



Park Hill School District

Building Successful Futures • Each Student • Every Day

Fifth Grade Science Curriculum

Course Description: In 5th grade, students will study three domains of science; physical science, life science, and earth and space science. For physical science, students study matter, its weight, and the mixing of substances. During the life science unit, students learn about the transfer of energy, matter and energy in plants, human impact on basic needs of plants and animals, food webs, and ecosystems. For earth and space science, students will study about gravity, observing and comparing stars, Earth's rotation, changes in appearance of objects in the sky, describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact, and the distribution of water on Earth.

Scope and Sequence:

Quarter	Unit	Timeframe
1	<u>Life Science</u> • Topic 1: Energy Transfer ◦ Energy Transfer ◦ Matter and Energy in Plants • Topic 2: Ecosystems ◦ Food Webs • Topic 3: Body Systems	22 days
2	<u>Earth and Space Science, Part 1</u> • Topic 1: Earth's Rotation • Topic 2: Observing the Stars • Topic 3: Objects in the Sky (Add Gravity Explore 1)	26 days
3	<u>Earth and Space Science, Part 2</u> • Topic 1: Earth's Systems Interactions • Topic 2: Water Sources • Topic 3: Reducing Human Footprint	13 days
4	<u>Physical Science</u> • Topic 1: Matter is Everywhere • Topic 2: Changes to Matter • Topic 3: Mixtures	28 days

Curriculum Revisions 2020-2021:

- Conversion to 3D version- Added Investigative Phenomena, Graphic Organizers, Picture Vocabulary Strategies, Mission Tasks (to replace PEATs for Engaging Scenarios)

Curriculum Revisions 2022-2023:

- Aligned number of days to lessons
- Changed the order of Physical Science Unit and Earth & Space Science Unit (part 1), as well as order of the topics within Earth & Space Science (part 1)

Curriculum Revisions 2023-2024:

- 1st quarter and 2nd quarter have switched Units as well as 3rd quarter and 4th quarter
- Took off the Gravity Scope
- Combined Energy Transfer and Matter and Energy in Plants
- Pacing Calendar outlines the Missouri Learning Standards taught and the Disciplinary Core Ideas (NGSS).
- Added a week long unit for Body Systems to cover a Missouri Learning Standard on vertebrates/invertebrates and body systems.

Curriculum Revisions 2024-2025:

- Moved Unit 1: Earth and Space Part 1 to 2nd Quarter
- Moved Unit 2: Life Science to 1st Quarter

Unit 1: Life Science

Subject: Science

Grade: 5th

Name of Unit: Life Science

Length of Unit: 22 days

Overview of Unit: Exploration of interactions of living things

Materials for the Engaging Scenario: The student's mission is to design a self-sustaining garden that provides food for the community.

Printed

1 Mission Log (per student or group)

1 Action Plan (per student or group)

Consumable

1 Sheet of paper (per student or group)

Reusable

1 Pencil (per student or group)

1 Set of colored pencils (per student or group)

Topic 1: Energy Transfer / Matter and Energy in Plants

Suggested Length of Time: 8 Days

Essential Questions (Student Wondering):

- How does energy transfer from the sun to other organisms?

Enduring Understanding (Learning Objectives):

- The student is expected to use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. (ET)
- The student is expected to support an argument that plants get the materials they need for growth chiefly from air and water. (M&E)
- The student is expected to generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (M&E)

Standards Addressed-Energy Transfer

Missouri Learning Standards:

- 5-PS3.D.1 Use models to describe that energy stored in food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

Priority: Disciplinary Core Ideas

- 5-PS3.D.1 Energy in Chemical Processes and Everyday Life: The energy released (from) food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).
- 5-LS1.C.1 Organization for Matter and Energy Flow in Organisms: Plants acquire their material for growth chiefly from air and water.

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-PS3-1 Use models to describe that energy in animals' food (used for body repair, growth, motion, and maintaining body warmth) was once energy from the sun.
- Matter and Energy → Energy-Energy can be transferred in various ways and between objects.
- Developing and Using Models → Predict Phenomena-Develop and/or use models to describe and/or predict phenomena.

