does the atomic structure of the water in Sample C tell you about its state of matter?	5 blocks

6	Heat and Matter	Instructional Focus: Explain how thermal energy affects particle motion and physical state. Connection to the Mission: Explain why the water in Sample A was found in its current phase. Explain why the water in Sample C was found in its current phase.	
Engaging Scenario		Students analyze soil samples taken by a rover on a recently discovered planet for evidence of life and other resources. They create an infographic of their results and present this information to Congress during a budget meeting to persuade legislators to continue funding NASA so that more missions are sent to this planet.	2 blocks

Unit 2: Matter Cycles & Energy Flows Through Organisms & Rocks

Subject: Science
Grade: 7
Name of Unit: Matter Cycles & Energy Flows Through Organisms & Rocks
Length of Unit: 21 blocks
Overview of Unit:

Bundle 2: Matter Cycles and Energy Flows through Organisms and Rocks

Student Letter

7th Grade: Bundle 2
Matter Cycles and Energy Flows through Organisms and Rocks

Mission Briefing

You are about to begin a new journey studying how matter flows into and out of organisms and discovering how this knowledge can be applied to our world. Your mission will be to create a plan for humans to visit Mars as part of the Mars Expedition design challenge. Your plan will include three main design considerations: transportation, food (both in transit and on Mars), and shelter. After you draft your plan, you will present it to the board committee members who will evaluate it on sound scientific principles. You will then have an opportunity to modify your plan before submitting final proposals. As you work toward this goal, you will be learning the following concepts:

- Photosynthesis plays an important role in the cycling of matter and flow of energy into and out of organisms.
- Food is rearranged through chemical reactions and forms new molecules that support growth and/or release energy as it moves through an organism.
- The flow of energy drives the cycling of Earth's materials.
- A chemical reaction can be determined by examining a substance's properties before and after an interaction.
- The total number of atoms does not change in a chemical reaction.
- Thermal energy can be released or absorbed.

Many investigations will be done in class over several weeks to help you learn these concepts from first-hand experiences. After completing each investigation, take time to look for examples of these concepts in the world around you.

Sincerely,

Unit 2 Storyline Summary
Anchoring phenomena: How can humans successfully colonize Mars? Seeds germinate and begin to sprout in only water and in the absence of soil and other resources. **Culminating mission:** Students create a proposal for surviving on Mars as part of a design challenge. They present their plan to the board committee members.

Priority Standards for unit:

- 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.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.
- 6-8.PS1.B.2 Construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.
- 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.
- 6-8.LS1.C.1 Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of Organisms.
- 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.

Priority Standards Unwrapped

Priority Standard: 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.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will describe the chemical and physical properties of substances.	2 Applying
Students will explain the difference between chemical change and a physical change.	2 Applying
Students will analyze and interpret data to identify patterns of change to determine if a chemical reaction has occurred.	3 Analyzing
Students will support their interpretation of data by describing the relationship between the change in substances' properties and the rearrangement of atoms in the reactants and products.	4 Evaluating

Priority Standard: 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.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will develop a model to identify the components of a given chemical reaction (number of and types of molecules in reactants and products)	3 Analyzing
Using a provided model, students will describe the relationship between the components, including molecular arrangement, atomic make-up, and mass of both reactants and products.	2 Applying

Students will explain how a provided model demonstrates the conservation of mass.	2 Applying

Priority Standard: 6-8.PS1.B.2 Construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Learning Targets	Webb's DOK Level Bloom's Level
Students will construct and test a device that requires either heating or cooling.	4 Creating
Students will analyze the data produced when testing a device designed to release or absorb heat.	3 Analyzing
Students will modify a device, based on data from testing, using new materials or changing the amount of chemicals to increase the efficiency of the device.	4 Evaluating

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will develop a model to address a problem to be solved.	4 Creating
Students will describe the relationships between the components to be tested.	2 Applying

Students will collect data representing the function of the proposed model.	2 Applying
Students will modify the model based on outcomes from the data and will use the modification to address a problem to be solved.	4 Evaluating
Priority Standard: 6-8.LS1.C.1 Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of Organisms.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will explain how matter cycles and energy flows in the processes of photosynthesis and cellular respiration.	2 Applying
Students will make a claim explaining or arguing that matter and energy flow in and out of organisms.	3 Analyzing
Students will evaluate evidence about the flow of matter and energy to support their claim.	3 Analyzing
Students will use their knowledge of photosynthesis and cellular respiration to support their claim.	2 Applying

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will develop a model to identify the components in the relationship between Earth's interior and continuous construction of Earth's Crust and the formation of its exterior features (ridges, trenches, mountains, and active volcanic chains).	4 Creating
Students will describe the relationship between the components in the relationship between Earth's interior and continuous construction of Earth's Crust and the formation of its exterior features (ridges, trenches, mountains, and active volcanic chains).	2 Applying
Students will use a model to describe, based on time and spatial evidence, how energy from Earth's interior and the Sun drive Earth's processes through its different material form and interactions.	3 Analyzing
Students will describe how time and spatial scales can affect how humans view landform changes.	2 Applying

Essential Questions:

1. How can we make something new that was not there before?
2. Can we create matter?
3. How can a device be designed that can absorb or release thermal energy?
4. How can we design an investigation to address a problem and ensure optimal design?
5. Where does food come from and where does it go next?
6. What cause's Earth's surface to change?

Enduring Understanding/Big Idea:

1. Chemical reactions result in new substances that were not present in the original reaction.
2. When substances react chemically, the atoms are rearranged to form new substances but the number and mass of atoms (i.e. the matter) does not change.
3. Utilize the design cycle to test and modify the device until a solution is found.
4. We utilize models to address problems in technology and engineering and modify our initial models to achieve an optimal design.
5. Matter and energy cycle continuously throughout living organisms, and the Sun is the original source of energy in most of these processes.
6. All features of Earth's surface are a result of energy flowing and matter recycling from within the Earth's interior.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific	
Scope 1: Characteristics of Chemical Reactions		
Synthetic Materials	Atom Chemical Process Chemical Reaction Compound Molecule	Precipitate (noun/chemistry) Product (noun/chemistry) Properties Reactant
Scope 2: Physical and Chemical Properties		
Bulk Materials	Chemical Property Chemical Reaction	Physical Property Pure Substance
Scope 3: Modeling Conservation of Mass		
Coefficient Conserve Subscript	Atom Chemical Equation Chemical Formula Chemical Process Chemical Reaction Law of Conservation of Matter	Mass Molecule Product (noun/chemistry) Properties Reactant

Scope 4: Thermal Energy in Chemical Reactions		
N/A	Chemical Reaction Endothermic Reaction Exothermic Reaction	Product (noun/chemistry) Reactant Thermal Energy
Scope 5: Introduction to Photosynthesis		
N/A	Chemical Reaction Chloroplast Energy (forms of) Glucose Matter Cycle	Microorganism Photosynthesis Phytoplankton Product (noun/chemistry) Reactant
Scope 7: Earth Materials		
Cycle System	Chemical Change Energy (forms of) Igneous Rock Metamorphic Rock	Physical Change Rock Cycle Sedimentary Rock

Resources for Vocabulary Development:

STEMscopedia & Picture Vocabulary

Engaging Scenario

An Engaging Scenario is a culminating activity tied to the unit's priority standards, that includes the following components: situation, challenge, specific roles, audience, product or performance.