Detailed Description/Instructions:

Standard	5 E's	Suggested # of Days	Notes
5-PS3.D.1 5-LS1.C.1 CC: Energy	Engage: Investigative Phenomena Assessing Prior Knowledge	½ Day	Watch setup video Investigative Phenomena: How does energy transfer from the sun to other organisms? APK: By the end of this lesson students

	Graphic Organizer Hook		will make a prediction about where the energy from a hamburger begins. Graphic Organizer: Energy in Living Things How do living things gain energy? What do living things use energy to do? Hook: By the end of this activity students experience taking food into their bodies to gain energy.
5-PS3.D.1 5-LS1.C.1 5-LS2-1 3-5-ETS1-2 CC: Energy	Explore 1: (From ET) Scientific Investigation- How Plants Use Energy Students judge the quality of food available in a healthy plant compared to a sunlight-deprived plant.	1Day	Explore 1: By the end of this activity, students will be able to judge the quality of food based on nutrients the plant receives.
5-LS1.C1 CC: Conservation of Matter	Explore 1: (From Matter & Energy) Scientific Investigation- Growing Plants Without Soil Students discover and learn that some plants can grow with only water and air.	3 Days	Do 1 Tip: <i>have students place staples closer to the top to allow for more root growth.</i> Do 1 Preparation: • Cross-cutting Concept: Conservation of Matter discussion- share with students that matter flows and cycles can be tracked in terms of the weight of the substances before and after a process occurs. The total weight of the substances does not change. This is what is meant by conservation of matter. Matter is transported into, out of, and within systems. Have them measure the mass of the baggie at the beginning and end of plant growth to show that little difference exists between the initial and final mass. Discuss possible experimental errors for any baggies that do have a significant difference in mass.

			Do 1: By the end of this activity students should be able to discover that some plants can grow with only water and air.
	Energy Transfer Explore 2: Activity-Got Energy? Students will play a game that models how energy flows in an ecosystem.	Optional	Explore 2: By the end of this lesson students should be able to explain the transfer of energy among organisms and the effects of too few energy resources. (For instance, what happens to the wolf population when there are not enough rabbits?)
5-PS3.D.1 5-LS1.C.1	Explain: Picture Vocabulary Strategy: Students will write riddles to review vocabulary terms. STEMscopedia from both Energy Transfer & Matter and Energy in Plants	1 Day	By the end of these activities students should be able to identify the relationship between producers and consumers and support a discussion explaining energy transfer with evidence.
5-LS2.A.1	Evaluate: Claim Evidence Reasoning Multiple Choice or Open-Ended Response Assessment	1 Day	Choose a CER from either Energy Transfer or Matter & Energy and all or a mix of multiple choice from these two scopes.

Topic 2: Food Webs & Ecosystems

Suggested Length of Time: 8 Days

Essential Questions (Student Wondering):

- Do all organisms eat plants? (FW)
- How do organisms interact with the nonliving things in their environment? (E)

Enduring Understanding (Learning Objectives):

- The student is expected to develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (FW)
- The student is expected to generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (FW)
- The student is expected to develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (E)
- The student is expected to generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (E)

Standards Addressed- Ecosystems

Missouri Learning Standards

- 5.LS2.B.1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- 5.LS1.A.1 Compare and contrast the major organs/organ systems (e.g. support, reproductive, digestive, transport/circulatory, excretory, response) that perform similar functions for animals belonging to different vertebrate classes.

Priority: Disciplinary Core Ideas

- 5-LS2.A.3 Interdependent Relationships in Ecosystems: A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-LS2-1 Developing a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- Developing and Using Models → Predict Phenomena-Develop and/or use models to describe and/or predict phenomena.
- Systems and System Models→ Systems Description-A system can be described in terms of its components and their interactions.

Standards Addressed-Food Webs

Missouri Learning Standards

- 5.LS2.B.1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Priority: Disciplinary Core Ideas

- 5-LS2.A.1 Interdependent Relationships in Ecosystems: The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that

eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil.

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- Developing and Using Models → Predict Phenomena-Develop and/or use models to describe and/or predict phenomena.
- Systems and System Models → System Description-A system that can be described in terms of its components and their interactions.

Detailed Description/Instructions:

Standard	5 E's	Suggested # of Days	Notes
5-PS3.D.1 5-LS1.C.1 CC: Energy	Engage: Investigative Phenomena APK Graphic Organizer Hook	1 Day	Investigative Phenomena: Do all organisms eat plants? APK: By the end of this activity students will be able to show the flow of energy from the sun to all other organisms. Graphic Organizer: Food Chains List examples of food chains in the squares below. Fill in information about plants, animals, and decomposers. Hook: By the end of this lesson Students construct a model showing how energy moves from one organism into another organism and eventually decomposes.
	From Food Webs Explore 1: Stringy Connections		Preparation: Watch the setup video. Print the organism cards and laminate. Cut out individual cards and a class set of journal page. Students become a live model of a food web. Give each organism card to a student. On chart paper record each pass to show how the food web is being built.
5.LS2.A.2 5.LS2.A.2 CC: System	From Ecosystems Engage: Investigative Phenomena APK	5 minutes	Watch setup video Investigative Phenomena: Can plants live without air? APK: In this activity, students read the

Descriptions	Graphic Organizer Hook		student statements about a non-native species being introduced into an ecosystem and its effect on the ecosystem. Graphic Organizer: Animal Surroundings- Pick an animal and describe how its surroundings help meet its needs. Hook: Students look at a picture of an elephant in the wild and discuss how its surroundings help it meet its needs.
5.LS2.A.2	Explore 1: Activity- Zoo Tour Students create a 3-D model of an animal's habitat that contains different elements to meet the animal's needs.	2 Days	Preparation Print and cut apart the Animal Information Cards so that each group gets one card. Place building materials in a common area so that groups can access them when needed. It may be useful to have a class computer available so students can research more information about their animal if they wish. If a 3-D model is not possible for your class, you could have students draw a picture or create a presentation using available technology.
5.LS2.A.2 5.LS2.A.2 CC: System Descriptions	Explain: Picture Vocabulary Strategy: Students will participate in a conversation using vocabulary words from the scope. STEMscopedia from Food Webs & Ecosystems Elaborate: Science Today	1 Day	By the end of these activities students will understand that every living organism has basic needs but that organisms meet these needs differently depending on their environment. Students will identify producers, consumers, herbivores, and carnivores thinking about how they depend on one another to meet their basic needs.
5-LS2.A.3 CC: System Description	Explore 3: Engineering Solutions- The Burmese Python Challenge Students create a blueprint to help contain an increasing population of pythons. Students also create a presentation for local authorities to describe how pythons damage the natural ecosystem of Florida.	1 Day	Watch setup video Explore 3: By the end of this activity students will have designed a way to trap an invasive species without harming other plants or animals in the same environment.

5-LS2.A.3 CC: System Description	Explain: Communicate Science-Creative Poster	2 Days	By the end of this activity students will be able to explain what invasive species are impacting our local ecosystem.
5-LS2.A.1 5-LS2.A.2 CC: System Descriptions	Evaluate: Claim Evidence Reasoning Multiple Choice or Open-Ended Response Assessment	1 Day	Choose a CER from either Food Webs or Ecosystems and all or a mix of multiple choice from these two scopes. Optional: Student Mission Performance Task is used as the Engaging Scenario or other unit-culminating activity. The student's mission is to design a self-sustaining garden that provides food for the community.

Engaging Scenario

Engaging Scenario (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Student Mission Performance Task:

The student's mission is to design a self-sustaining garden that provides food for the community.
Print a Mission Log and Action Log for each student.

Topic 3: Body Systems

Suggested Length of Time: 1 weeks

Essential Questions (Student Wondering):

- What are the main functions of each body system?
- How are human organ systems alike or different from an animal of a different vertebrate class (i.e. reptile)?

Enduring Understanding (Learning Objectives):

- Students will be able to identify the structures and functions of each organ system.
- Students will be able to explain how various systems work together to perform various functions.
- Students will be able to explain how organ systems of an animal in one vertebrate class are similar/different than that of a animal in a different vertebrate class (i.e. mammal vs reptile)

Standards Addressed

Missouri Learning Standards:

- 5.LS1.A.1 Compare and contrast the major organs/organ systems (e.g., support, reproductive, digestive, transport/circulatory, excretory, response) that perform similar functions for animals belonging to different vertebrate classes.

Priority: Disciplinary Core Ideas

- **LS1.A: Structure and Function**
Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction with organs that are specialized for particular body functions. (A.1)
- **LS1.C: Organization of Matter and Energy Flow in Organisms**
Plants acquire their material for growth chiefly from air and water. (C.1)

Supporting: Crosscutting Concepts and Science and Engineering Practices

Energy and Matter

- Energy can be transferred in various ways and between objects.(A.1)
- Matter is transported into, out of, and within systems. (C.1)

Engaging in an Argument from Evidence

- Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
- Construct and/or support an argument with evidence, data, and/or a model. (A.1)
- Support an argument with evidence, data, or a model. (C.1)

Engaging Experience 1

Teaching Point: Today I'm going to teach you that we can classify animals as vertebrates or invertebrates by looking at their skeletal system.

Suggested Length of Time: 2 days

Standards Addressed

Priority: 5.LS1.A.1 Compare and contrast the major organs/organ systems (e.g., support, reproductive, digestive, transport/circulatory, excretory, response) that perform similar functions for animals belonging to different vertebrate classes.