Engaging Scenario 1 block

Students create a proposal for surviving on Mars as part of a design challenge. They present their plan to the board committee members.

Put students in groups of 3. Each group member is in charge of developing a plan to address one (or more) of the following questions:

1. How will you cycle energy and matter in the food chain since a Mars' colony would be a closed system?
2. How will you provide transportation on and around Mars using chemical reactions?
3. What Martian materials do you anticipate using to construct shelter? (i.e. foundational materials for the structure you bring with you)

Rubric for Engaging Scenario:

Proposed Flow of Activities

- ½ block
  - Put students in groups of 3
  - Each group member tackles one of the 3 guiding
  - The group assembles a posterboard visually displaying their solutions to the 3 guiding questions.
- ½ block
  - Gallery Walk
  - 2 group members stay put, 1 group member travels and listens to explanation
  - Teacher travels and provides feedback.
  - ⅓ of the way through gallery walk, group members switch roles so every group member gets a chance to visit each station and to present.

Scope 1: Characteristics of Chemical Reactions

Engaging Experience

Title: Characteristics of Chemical Reactions

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will describe the chemical and physical properties of substances.	2 Applying
Students will explain the difference between chemical change and a physical change.	2 Applying
Students will analyze and interpret data to identify patterns of change to determine if a chemical reaction has occurred.	3 Analyzing
Students will support their interpretation of data by describing the relationship between the change in substances' properties and the rearrangement of atoms in the reactants and products.	4 Evaluating

Engage	Explore	Explain	Elaborate	Evaluate
Investigative Phenomena **Graphic Organizer**	**Explore 1** **Explore 3**	**Linking Literacy** - pre reading - choose 1: during reading **or** after reading	*PhET Simulation: Reactants, Products and Leftovers: Chemical Reactions*	**Open Ended Response** *Multiple Choice Assessment*

Hook (see notes)		**STEMscopedia** **Content Connections Video**	*SEP Simulation - Characteristic of Chemical Reactions*	

Instructional Notes:
Scientists in lower grades have exposure to the idea that when 2 or more different substances are mixed a new substance with different properties is formed.
In 7th grade, we are exposing them to when 2 or more substances are mixed they are changed on a molecule level, but the number of atoms are conserved. Also, some reactions absorb and release energy.

Instructional Focus: Know that a chemical reaction can be determined by examining a substance's properties before and after an interaction
Connection to the Mission: How can you simulate some of the natural chemical reactions on Mars? Would knowledge of natural chemical reactions best be used in your transportation, food, or lodging plans? Explain your reasoning.

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
● Engage: Investigative ● Phenomena and Hook ● Linking Literacy Pre Reading ● Explore 1 ● Graphic Organizer ● STEMscopedia	● Content Connections Video ● Explore 3 (CER) ● Linking Literacy During Reading or Linking Literacy After Reading ● STEMscopedia ● Revisit Graphic Organizer	● Review and Process the Linking Literacy During Reading or After Reading ● Revisit Graphic Organizer ● Evaluate ● **Add to Mission Log - Teacher Guide - Mission Log**

*Hook - may want to order goldenrod paper and windex solution (yellow to bright red)
Phenol red over baking soda
Lemon Juice Hidden messages

Explore 3:
The Claim Evidence Reasoning helps to support the academic language of products and reactants and should be a focus during Explore 3.
If you have rock and mineral samples in your science closet, use it in addition to the chart that shows the elements.

Evaluate: The open ended response assessment allows students to be assessed on the skill of analyzing data.

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Board Approved: June 13, 2024

Scope 2: Physical and Chemical Properties

Engaging Experience

Title: Physical and Chemical Properties

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level / Bloom's Level
Students will describe the chemical and physical properties of substances.	2 Applying
Students will explain the difference between chemical change and a physical change.	2 Applying
Students will analyze and interpret data to identify patterns of change to determine if a chemical reaction has occurred.	3 Analyzing
Students will support their interpretation of data by describing the relationship between the change in substances' properties and the rearrangement of atoms in the reactants and products.	4 Evaluating

Engage	Explore	Explain	Elaborate	Evaluate
Accessing Prior Knowledge Hook	**Explore 2** Explore 3 (CER)	Picture Vocabulary STEMscopedia Content Connections Video	*Math Connections* *Reading Science A/B/C - Archimedes and the Golden Crown*	Choose 1: Claim-Evidence-Reasoning Open-Ended Response Multiple Choice Assessment

<u>Instructional Notes:</u>
Scientists in lower grades have exposure to the idea that matter is made of really small particles and that even when particles seem to disappear, they don't, they just change form.
*In 7th grade, we are exposing them t*o matter is composed of atoms and molecules. Atoms and molecules configuration can be used to explain states of matter, phase changes, and conservation of matter.

<u>Instructional Focus</u>: Know that a chemical reaction can be determined by examining a substance's properties before and after an interaction.
<u>Connection to the Mission</u>: What chemical properties would you expect to be similar on both Earth and Mars? How can you improve upon current designs for Mars expeditions?

<u>What *could* a science workshop look like during each block?</u>

<u>Block 1</u>	<u>Block 2</u>	<u>Block 3</u>
Hook Explore 3 STEMscopedia (Try it now)	Accessing Prior Knowledge Explore 2 Content Connections Video STEMscopedia	Evaluate (pick your modality) Elaborate **Add to Mission Log - Teacher Guide - Mission Log**

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Scope 3: Modeling Conservation of Mass

Engaging Experience

Title: Modeling Conservation of Mass

Suggested Length of Time: 4 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will develop a model to identify the components of a given chemical reaction (number of and types of molecules in reactants and products)	3 Analyzing
Using a provided model, students will describe the relationship between the components, including molecular arrangement, atomic make-up, and mass of both reactants and products.	2 Applying
Students will explain how a provided model demonstrates the conservation of mass.	2 Applying

Engage	Explore	Explain	Elaborate	Evaluate
Investigative phenomen (light a match!) **Accessing Prior Knowledge** **Graphic Organizer** Hook	**Explore 1 /** Guided Practice (Intervention) **Explore 2**	Picture Vocabulary Linking Literacy - During Reading STEMscopedia (see notes) **Content Connections Video with Handout**	Math Connections **PhET Simulation Practice - Balancing Chemical Equations - Chemical Reactions**	Multiple Choice Assessment Concept Attainment Quiz (Intervention)

Instructional Notes:
Scientists in lower grades have exposure to when 2 or more substances are mixed together a new substance with new properties may be formed.
In 7th grade, we are exposing them to when 2 or more substances are reacting atoms will rearrange but the total number of atoms is conserved. During this process sometimes energy will be released and sometimes energy will be absorbed.

Instructional Focus: Know that the total number of atoms does not change in a chemical reaction.

Connection to the Mission: One of the basic substances in organisms is carbon. Based on the concept of conservation of matter, what happens to the carbon in a plant when the plant is eaten by a cow? How does this relate to your food plan?

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3	Block 4
Investigative Phenomena APK Graphic Organizer Explore 1 Linking Literacy - During Reading	Explore 2 → revisit Graphic Organizer PhET Simulation	Content Connections Video with Handout Math Connections	Multiple Choice Assessment Or Concept Attainment Quiz (Intervention) **Add to Mission Log - Teacher Guide - Mission Log**

APK - tree growing also connects with future Intro to Photosynthesis scope and how plants grow from transferring atoms during photosynthesis from $CO_2 + H_2O$ to plant tissue.

Graphic Organizer - This is an academic language script to help build academic vocabulary.