Supporting:

Detailed Description/Instructions:

- **One way to do this is** to watch the following videos and complete a note taking page based on what is learned about vertebrates and invertebrates.
- **Another way to do this is** to follow the activity [Vertebrate Grab Bag](#).

Bloom's Levels: Apply

Webb's DOK: 3

Engaging Experience 2

Teaching Point: “Today I’m going to teach you that animals have different organs/ organ systems by comparing and contrasting different animals and how their systems work depending on their skeletal system.

Suggested Length of Time: 3 days

Standards Addressed

Priority: 5.LS1.A.1 Compare and contrast the major organs/organ systems (e.g., support, reproductive, digestive, transport/circulatory, excretory, response) that perform similar functions for animals belonging to different vertebrate classes.

Supporting:

Detailed Description/Instructions:

One way to do this is to learn about the different transportation systems by watching these videos or reading these articles:

- [Learn 360 Transportation Systems in Animals](#),
- [The Digestive System](#)
- [The Skeletal System](#)
- [The Heart and Circulatory System](#)

After watching the videos or reading the articles do the activity that coincides with each.

Compare and contrast 2 animals and their transport system with a Venn diagram, 3 column notes or a one pager.

Another way to do this is to watch the videos about [Human Body Systems](#), take notes and make a comparison between two animals.

Bloom's Levels: Apply

Webb's DOK: 3

Unit 2: Earth and Space Science, Part 1

Subject: Science

Grade: 5th

Name of Unit: Earth and Space Science

Length of Unit: 26 Days

Materials for the Engaging Scenario: The students mission is to design a planetarium combined with a thrill ride that lets people experience and learn about the Sun, the Moon, Earth, and the stars, as well as the motions of Earth and the Moon.

1 Mission Log (per student or group)

1 Action Plan (per student or group)

Topic 1: Earth's Rotation

Suggested Length of Time: 7 - 9 days

Essential Questions (Student Wondering):

- What patterns does Earth's movement cause?

Enduring Understanding (Learning Objectives):

- The student is expected to represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
- The student is expected to generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Standards Addressed

Missouri Learning Standards:

- 5.ESS1.B.2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Priority: Disciplinary Core Ideas

- 5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-ESS1.B.1 Earth and the Solar System: The orbits of Earth around the Sun and of the Moon around Earth, together with the rotation of Earth about an axis between its North and South Poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the Sun, The Moon, and stars at different times of the day, month, and year.

- Patterns → Similarities and Differences: Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates of change for natural phenomena and designed products.
- Analyzing and Interpreting Data → Represent Data: Represent data in tables and/or various graphical displays to reveal patterns that indicate relationships.

Detailed Description/Instructions:

Standard	5E's	Suggested # of Days	Notes
5-ESS1.B.1 CC: Similarities and Differences	Engage: Investigative Phenomena Assessing Prior Knowledge Graphic Organizer Hook	1 Day	Investigative Phenomena: What patterns does Earth's movement cause? APK: Students will make predictions about shadows made by the sun during the day. Graphic Organizer: Earth's Rotation Draw a diagram to illustrate the cause of each pattern. Be sure to label and explain. Hook: By the end of this activity, students will be able to create a model of shadows created by the sun throughout the day and draw conclusions about the change in length morning to night.
5-ESS1.B.1 CC: Similarities and Differences	Explore 1: Activity-Shadow Tracker Students construct a sundial, using a paper plate, pencil, and small ball of modeling clay.	2-3 Days	Explore 1: By the end of this activity, students will be able to build a model to measure the length of shadows throughout the day and draw conclusions about the change in length morning to night. Highlight the cross-cutting concept, similarities and differences, when recording how the shadow changed throughout the day.
	Explore 2: Option 1: Tuva- Hours of Daylight Students discover and learn that some plants can grow with only water and air. Option 2: https://www.timeanddate.com/sun/	NEW-optional	Preparation Print the copy of Hours of Daylight for each student. Plan to allow students to work at computers either individually or in small groups. It is recommended to not have more than three students per computer. Option 2: Sunrise and Sunset Calculator. Students will search different locations around the world and explore the different hours of daylight per month.