Explore 1 - requires LOTS of materials. Students construct their own models. Consider using 3-hole punch punches, beads, etc… Consider using Guided Practice cards to make models of because there are fewer atoms necessary when constructing models.

STEMscopedia: pull out information that supports the Linking Literacy, Explore 1 and Explore 2.

Phet Sim Balancing Chemical Equations - use the balance tool.

Math Connections: Skip #2 or share that atomic mass will be introduced in high school and it is located on the periodic table.
May Include (if time or support is needed) **Must Include** to ensure skill and content is present

Scope 4: Thermal Energy in Chemical Reactions

Engaging Experience

Title: Thermal Energy in Chemical Reactions

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 6-8.PS1.B.2 Construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Learning Targets	Webb's DOK Level Bloom's Level
Students will construct and test a device that requires either heating or cooling.	4 Creating
Students will analyze the data produced when testing a device designed to release or absorb heat.	3 Analyzing
Students will modify a device, based on data from testing, using new materials or changing the amount of chemicals to increase the efficiency of the device.	4 Evaluating

Priority Standard: 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.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will develop a model to address a problem to be solved.	4 Creating
Students will describe the relationships between the components to be tested.	2 Applying
Students will collect data representing the function of the proposed model.	2 Applying
Students will modify the model based on outcomes from the data and will use the modification to address a problem to be solved.	4 Evaluating

Engage	Explore	Explain	Elaborate	Evaluate
Investigative Phenomena (see notes) Accessing Prior Knowledge Graphic Organizer Hot and Cold Science	Explore 1 (CER) **Explore 2 (see Instructional Notes!)**	**Content Connections Video**	Science Today - Watch It! Guided Practice (Intervention)	Multiple Choice Assessment Student reflection after Explore 2 design challenge

Instructional Notes:
Scientists in lower grades have exposure to when 2 or more substances are mixed together a new substance with new properties may be formed.
In 7th grade, we are exposing them to when 2 or more substances are reacting atoms will rearrange but the total number of atoms is conserved. During this process sometimes energy will be released and sometimes energy will be absorbed.

Instructional Focus: Explain how thermal energy can be released or absorbed.
Connection to the Mission: How can reactions that absorb energy be used in your transportation plan? How can reactions that release energy be used in your transportation plan? How can endothermic and exothermic reactions be used in your lodging plans?

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
Explore 2 - Explain task Investigative Phenomena (see notes) Accessing Prior Knowledge Graphic Organizer Hot and Cold Science	Explore 2 - Design, Test, and Feedback Loop Content Connections Video Graphic Organizers	Multiple Choice Assessment or Student reflection after Explore 2 design challenge **Add to Mission Log - Teacher Guide - Mission Log**

Investigative Phenomena: maybe bring in a pack of hot hands hand warmers

Explore 2: This is a MUST DO as it's the only Explore that meets the learning objective for this bundle. However, consider using this alternative lesson that provides more structure and support for the teacher.

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Scope 5: Introduction to Photosynthesis

Engaging Experience

Title: Introduction to Photosynthesis

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 6-8.LS1.C.1 Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of Organisms.

Learning Targets	Webb's DOK Level / Bloom's Level
Students will explain how matter cycles and energy flows in the processes of photosynthesis and cellular respiration.	2 Applying
Students will make a claim explaining or arguing that matter and energy flow in and out of organisms.	3 Analyzing
Students will evaluate evidence about the flow of matter and energy to support their claim.	3 Analyzing
Students will use their knowledge of photosynthesis and cellular respiration to support their claim.	2 Applying

Engage	Explore	Explain	Elaborate	Evaluate
Investigative phenomena or APK Graphic Organizer *Hook*	Explore 1 Explore 2	Linking Literacy - During Reading	*Science Today - Watch It!*	Multiple Choice Assessment

Instructional Notes:
Scientists in lower grades have exposure to plants and animals need to take in air and water. Animals take in food, plants make their own food from light and air. Animals use food both for energy and materials to grow and repair.
In 7th grade, we are exposing them to photosynthesis is used to make sugars. Within both plants and animals food/sugar is broken down through chemical reactions and, in so doing, release energy.

Instructional Focus: Describe how photosynthesis plays an important role in the cycling of matter and flow of energy into and out of organisms.
Connection to the Mission: What is the role of the Sun in photosynthesis? Describe the chemical reaction that occurs during photosynthesis.

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
Accessing Prior Knowledge Graphic Organizer or Linking Literacy - During Reading Explore 1	Explore 2 Science Today - Watch It! Guided Practice (Intervention) Content Connections Video	Guided Practice (Intervention Tab) to review before assessment Concept Attainment Quiz as review Multiple Choice Assessment **Add to Mission Log - Teacher Guide - Mission Log**

Explore 2: You can get a thin piece of Elodea at your local pet store. Miles of Exotic by MetroNorth Mall

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Scope 7: Earth Materials

Engaging Experience

Title: Earth Materials

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will develop a model to identify the components in the relationship between Earth's interior and continuous construction of Earth's Crust and the formation of its exterior features (ridges, trenches, mountains, and active volcanic chains).	4 Creating
Students will describe the relationship between the components in the relationship between Earth's interior and continuous construction of Earth's Crust and the formation of its exterior features (ridges, trenches, mountains, and active volcanic chains).	2 Applying
Students will use a model to describe, based on time and spatial evidence, how energy from Earth's interior and the Sun drive Earth's processes through its different material form and interactions.	3 Analyzing
Students will describe how time and spatial scales can affect how humans view landform changes.	2 Applying

Engage	Explore	Explain	Elaborate	Evaluate
Investigative Phenomena **Hook**	**Explore 1** **Explore 3**	**STEMscopedia**	*Career Connections - Geologist*	Teacher eval/conference of Explore 3

Instructional Notes:
Scientists in lower grades have exposure to 4 major earth systems - geosphere (rocks, soil), hydrosphere (water/ice), atmosphere(air) and biosphere (living things). The systems interact by rain shaping land/providing moisture for living things. Water, ice, wind, and organisms break down rocks, soils, and sediments and move them around.
to the sun and Earth's interior are the primary sources of energy driving changes to the 4 major earth systems. Plate tectonics influences the geosphere and drives the rock cycle.

Instructional Focus: Know that the flow of energy drives the cycling of Earth's materials.
Connection to the Mission: What types of rock would make for the best foundation to build upon on Mars? Would you expect the same type of cycling of rocks to occur on Mars? Explain your reasoning.

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
Hook Explore 1(see instructional notes)	Content Connections Video Explore 3 with support from STEMscopedia Gallery Walk (feedback from peers)	Explore 3 continued with a teacher conference and feedback **Add to Mission Log - Teacher Guide - Mission Log**

Explore 1: don't use crayons. Use starbursts (previous year example).

Explore 3 & STEMscopedia - When you print off the checklist for what should be included in the student mobile, you may want to highlight portions of the STEMscopedia that will support students in creating that portion of their model.

Explore 3 is the evaluation because this standard is addressing developing a model. It is imperative that you provide feedback along the way and help students understand components missing in their model. This is an opportunity to utilize conferring and formative feedback loops.