5-ESS1.B.1 CC: Similarities and Differences	Explain: Picture Vocabulary Strategy: Students will play a game similar to the popular game Guess Who? to review vocabulary terms. STEMscopedia Elaborate: Science Today Science Rock Career Connections Interactive Practice	3 - 4 Days	CCV Videos are all less than 4 minutes long and have a response activity, so will take 10 - 15 minutes each, plus any discussion or journaling. CCV1: By the end of this lesson, the student will be able to explain the earth's rotation around the sun. CCV2: By the end of this lesson, the student will be able to identify that the sun rises in the east and sets in the west and explain the sun's apparent movement across the sky during the day. CCV3 & CCV4: Optional review modeling shadow length. STEMscopedia: By the end of this lesson, the student will understand the concepts rotation, day/night, seasons (basic), and an introduction to planet movement. Highlight the cross-cutting concept, similarities and differences, when reviewing these concepts. Science Today: By the end of this lesson, students will be able to transfer their understanding of shadows to an explanation of how sundials work. Career Connection: By the end of this lesson, students will be able to identify how astronomers use technology to study the distance and composition of stars.
5-ESS1.B.1	Evaluate: Claim Evidence Reasoning Open Ended Response or Multiple Choice	1 Day	

Topic 2: Observing the Stars

Suggested Length of Time: 5 days

Essential Questions (Student Wondering):

- [If the Sun is an average-sized star, why does it look like the largest?](#)

Enduring Understanding (Learning Objectives):

- The students are expected to support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.

Standards Addressed

Missouri Learning Standards

- 5.ESS1.A.1 Support an argument that relative distance from Earth affects the apparent brightness of the sun compared to other stars.

Priority: Disciplinary Core Ideas 5-

- ESS1.1 Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-ESS1.A.1 The Universe and Its Stars: The Sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.
- Engaging in Argument from Evidence → Construct and Support--Construct and/or support an argument with evidence, data, and/or a model.
- Scale, Proportion, and Quantity → Natural Objects--Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.

Detailed Description/Instructions:

Standard	5E's	Suggested # of Days	Notes
5-EES1.A.1 CC: Natural Objects	Engage: Investigative Phenomena Assessing Prior Knowledge Graphic Organizer Hook	1 Day	Watch setup video Investigative Phenomena: If the Sun is an average-sized star, why does it look like the largest? APK: In this formative assessment, students will consider the distance of stars based on brightness. Graphic Organizer: The Sun and Other Stars Our Sun is a star. Think about what makes

			our Sun unique and what makes it the same as other stars. Use the Venn diagram to compare and contrast the Sun with other stars. Hook: By the end of this activity, students will understand that the closer they are to a light source the brighter the light appears.
5-EES1.A.1 CC: Natural Objects	Explore 1: Activity- Star Model Students will create a scaled model of the four stars closest to Earth.	1 Days	Do 1: By the end of this lesson, students will be able to build and explain a scaled model of the closest stars to earth and draw a conclusion about the distance based on brightness. (May be able to start on the same day as the APK and Hook Day; CER) CC: Highlight the natural objects that exist and are being observed while learning about this concept.
5-EES1.A.1	Explain: Picture Vocabulary Strategy: In this activity, students will create a concept map connecting all the vocabulary words from the scope. STEMscopedia Elaborate:	2 Days	STEMscopedia: By the end of this lesson, the student will understand how stars are classified. Science Today--Read It: By the end of this lesson, students will make comparisons between our earth-sun system and a similar earth-sun system through authentic, real life media. (may be excluded for time, could be enrichment) Optional assignments: Concept Review Game; Math activity good math enrichment, decimals/measurement
5-EES1.A.1	Evaluate: Claim Evidence Reasoning Open Ended Response or Multiple Choice	1 Day	

Topic 3: Objects in the Sky

Suggested Length of Time: 6-7 Days

Essential Questions (Student Wondering):

- Why do objects in the sky appear to move and change so much and how do they stay in orbit?

Enduring Understanding (Learning Objectives):

- The student is expected to represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Standards Addressed

Missouri Learning Standards:

- 5.ESS1.B.2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Priority: Disciplinary Core Ideas

- 5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-ESS1.B.1 The orbits of Earth around the Sun and of the Moon around Earth, together with the rotation of Earth about an axis between its North and South Poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the Sun, the Moon, and stars at different times of the day, month, and year.
- Analyzing and Interpreting Data → Represent Data--Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships.
- Patterns → Similarities and Differences--Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates of change for natural phenomena and designed products.

Detailed Description/Instructions:

Standard	5 E's	Suggested # of Days	Notes
5-ESS1.B.1 CC: Similarities and Differences	Engage: Investigative Phenomena Assessing Prior Knowledge Graphic Organizer	1 Day	Watch setup video Investigative Phenomena: Why do objects in the sky appear to move and change so much? APK: Students predict the correct order of moon phases.