May Include (if time or support is needed)
Must Include to ensure skill and content is present

Summary of Engaging Learning Experiences for Scopes

Scope	Engaging Experience Title	Description	Suggested Length of Time
1	Characteristics of Chemical Reactions	Instructional Focus: Know that a chemical reaction can be determined by examining a substance's properties before and after an interaction. Connection to the Mission: How can you simulate some of the natural chemical reactions on Mars? Would knowledge of natural chemical reactions best be used in your transportation, food, or lodging plans? Explain your reasoning	3 blocks
2	Physical and Chemical Properties	Instructional Focus: Know that a chemical reaction can be determined by examining a substance's properties before and after an interaction. Connection to the Mission: What chemical properties would you expect to be similar on both Earth and Mars? How can you improve upon current designs for Mars expeditions?	3 blocks
3	Modeling Conservation of Mass	Instructional Focus: Know that the total number of atoms does not change in a chemical reaction. Connection to the Mission: One of the basic substances in organisms is carbon. Based on the concept of conservation of matter, what happens to the carbon in a plant when the plant is eaten by a cow? How does this relate to your food plan?	4 blocks
4	Thermal Energy in Chemical Reactions	Instructional Focus: Explain how thermal energy can be released or absorbed. Connection to the Mission: How can reactions that absorb energy be used in your transportation plan? How can reactions that release energy be used in your transportation plan? How can endothermic and exothermic reactions be used in your lodging plans?	3 blocks

5	Introduction to Photosynthesis	Instructional Focus: Describe how photosynthesis plays an important role in the cycling of matter and flow of energy into and out of organisms. Connection to the Mission: What is the role of the Sun in photosynthesis? Describe the chemical reaction that occurs during photosynthesis.	3 blocks
7	Earth Materials	Instructional Focus: Know that the flow of energy drives the cycling of Earth's materials. Connection to the Mission: What types of rock would make for the best foundation to build upon on Mars? Would you expect the same type of cycling of rocks to occur on Mars? Explain your reasoning.	3 blocks
Engaging Scenario		Students create a proposal for surviving on Mars as part of a design challenge. They present their plan to the board committee members.	1 block

Unit 3: Natural Processes & Human Activities Shape Earth's Resources & Ecosystems

Subject: Science
Grade: 7
Name of Unit: Natural Processes & Human Activities Shape Earth's Resources & Ecosystems
Length of Unit: 14 blocks
Overview of Unit:

Bundle 3: Natural Processes and Human Activities Shape Earth's Resources and Ecosystems

Student Letter

7th Grade: Bundle 3
Natural Processes and Human Activities Shape Earth's Resources and Ecosystems

Mission Briefing

You are about to begin a new journey studying how ecosystems have changed over time due to natural processes and human activities and discovering how this knowledge can be applied to our world. Your mission will be to imagine you are a reporter for a local newspaper. You will write an article informing the public about the effects colliding continents will have on the matter and energy flow within different ecosystems. As you work toward this goal, you will be learning the following concepts:

- Resource availability affects populations and growth of organisms.
- There are patterns of relationships among organisms and abiotic factors in an ecosystem.
- The flow of energy drives the cycling of Earth's materials in both living and nonliving parts of an ecosystem.
- Distribution of fossils and rocks, continental shapes, and seafloor structures are observed to provide evidence of the past.
- Earth has mineral, energy, and water resources.
- A chemical reaction can be determined by examining a substance's properties before and after an interaction.

Many investigations will be done in class over several weeks to help you learn these concepts from first-hand experiences. After completing each investigation, take time to look for examples of these concepts in the world around you.

Sincerely,

Unit 3 Storyline Summary
Anchoring phenomena: How will the movement of continents affect the matter and energy flow within the new ecosystems? Students interact with a video of inflatables in a pool. **Culminating mission:** Students write a news article that describes how the movement of continents in the distant future will alter and affect the matter and energy flow within the new ecosystems.

Priority Standards for unit:

- 6-8.LS2.A.2 Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem.
- 6-8.LS2.B Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- 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.

Priority Standards Unwrapped

Priority Standard: 6-8.LS2.A.2 Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will identify the effect of competitive, predatory, and mutually beneficial interactions in ecosystems.	2 Applying
Students will describe how the relationships between organisms (mutualism, commensalism & parasitism) affect resource availability across ecosystems.	2 Applying
Students will construct explanations predicting cause and effect relationships in ecosystems using qualitative or quantitative data.	2 Applying

Priority Standard:6-8.LS2.B Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will develop a model that describes energy transfer and matter cycling among producers, consumers, and decomposers.	1 Understanding
Students will develop a model that describes energy transfer and matter cycling between organisms and the nonliving parts of an ecosystem.	1 Understanding
Students will use a model they developed to construct an explanation of how energy transfer and matter cycling occurs at each level of an ecosystem.	3 Applying

Priority Standard: 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.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will organize given data that represents the distribution and ages of fossils and rocks, continental shapes, seafloor structures, and/or age of oceanic crust.	3 Analyzing
Students will use analyzed data to provide evidence for past plate motion.	3 Analyzing
Students will describe geologic patterns: regions that share fossils and rocks, shapes of continents, separation of continents, and the distribution of seafloor structures.	3 Analyzing

Essential Questions:

1. How do changes in an ecosystem affect what lives there?
2. How does energy move in an ecosystem?
3. What caused Earth's surface to change?

Enduring Understanding/Big Ideas:

1. Every ecosystem contains predatory, competitive, and mutually beneficial relationships.
2. The transfer of energy can be tracked as energy flows through a natural system.
3. 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, and we are able to show that Earth's plates have moved great distances, collided, and spread apart because of our investigation of rocks and fossils.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific	
Scope 1: Relationships in Ecosystems		
N/A	Abiotic Factor Biotic Factor Competition (within ecosystems) Ecosystem	Interdependent Mutualism Organism Population Predation
Scope 2: Flow of Energy in Ecosystems		
Aquatic	Atom Carnivore Consumer (within ecosystems) Decomposers Ecosystem Energy (within ecosystems) Energy Transfer	Food Web Matter Cycle Nutrients Organism Producer (within ecosystems) Terrestrial Trophic Level

Resources for Vocabulary Development:

STEMscopedia & Picture Vocabulary

Engaging Scenario

An Engaging Scenario is a culminating activity tied to the unit's priority standards, that includes the following components: situation, challenge, specific roles, audience, product or performance.

Engaging Scenario 2 blocks

Students write a news article that describes how the movement of continents in the distant future will alter and affect the matter and energy flow within the new ecosystems.

Suggested to put students in groups of 3. One student focuses on writing about the geologic process that are producing the collision of continents. Another student focuses on writing about the effects of the N. American and S. American ecosystems merging together. A third student composes a caption that illustrates the effects of the collision.

Consider encouraging a sensational or satiric tone with the article. For example: *Imminent peril, please take caution. Time to buy toilet paper and stock up on water because North America will be colliding with Europe in just 300 million years*. Another example: *Have you ever wanted to visit Europe but transatlantic travel is cost-prohibitive. No worries. Buy a good pair of shoes because in just 300 million years you'll be able to walk on over..*

Also consider supplying a list word bank for partners 1 and parter 2 with a preset number of terms they must use correctly when writing about the geologic processes and ecosystem effects. Say 10 vocab words and pick 6 to embed in your writing.

Block 1: planning
Block 2: ½ finishing touches, ½ gallery walk.

Rubric for Engaging Scenario:

Due to the group nature and scope of this project it is suggested that students are graded on a 1-3 scale based on effort and output as opposed to content.

Scope 1: Relationship in Ecosystems

Engaging Experience

Title: Relationship in Ecosystems

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 6-8.LS2.A.2 Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem.

Learning Targets	Webb's DOK Level Bloom's Level
Students will identify the effect of competitive, predatory, and mutually beneficial interactions in ecosystems.	2 Applying
Students will describe how the relationships between organisms (mutualism, commensalism & parasitism) affect resource availability across ecosystems.	2 Applying
Students will construct explanations predicting cause and effect relationships in ecosystems using qualitative or quantitative data.	2 Applying

Engage	Explore	Explain	Elaborate	Evaluate
Investigative Phenomena Hook Graphic Organizer	**Explore 1** **Explore 3**	Pic vocabulary **Linking Literacy - post reading** + Stemscopedia Concept Review Content Connections	Math Connections	**Multiple Choice**

Instructional Notes:
Scientists in lower grades have exposure to understanding that the food of almost any kind of animal can be traced back to plants. Organisms are related in food webs.
In 7th grade, we are exposing them to the ability to analyze and interpret data to provide evidence for the effects of biotic and abiotic factors on organisms and populations in a schoolyard ecosystem and provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

Instructional Focus: Know that there are patterns of relationships among organisms and abiotic factors in an ecosystem.
Connection to the Mission: Which cell structures would be most affected without food? Which cell structures would be most affected without water?

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
Mission Log (pages 1-4) Hook + Graphic Organizer	Content Connections Video **Explore 1** **Linking Literacy - post reading** + Stemscopedia	**Explore 3** **Multiple Choice Evaluation** **Add to Mission Log - Teacher Guide - Mission Log**

Mission Log - the first 31/2 pages draws upon knowledge learned from scopes in Bundles 1 & 2. Suggested to complete these pages before diving into the first scope of bundle 4.

Hook + Graphic Organizer: Consider displaying hook on the board, having table groups discuss the +/- relationships. Then record these relationships on the graphic organizer individually.

Explore 1: Fun intro to relationships. May be pressed for time in Block 2. Consider not calling on every pair and only 2 examples per relationship–be purposeful in calling on organisms to make sure examples of each relationship are discussed.

Scope 2: Flow of Energy in Ecosystems

Engaging Experience

Title: Flow of Energy in Ecosystems

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 6-8.LS2.B Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

Learning Targets	Webb's DOK Level Bloom's Level
Students will develop a model that describes energy transfer and matter cycling among producers, consumers, and decomposers.	1 Understanding
Students will develop a model that describes energy transfer and matter cycling between organisms and the nonliving parts of an ecosystem.	1 Understanding
Students will use a model they developed to construct an explanation of how energy transfer and matter cycling occurs at each level of an ecosystem.	3 Applying

Engage	Explore	Explain	Elaborate	Evaluate
APK Graphic Organizer Hook	**Explore 1** **Explore 2**	Pic vocabulary Linking Literacy - Pre & Post Concept Review Game Content Connections Video		Concept Attainment Quiz (Intervention) **Create a Model** (not in Stemscopes)
Instructional Notes:				

Scientists in lower grades have exposure to matter cycling between air and soil and among organisms as they live and die.
In 7th grade, we are exposing them to atoms making up the ecosystem are repeatedly cycling between living and nonliving parts of the ecosystem. Food webs model how matter and energy are transferred.

Instructional Focus: Describe how the flow of energy drives the cycling of Earth's materials in both living and nonliving parts of an ecosystem
Connection to the Mission: How are matter and energy conserved within an ecosystem?

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
APK Hook Content Connections Video + Graphic Organizer **Explore 1**	**Explore 2** Linking Literacy, pre & post Concept Review Game	Concept Attainment Quiz (Intervention) **Create a Model** (not in Stemscopes) **Add to Mission Log - Teacher Guide - Mission Log**

Create a Model: The learning target is to "develop a model to describe…" so it makes more sense for students to have a performance assessment in which they actually develop and appropriately label a food web diagram using vocabulary and concepts taught during this scope. You will need to create the instructions and setup for this assessment because it is not available in STEMscopes.

Consider having this evaluation be a partner/group eval. Groups create a food web together and are provided with a word bank they must use when describing how matter and energy moves through the system. Consider using the food web cards from Explore 1 but make sure groups get a different set than they used for Explore 1.

Scope 3: Plate Tectonics

Engaging Experience

Title: Plate Tectonics

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level / Bloom's Level
Students will organize given data that represents the distribution and ages of fossils and rocks, continental shapes, seafloor structures, and/or age of oceanic crust.	3 Analyzing
Students will use analyzed data to provide evidence for past plate motion.	3 Analyzing
Students will describe geologic patterns: regions that share fossils and rocks, shapes of continents, separation of continents, and the distribution of seafloor structures.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
APK Graphic Organizer Hook	Explore 1 **Explore 2**	Pic vocab *Linking Literacy - During Reading* Stemscopedia+ Graphic Organizer Content Connections Video - Plate Tectonics	*Math Connections* (hard/bonus) Concept Attainment Quiz (intervention)	**CER**

Instructional Notes:
Scientists in lower grades have exposure to maps and different features of the Earth's surface. In 7th grade, we are exposing them to plate tectonics as the unifying theory to explain geologic history, the movement of rocks at Earth's surface, and patterns for geologic phenomena (volcanoes, earthquakes, etc…).

Instructional Focus: Describe how distribution of fossils and rocks, continental shapes, and seafloor structures are observed to provide evidence of the past.
Connection to the Mission: What would cause the continents to collide together in the future?

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
APK Graphic Organizer Hook Explore 1 Content Connections Video - Plate Tectonics	**Explore 2** Stemscopedia+ Graphic Organizer	Concept Attainment Quiz **CER** **Add to Mission Log - Teacher Guide - Mission Log**

Linking Literacy is a may do for students who may need extra support to develop understanding during reading. It may be redundant/unnecessary for some students.

Scope 4: Seafloor Spreading

Engaging Experience

Title: Seafloor Spreading

Suggested Length of Time: 2 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will organize given data that represents the distribution and ages of fossils and rocks, continental shapes, seafloor structures, and/or age of oceanic crust.	3 Analyzing
Students will use analyzed data to provide evidence for past plate motion.	3 Analyzing
Students will describe geologic patterns: regions that share fossils and rocks, shapes of continents, separation of continents, and the distribution of seafloor structures.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
APK Hook	**Explore 1**	Pic vocab Linking Literacy - during/**post reading** **Content Connections Video**		**Multiple Choice Assessment**

Instructional Notes:
Scientists in lower grades have exposure to how Earth changes over time via weathering and erosion.
In 7th grade, we are exposing them to how fossil records can be used to identify geologic history in addition to ice cores and tree ring patterns.

Instructional Focus: Know what happens at the mid-ocean ridge and at subduction zones.
Connection to the Mission: How could seafloor spreading result in the colliding of the continents in the future?

What *could* a science workshop look like during each block?