	Hook		Graphic Organizer: The Sun, the Moon, and the Stars Fill in the cause-and-effect charts. Hook: Students describe the movement of the moon and other changes to the night sky. (formative assessment)
5-PS2.B.1 CC: Cause and Effect	Explore 1: From Gravity Scope Activity- Earth's Forces Students use a model to observe the effects of gravitational pull.	1 Day	Explore 1: By the end of this activity, students will relate the distance between objects, such as between the object in the hook and the earth, and the force of gravity. Highlight the cross-cutting concept, cause and effect, with this activity.
5-ESS1.B.1 CC: Similarities and Differences	Explore 1: Scientific Investigation- Moon Phase Experience Students model the phases of the Moon using a Styrofoam ball and a lamp. Explore 2: Scientific Investigation- Up in the Wonderful Sky Students are "Earth" as they revolve around the "Sun. As they revolve, students take notice of the constellations they can see from certain locations during the year.	2-3 Days	Explore 1: By the end of this activity, the student will model the phases of the moon and draw conclusions about the phases. Explore 2: By the end of this activity, the student will be able to differentiate between revolve and rotate and explain that the night sky changes throughout the year as the earth revolves around the sun. CC: Apply the cross-cutting concept, similarities and differences, to moon phases and the concept of revolve and rotate when learning about these topics.
5-ESS1.B.1 Similarities and Differences	Explain: Picture Vocabulary Strategy: Students will participate in a conversation using vocabulary words from the scope. STEMscopedia CCV2	2 Days	STEMscopedia: By the end of this lesson, students will be able to compare and contrast objects in the sky and explain the cause for day and night. Apply the cross-cutting concept, similarities and differences, to day and night. CCV2: By the end of this lesson, the student will be able to explain that the moon phase model is one of many patterns in nature and that patterns can be used to make predictions.

	Elaborate: Science Today Science Rock/Interactive		Science Today: By the end of this lesson, the student will be able to create a model from given data to represent the changes in the night sky. Math Activities would complement coordinate grids.
5-ESS1.B.1	Evaluate: Assess	1 Day	Student Mission Performance Task: The students mission is to design a planetarium combined with a thrill ride that lets people experience and learn about the Sun, the Moon, Earth, and the stars, as well as the motions of Earth and the Moon.

Unit 3: Earth and Space Science, Part 2

Subject: Science

Grade: 5th

Name of Unit: Earth and Space Science

Length of Unit: 13 Days

Materials for the Engaging Scenario: Students will create a special TV news report about water on Earth and how it can be conserved.

Printed

1 Mission Log (per student or group)

1 Action Plan (per student or group)

Consumable

2 Sheet of construction paper, white (per student or group)

Reusable

1 Computer (optional) (per student or group)

1 Pencil (per student or group)

Topic 1: Earth's Systems Interactions

Suggested Length of Time: 7 Days

Essential Questions (Student Wondering):

How do organisms, land, air and water interact in an environment?

Enduring Understanding (Learning Objectives):

- The student is expected to develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Standards Addressed

Missouri Learning Standards:

- 5.ESS2.A.1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Priority: Disciplinary Core Ideas

- 5-ESS2-1 The student is expected to develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-ESS2.A.2 Earth Materials and Systems: Earth's systems interact in multiple ways to affect Earth's surface materials and processes. The ocean shapes landforms and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.
- Developing and Using Models → Develop a Model--Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.
- Systems and System Models → System Description--A system can be described in terms of its components and their interactions.

Detailed Description/Instructions:

Standard	5E's	Suggested # of Days	Notes
5-ESS2.A.2; CC: System Description	Engage: Investigative Phenomena Hook	1 Day	Watch setup video Investigative Phenomena: How do organisms, land, air and water interact in an environment? Note: Earth's Systems Scope strongly supports the vocabulary for the 4 spheres and other components of that scope can be used if needed. APK: By the end of this lesson, the student will be able to match pictures

			with each of the earth's spheres using the correct prefix--bio, atmos, hydro, and geo in their journals. Graphic Organizer: Interactions on Earth Complete the graphic. The top rectangle is the main sphere of the graphic. Record characteristics of that sphere in the rectangle. In the rectangles connected below, explain or provide an example of how those spheres interact. Hook: By the end of this lesson, students will be able to identify the interaction between the biosphere, hydrosphere, atmosphere, and geosphere.
	Explore 1: The Four Spheres of Earth Students work in groups to build a diorama highlighting the different spheres of Earth.		
	Explore 2: Systems Interactions Students move through stations to identify and describe the relationships between the atmosphere, biosphere, geosphere, and hydrosphere.		
5-ESS2.A.2 5-ESS2-1 CC: System Description	Explore 3: Modeling the Systems (<i>previously The Clash of Earth's Systems</i>) Students work in groups to design a model illustrating how two of the following systems interact: the atmosphere, the biosphere, the geosphere, and the hydrosphere.	Optional 2 Days	Explore 3: By the end of this lesson students will be able to model the interactions between two earth systems.

5-ESS2.A.2 System Description	Explain: Picture vocabulary Strategy: In this activity, students will play a relay game to win points by reviewing vocabulary terms. STEMscopedia	1 Day	STEMscopedia: By the end of this lesson students will be able to explain the water cycle and contrast climate/weather.
5-ESS2.A.2;	Evaluate: CER Multiple Choice Open-Ended	1 Day	

Topic 2: Water Sources

Suggested Length of Time: 6 Days

Essential Questions (Student Wondering):

- How much of Earth's surface is covered by water?

Enduring Understanding (Learning Objectives):

- The student is expected to describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

Standards Addressed

Missouri Learning Standards:

- 5.ESS2.C.1 Describe and graph the amounts and percentages of water in various reservoirs to provide evidence about the distribution of water on Earth.

Priority: Disciplinary Core Ideas

- 5. ESS2.2 Describe and graph the amounts and percentages of water and freshwater in various reservoirs to provide evidence about the distribution of water on Earth.

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5. ESS2.C.1 The Role of Water in Earth's Surface Processes--Nearly all of the Earth's available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.

- Using Mathematical and Computational Thinking → Address Questions and Problems--Describe, measure, estimate, and/or charts generated from simple algorithms to compare alternative solutions to an engineering problem.
- Scale, Proportion, and Quantity → Standard Units--Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Detailed Description/Instructions:

Standard	5 E's	Suggested # of Days	Notes
5-ESS2.C.1; CC: Standard Units (measurement)	Engage: Investigative Phenomena Assessing Prior Knowledge Graphic Organizer Hook	1 Day	Watch setup video Investigative Phenomena: How much of Earth's surface is covered by water? APK: By the end of this lesson students will consider where most of earth's freshwater supply is stored. Graphic Organizer- How Much Water? Label the chart demonstrating the distribution of water on earth. Create a symbol to represent each type of water source and add your symbols in the empty rectangles. Use the table at the bottom of the page to list examples of bodies of freshwater. Hook: By the end of this lesson students will understand that only a tiny percentage of the earth's water supply is fresh and readily available for use by humans.
5-ESS2.C.1; CC: Standard Units (measurement)	Explore 1: Activity- Where is the Water? Students will understand the importance of having clean fresh water to drink by being served salt water. Explore 2: Activity- Water Distribution Model Presentation Students should create a poster and an infographic that models the distribution of water on Earth.	2-3 Days Optional	Explore 1: By the end of this lesson students will be able to model and graph the distribution of earth's water. Explore 2: By the end of this lesson students will be able to model the distribution of the earth's water supply and explain the importance of conservation of water.

5-ESS2.C.1; CC: Standard Units (measurement)	Explain: Picture Vocabulary STEMscopedia Strategy: Students will play Connect Four with a peer to practice vocabulary terms. Communicate (optional) Elaborate: Science Today Career Connection	2 -3 Days	STEMscopedia: By the end of this lesson students will be able to further explain the water cycle, extending their understanding from the previous scope. Communicate (optional): By the end of this lesson students will be able to explain the pros and cons of melting glaciers to obtain freshwater. Science Today: By the end of this lesson students will be able to explain desalination and cite the real-world purpose for the process. Career Connection: By the end of this lesson students will understand the job of an oceanographer and why the study of the oceans is important.
5-ESS2.C.1;	Evaluate: Claim Evidence Reasoning Open Ended Response or Multiple Choice	1 Day	

Topic 3: Reducing Human Footprint

Suggested Length of Time: 6 Days

Note: If additional time is available, especially on days with odd scheduling needs near the end of the school year, there are especially engaging activities that connect from previous topics and allow students to engage in projects with little instructional support.

Essential Questions (Student Wondering):

- How do our actions affect the environment and what can we do to reduce those effects?

Enduring Understanding (Learning Objectives):

- The student is expected to obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
- The student is expected to generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Standards Addressed

Missouri Learning Standards:

- 5.ESS3.C.1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's Resources and environment.

Priority: Disciplinary Core Ideas

- 5-ESS3.1 Obtain and combine information about ways individual communities use science ideas to protect Earth's resources and environment.

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-ESS3.C.1 Human Impacts on Earth Systems: Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space.
- 5-ESS3.C.2--Human Impacts on Earth Systems--Individuals and communities are doing things to help protect Earth's resources and environments.
- Systems and System Models → System Description: A system can be described in terms of its components and their interactions.
- Obtaining, Evaluating, and Communicating Information → Phenomena and Solutions--Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.