Block 1	Block 2
APK Hook **Explore 1** **Content Connections Video**	Linking Literacy - during/**post reading** **Multiple Choice Assessment** **Add to Mission Log - Teacher Guide - Mission Log**

Summary of Engaging Learning Experiences for Scopes

Scope	Engaging Experience Title	Description	Suggested Length of Time
1	Relationship in Ecosystems	Instructional Focus: Know that there are patterns of relationships among organisms and abiotic factors in an ecosystem. Connection to the Mission: Which cell structures would be most affected without food? Which cell structures would be most affected without water?	3
2	Flow of Energy in Ecosystems	Instructional Focus: Describe how the flow of energy drives the cycling of Earth's materials in both living and nonliving parts of an ecosystem Connection to the Mission: How are matter and energy conserved within an ecosystem?	3
3	Plate Tectonics	Instructional Focus: Describe how distribution of fossils and rocks, continental shapes, and seafloor structures are observed to provide evidence of the past. Connection to the Mission: What would cause the continents to collide together in the future?	3
4	Seafloor Spreading	Instructional Focus: Know what happens at the mid-ocean ridge and at subduction zones. Connection to the Mission: How could seafloor spreading result in the colliding of the continents in the future?	2
Engaging Scenario		Students write a news article that describes how the movement of continents in the distant future will alter and affect the matter and energy flow within the new ecosystems.	2

Unit 4: Sustaining Biodiversity & Ecosystem Services in a Changing World

Subject: Science
Grade: 7
Name of Unit: Sustaining Biodiversity & Ecosystem Services in a Changing World
Length of Unit: 21 blocks
Overview of Unit:

Student Letter

7th Grade: Bundle 4
Sustaining Biodiversity and Ecosystem Services in a Changing World

Mission Briefing

You are about to begin a new journey studying how geoscience processes affect the biodiversity in and around ecosystems and discovering how this knowledge can be applied to our world. Your mission will be to analyze a map of Sunnyville, California, and note any possible impacts, positive or negative, on the current populations. You will present your findings to the International Panel during the Biodiversity Protection Conference. Your presentation will include your findings and a possible solution to the impacts of the processes on the biodiversity of certain populations living in the area. As you work toward this goal, you will be learning the following concepts:

- Populations of organisms are affected by physical and biological changes.
- Humans can play a role in maintaining biodiversity in ecosystems.
- Geoscience processes have changed Earth's surface features over time.
- Future catastrophic events can be predicted using data from previous natural hazards.
- Synthetic materials come from natural resources and impact society.

Many investigations will be done in class over several weeks to help you learn these concepts from first-hand experiences. After completing each investigation, take time to look for examples of these concepts in the world around you.

Sincerely,

Unit 4 Storyline Summary
Anchoring phenomena: How will geoscience processes affect biodiversity in Sunnyville, California, 40 years from now? Students interact with a video of an avalanche. **Culminating mission:** Students analyze a map of a fictitious town, Sunnyville, California, to determine any impacts to the biodiversity of the ecosystem in and around the city 40 years from now. Students create posters that summarize these impacts and include solutions to the possible decrease in biodiversity. They present their posters to the International Panel (class) during the Biodiversity Protection Conference.

Priority Standards for unit:

- 6-8.LS2.A.2 Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem.
- 6-8.LS2.C.1 Construct an argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations.
- 6-8.LS2.C.2 Evaluate benefits and limitations of differing design solutions for maintaining an ecosystem.
- 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.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.
- 6-8.PS1.A.3 Gather, analyze, and present information to describe that synthetic materials come from natural resources and how they impact society.

Priority Standards Unwrapped

Priority Standard: 6-8.LS2.A.2 Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will identify the effect of competitive, predatory, and mutually beneficial interactions in ecosystems.	2 Applying
Students will describe how the relationships between organisms (mutualism, commensalism & parasitism) affect resource availability across ecosystems.	2 Applying
Students will construct explanations predicting cause and effect relationships in ecosystems using qualitative or quantitative data.	2 Applying

Priority Standard: 6-8.LS2.C.1 Construct an argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will describe changes in the physical and biological components of an ecosystem using evidence.	2 Applying
Students will describe changes in the populations of an ecosystem using evidence.	2 Applying
Students will identify patterns in evidence to explain	3

causal relationships between physical and biological components of an ecosystem and changes in organism populations.	Analyzing
Students will construct an argument to explain how changes to an ecosystem affect organism populations within the ecosystem.	3 Analyzing
Priority Standard: 6-8.LS2.C.2 Evaluate benefits and limitations of differing design solutions for maintaining an ecosystem.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will analyze solutions for maintaining the biodiversity of an ecosystem and describe the solution's strengths and weaknesses.	4 Evaluating
Students will predict possible side effects of design solutions on both maintaining an ecosystem's biodiversity and access to resources human consumption.	4 Evaluating
Priority Standard: 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.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will identify and describe the problem and design constraints (time, materials, cost, safety) within a given scenario.	3 Analyzing
Students will identify relationships between human activity and positive and negative environmental impacts.	2 Applying
Students will use evidence and reasoning to make a	3

claim about the effectiveness of each proposed solution based upon the impact to the environment and the constraints and criteria of the problem.	Analyzing

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will identify the time and spatial scales for each geoscience process.	2 Applying
Students will construct explanations to explain a given phenomena using evidence of geoscience processes	3 Analyzing
Students will identify and describe, using necessary evidence, how Earth's surface processes and interior can affect its surface sediments over time.	3 Analyzing
Students will identify and describe, using necessary evidence, how plate motion occurs and its results, including catastrophic events.	3 Analyzing

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will organize given data, on natural hazards, to identify the frequency, location, and impact of a natural hazard.	3 Analyzing

Students will analyze given data, on natural hazards, to identify and describe patterns in the datasets.	3 Analyzing
Students will use the analyzed data, on natural hazards, to forecast and predict future events.	4 Evaluating

Priority Standard: 6-8.PS1.A.3 Gather, analyze, and present information to describe that synthetic materials come from natural resources and how they impact society.

Learning Targets	Webb's DOK Level Bloom's Level
Students will collect information about where synthetic materials come from and their role in society.	2 Applying
Students will analyze information about where synthetic materials come from and their role in society.	3 Analyzing
Students will present information about the impact synthetic materials have on society.	1 Recalling

Essential Questions:

1. How can changes to physical or biological components of an ecosystem affect organisms and populations?
2. How does changing an ecosystem affect what lives there?
3. What do good solutions look like?
4. How and why does the Earth's surface change?
5. How can we use data to mitigate the impact of future catastrophic events?
6. How do synthetic materials impact society?

Enduring Understanding/Big Ideas:

1. Ecosystems are dynamic in nature and their characteristics can vary over time and disruptions to any physical or biological component of an ecosystem can lead to shifts in all

its population.

2. Small changes in one part of a system might cause large changes in another part.
3. There are processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
4. Geoscience processes, operating from microscopic to planetary in scale, have shaped and will continue to shape the Earth's surface for billions of years.
5. Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events.
6. Natural resources undergo a chemical process to form synthetic materials and these synthetic materials can have positive and negative impacts on society.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific	
Scope 1: Dynamic Nature of Ecosystems		
Dynamic	Competition (within ecosystems) Ecosystem Ecosystem Dynamics	Population (within ecosystems) Resilience (within ecosystems)
Scope 2: Ecosystem Biodiversity		
N/A	Biodiversity Ecosystem Recycling Resource (within an ecosystem)	Species Terrestrial Water Purification
Scope 3: Geoscience Processes		
System	Earthquake Geoscience Process Global	Microscopic Tectonic Plate
Scope 4: Weathering and Erosion		
N/A	Deposition Erosion Erosional Features	Sediment Surface Feature Underground Formations

	Geoscience Process	Weathering
Scope 5: Natural Hazard Predictions		
N/A	Atmospheric Conditions Catastrophic Events Earthquake Flood Forecast	Geologic Forces Natural Hazard Seismic Waves Volcanic Eruption
Scope 6: Synthetic Materials		
N/A	Natural Resources Nonrenewable Physical Property	Renewable Synthetic Materials

Resources for Vocabulary Development:

STEMscopedia & Picture Vocabulary

Engaging Scenario

An Engaging Scenario is a culminating activity tied to the unit's priority standards, that includes the following components: situation, challenge, specific roles, audience, product or performance.

Engaging Scenario 2 blocks

Students make a poster for the INternational Panel of a Biodiversity Protection Conference that presents solutions to a potential impact on biodiversity in the ecosystem surround Sunnyville California 40 years in the future.

Suggested to put students in groups of 3. One student focuses on wetland ecosystems. Another student focuses on forest ecosystems. A third student focuses on coastal ecosystems.

Block 1: planning
Block 2: ½ finishing touches, ½ gallery walk.

Rubric for Engaging Scenario:

Due to the group nature and scope of this project it is suggested that students are graded on a 1-3 scale based on effort and output as opposed to content.

Scope 1: The Dynamic Nature of Ecosystems

Engaging Experience

Title: The Dynamic Nature of Ecosystems

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 6-8.LS2.C.1 Construct an argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations.

Learning Targets	Webb's DOK Level Bloom's Level
Students will describe changes in the physical and biological components of an ecosystem using evidence.	2 Applying
Students will describe changes in the populations of an ecosystem using evidence.	2 Applying
Students will identify patterns in evidence to explain causal relationships between physical and biological components of an ecosystem and changes in organism populations.	3 Analyzing
Students will construct an argument to explain how changes to an ecosystem affect organism populations within the ecosystem.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
APK Graphic Organizer	Explore 1 Explore 2 Explore 3	Linking Literacy - pre/during/post STEMscopedia	Science Today - Read It	CER Concept Attainment Quiz (From Intervention)

<u>Instructional Notes:</u>
Scientists in lower grades have exposure to when events happen in an ecosystem, some organisms die, some thrive, some move on.
In 7th grade, we are exposing them to how disruptions tend to affect all parts of an interconnected ecosystem and and integrity of the ecosystem's biodiversity is altered.

Instructional Focus: Describe how populations of organisms are affected by physical and biological changes.
Connection to the Mission: What physical components in the area are possibly impacting the populations? What biological components in the area are possibly impacting the populations?

<u>What *could* a science workshop look like during each block?</u>

<u>Block 1</u>	<u>Block 2</u>	<u>Block 3</u>
APK Graphic Organizer Explore 1, 2, or 3	Explore 1, 2, or 3 Linking Literacy + STEMscopeda	Science Today, Read It. Concept Attainment Quiz (for review) CER **Add to Mission Log - Teacher Guide - Mission Log**

Explores 1, 2, & 3: Explores are unique for this scope. Explore 1 involves a two-week time period and external supplies. Explore 2 is potentially messy and supply-heavy. Explore 3 is chaotic. Pick the Explore that best meets your vibe.

Scope 2: Ecosystem Biodiversity

Engaging Experience

Title: Ecosystem Biodiversity

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 6-8.LS2.A.2 Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will identify the effect of competitive, predatory, and mutually beneficial interactions in ecosystems.	2 Applying
Students will describe how the relationships between organisms (mutualism, commensalism & parasitism) affect resource availability across ecosystems.	2 Applying
Students will construct explanations predicting cause and effect relationships in ecosystems using qualitative or quantitative data.	2 Applying

Priority Standard: 6-8.LS2.C.2 Evaluate benefits and limitations of differing design solutions for maintaining an ecosystem.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will analyze solutions for maintaining the biodiversity of an ecosystem and describe the solution's strengths and weaknesses.	4 Evaluating
Students will predict possible side effects of design solutions on both maintaining an ecosystem's biodiversity and access to resources human consumption.	4 Evaluating

Priority Standard: 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.	
Learning Targets	**Webb's DOK Level** **Bloom's Level**
Students will identify and describe the problem and design constraints (time, materials, cost, safety) within a given scenario.	3 Analyzing
Students will identify relationships between human activity and positive and negative environmental impacts.	2 Applying
Students will use evidence and reasoning to make a claim about the effectiveness of each proposed solution based upon the impact to the environment and the constraints and criteria of the problem.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
APK Graphic Biodiversity	**Explore 1** Explore 2	Pic vocabulary **Linking Literacy - pre/during**	Math Connections **Science Today - Read It**	**Multiple Choice** Short Answer

<u>Instructional Notes:</u>
Scientists in lower grades have exposure to when events happen in an ecosystem, some organisms die, some thrive, some move on.
In 7th grade, we are exposing them to how disruptions tend to affect all parts of an interconnected ecosystem and integrity of the ecosystem's biodiversity is altered.

Instructional Focus: Explain how humans can play a role in maintaining biodiversity in ecosystems.
Connection to the Mission: Brainstorm at least one change in the biodiversity in the area caused by the following situations: addition of a city, addition of a neighborhood, and clearing the forest for farmland.

<u>What *could* a science workshop look like during each block?</u>

<u>Block 1</u>	<u>Block 2</u>	<u>Block 3</u>
APK Graphic Biodiversity **Explore 1**	**Linking Literacy - pre/during** Explore 2 **Science Today - Read It**	**Multiple Choice** Short Answer **Add to Mission Log - Teacher Guide - Mission Log**

Scope 3: Geoscience Processes

Engaging Experience

Title: Geoscience Processes

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will identify the time and spatial scales for each geoscience process.	2 Applying
Students will construct explanations to explain a given phenomena using evidence of geoscience processes	3 Analyzing
Students will identify and describe, using necessary evidence, how Earth's surface processes and interior can affect its surface sediments over time.	3 Analyzing
Students will identify and describe, using necessary evidence, how plate motion occurs and its results, including catastrophic events.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
APK Hook	**Explore 1** **Explore 2** Explore 3	Linking Literacy - **during**, post **Stemscopedia** **Science Rock - Earth Changes** Concept Review Game	Science Today - Watch it!	Short Answer Multiple Choice

<u>Instructional Notes:</u>
Scientists in lower grades have exposure to wind, water, ice, and humans break down rocks into smaller pieces and moves them around.
In 7th grade, we are exposing them to the idea that Earth's interior processes are an additional source of change of landforms in addition to weather.

Instructional Focus: Brainstorm at least one change in the biodiversity in the area caused by the following situations: addition of a city, addition of a neighborhood, and clearing the forest for farmland.
Connection to the Mission: Make a list of geoscience processes that could be happening in and around Sunnyville on a large scale and a small scale. How could these geoscience processes impact the biodiversity of Sunnyville?

<u>What *could* a science workshop look like during each block?</u>

<u>Block 1</u>	<u>Block 2</u>	<u>Block 3</u>
APK Hook **Explore 1**	**Explore 2** Linking Literacy - **during**, post **Stemscopedia** Science Today - Watch it!	**Science Rock - Earth Changes** Concept Review Game Short Answer Multiple Choice **Add to Mission Log - Teacher Guide - Mission Log**

Scope 4: Weathering and Erosion

Engaging Experience

Title: Weathering and Erosion

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level / Bloom's Level
Students will identify the time and spatial scales for each geoscience process.	2 Applying
Students will construct explanations to explain a given phenomena using evidence of geoscience processes	3 Analyzing
Students will identify and describe, using necessary evidence, how Earth's surface processes and interior can affect its surface sediments over time.	3 Analyzing
Students will identify and describe, using necessary evidence, how plate motion occurs and its results, including catastrophic events.	3 Analyzing

Engage	Explore	Explain	Elaborate	Evaluate
APK Hook	**Explore 1 & Explore 3 (same time)** **Explore 2**	Linking Literacy - **pre** **Stemscopedia + Graphic Organizer** **Content Connections** Concept Review Game	Science Today - Watch It! Career Connections - Geologist	Open-ended and/or Multiple Choice

<u>Instructional Notes:</u>
Scientists in lower grades have exposure to wind, water, ice, and humans break down rocks into smaller pieces and moves them around.
In 7th grade, we are exposing them to the idea that Earth's interior processes are an additional source of change of landforms in addition to weather.

Instructional Focus: Know that geoscience processes include surface weathering and deposition by the movements of water, ice, and wind.
Connection to the Mission: How could water erode different areas in Sunnyville? Where might you see weathering occurring in Sunnyville?

<u>What *could* a science workshop look like during each block?</u>

<u>Block 1</u>	<u>Block 2</u>	<u>Block 3</u>
APK Hook **Explore 1 & Explore 3 (same time)** **Content Connections**	**Explore 2** Linking Literacy - **pre** **Stemscopedia + Graphic Organizer**	Concept Review Game Multiple Choice and/or open-ended **Add to Mission Log - Teacher Guide - Mission Log**

Multiple choice/open-ended - not thrilled with images in #2&3 of open-ended nor #2 of the multiple choice. Stalagmite formation is neither an emphasis nor even a mention in Stemscopedia. Could benefit from additional questions.

Scope 5: Natural Hazard Predictions

Engaging Experience

Title: Natural Hazard Predictions

Suggested Length of Time: 4 blocks

Standards Addressed

Priority Standard: 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.

Learning Targets	Webb's DOK Level Bloom's Level
Students will organize given data, on natural hazards, to identify the frequency, location, and impact of a natural hazard.	3 Analyzing
Students will analyze given data, on natural hazards, to identify and describe patterns in the datasets.	3 Analyzing
Students will use the analyzed data, on natural hazards, to forecast and predict future events.	4 Evaluating

Engage	Explore	Explain	Elaborate	Evaluate
APK Hook Graphic Organizer	**Explore 1** **Explore 2**	Linking Literacy - **pre** **Stemscopedia** Concept Review Game Content Connections Video	Science Today - Read it! Career Connections- Meteorologist	CER & multiple choice

Instructional Notes:
Scientists in lower grades have exposure to a variety of natural disasters from which we have various responses and ways to help.
In 7th grade, we are exposing them to patterns of natural disasters arising from the geologic forces of Earth's interior. This knowledge makes us more able to predict, prepare for, and respond to disasters.

Instructional Focus: Know that future catastrophic events can be predicted using data from previous natural hazards.
Connection to the Mission: After analyzing the map of Sunnyville, can you predict any possible future natural hazards

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3	Block 4
APK Hook Explore 2 research & prepare	Explore 2 presentations Content Connections Video Graphic Organizer+ Stemscopedia	Explore 1 Linking Literacy – **pre Stemscopedia**	Concept Review Game CER & multiple choice **Add to Mission Log - Teacher Guide - Mission Log**

Explore 1: Consider making only 1 map and using different colors of highlighters to overlay volcanoes and earthquakes, since transparencies are hard to come by and easily erase.

Explore 2: Though Explore 2 involves more time than most explores, it directly correlates to the learning goal and Stemscopes has done most of the heavy lifting. 8 topics = 8 groups of 3-4 students. Six questions to research. Each question could be the title for a 6-slide slidedeck with group members assigned 2 questions each.

Linking Literacy Pre-read: Would omit the phrase "populations" from the prompt because it insinuates population is causative for natural hazards.

Scope 6: Synthetic Materials

Engaging Experience

Title: Synthetic Materials

Suggested Length of Time: 3 blocks

Standards Addressed

Priority Standard: 6-8.PS1.A.3 Gather, analyze, and present information to describe that synthetic materials come from natural resources and how they impact society.

Learning Targets	Webb's DOK Level Bloom's Level
Students will collect information about where synthetic materials come from and their role in society.	2 Applying
Students will analyze information about where synthetic materials come from and their role in society.	3 Analyzing
Students will present information about the impact synthetic materials have on society.	1 Recalling

Engage	Explore	Explain	Elaborate	Evaluate
APK Graphic Organizer Hook	**Explore 1** **Explore 2**	Stemscopedia Content connections video	*Science Today - Watch It*	Open-ended response questions

Instructional Notes:
Scientists in lower grades have exposure to matter is made of small particles we cannot see. In 7th grade, we are exposing them to atoms and molecules better explain how matter is conserved as we transfer from state to another.

Instructional Focus: Explain how synthetic materials come from natural resources and impact society.
Connection to the Mission: How could the use of synthetic materials affect the ecosystem in and around Sunnyville?

What *could* a science workshop look like during each block?

Block 1	Block 2	Block 3
APK Hook Explore 1 Graphic Organizer Content Connections Video	Explore 2 (research/prep)	Explore 2 (present) Open-ended response questions **Add to Mission Log -** **Teacher Guide - Mission Log**

Explore 2: Though Explore 2 involves more time than most explores, it directly correlates to the learning goal and Stemscopes has done most of the heavy lifting. 8 topics = 8 groups of 3-4 students. Six questions to research. Each question could be the title for a 6-slide slidedeck with group members assigned 2 questions each. This explore could be lengthened due to MAP testing in May or cut if

Summary of Engaging Learning Experiences for Scopes

Scope	Engaging Experience Title	Description	Suggested Length of Time
1	The Dynamic Nature of Ecosystems	Instructional Focus: Describe how populations of organisms are affected by physical and biological changes Connection to the Mission: What physical components in the area are possibly impacting the populations? What biological components in the area are possibly impacting the populations?	3
2	Ecosystem Biodiversity	Instructional Focus: Explain how humans can play a role in maintaining biodiversity in ecosystems. Connection to the Mission: Brainstorm at least one change in the biodiversity in the area caused by the following situations: addition of a city, addition of a neighborhood, and clearing the forest for farmland.	3
3	Geoscience Processes	Instructional Focus: Brainstorm at least one change in the biodiversity in the area caused by the following situations: addition of a city, addition of a neighborhood, and clearing the forest for farmland. Connection to the Mission: Make a list of geoscience processes that could be happening in and around Sunnyville on a large scale and a small scale. How could these geoscience processes impact the biodiversity of Sunnyville?	3
4	Weathering and Erosion	Instructional Focus: Know that geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Connection to the Mission: How could water erode different areas in Sunnyville? Where might you see weathering occurring in Sunnyville?	3
5	Natural Hazard Predictions	Instructional Focus: Know that future catastrophic events can be predicted using data from previous natural hazards.	4

		Connection to the Mission: After analyzing the map of Sunnyville, can you predict any possible future natural hazards	
6	Synthetic Materials	Instructional Focus: Explain how synthetic materials come from natural resources and impact society. Connection to the Mission: How could the use of synthetic materials affect the ecosystem in and around Sunnyville?	3
Engaging Scenario		Students analyze a map of a fictitious town, Sunnyville, California, to determine any impacts to the biodiversity of the ecosystem in and around the city 40 years from now. Students create posters that summarize these impacts and include solutions to the possible decrease in biodiversity. They present their posters to the International Panel (class) during the Biodiversity Protection Conference.	2

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.