Detailed Description/Instructions:

Standard	5 E's	Suggested # of Days	Notes
5-ESS3.C.1 CC: System Descriptions	Engage: Investigative Phenomena Assessing Prior Knowledge (HF) Graphic Organizer Hook (RHF)	1 Day	Watch setup video appropriate to the activities used from each scope. Investigative Phenomena: How much of Earth's surface is covered by water? APK: By the end of this lesson students will be able to explain their position on a potential problem in the environment. Graphic Organizer: How Can You Reduce Your Human Footprint? Explain a human footprint in each rectangle. In the arrow next to the rectangle, explain ways that the human footprint can be reduced. Hook: By the end of this lesson students will be able to draw a conclusion about the effects of pollution on groundwater.
	Explore 1: Scientific		As students work through the activity, look for

	Investigation- The Fertilizer We Use Students will use a model to observe what happens to the soil that grows the food we eat and to the underground drinking water when chemicals are added during farming.		teachable moments to introduce students to the following vocabulary terms. Try to point out examples of the terms as students are working so they can connect the meaning of the word with their experiences. Encourage students to use the following words as they record and discuss their findings. Communities: all the interacting populations in particular areas Resource: something we can use Environment: the space, conditions, and all the living and nonliving things around an organism Interactions: actions by one thing that have an effect on a different or separate thing Land: the part of Earth's surface not covered by water, as opposed to the sea or the air Vegetation: plants, or all the plants found in a particular area Agriculture: the science, art, and business of cultivating soil, producing crops, and raising livestock Stream: a small body of freshwater that flows into a river Ocean: the entire body of saltwater that covers about 71% of Earth
5-ESS3.C.1	Explore 2: Scientific Investigation- Acid Rain Students must investigate the effects of acid rain by simulating the process, using chalk, water, and vinegar.	1 Day	Explore 2: By the end of this lesson students will be able to explain the effects of acid rain.
	Explore 3: Research-Saving Earth Students gather research from multiple sources to determine what their community is currently doing to prevent pollution and save our Earth. Students will also research how people can help in this process and suggest at least two new things the community could	Optional: 1 Day	Explore 3: By the end of this lesson students will identify a problem in the environment created by humans and present a solution.

	implement to further its success in reducing the current human footprint.		
	Explore 4: Engineering Solutions- NASA Needs Your Help! Students will design a space-trash collector to clean up Earth's outer atmosphere.	1 Day	Explore 4: By the end of this lesson students will be able to identify the problems created by “space junk” and create an engineering solution to clean it up.
5-ESS3.C.1 CC: System Descriptions	Explain: Picture Vocabulary STEMscopedia Strategy: In this activity, students will play a game of Vocabulary Baseball	1 Day	Math activity complements multiplying decimals. STEMscopedia: By the end of this lesson students will be able to explain both positive and negative human effects on the environment.
5-ESS3.C.2 CC: System Description	Elaborate: Communicate Science Career Connections	2 Days (minimum-choose at least one activity)	Communicate Science: By the end of this lesson students will be able to present at least one argument in support of reducing our impact on the community. Career Connections: By the end of this lesson students will understand how civic leaders consider the needs of the community and will be able to identify a problem and create a solution.
5-ESS3.C.1 CC: System Descriptions	Evaluate: Assess	1 Day	Student Mission Performance Task: Students will create a special TV news report about water on Earth and how it can be conserved.

Engaging Scenario (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Student Mission Performance Task:

Students will create a special TV news report about water on Earth and how it can be conserved.

Print a Mission Log and Action Log for each student.

Unit 4: Physical Science

Subject: Science

Grade: 5th

Name of Unit: Physical Science

Length of Unit: 28 Days

Overview of Unit: Exploration of matter concepts

Materials for the Engaging Scenario: Students will use their knowledge of the properties of matter to design a plan for cleaning up the water supply after a tsunami.

Printed

1 Mission Log (per student or group)

1 Action Plan (per student or group)

Consumable

1 Sheet of paper (per student or group)

Reusable

1 Pencil (per student or group)

Topic 1: Matter is Everywhere

Suggested Length of Time: 7-10 Days

Essential Questions (Student Wondering):

How do we know matter exists, even if it cannot be seen?

Enduring Understanding (Learning Objectives):

- The student is expected to develop a model to describe that matter is made of particles too small to be seen

Standards Addressed

Missouri Learning Standards:

- 5-PS1.A.1 Develop a model to describe that matter is made of particles too small to be seen.

Priority: Disciplinary Core Ideas

- 5-PS1.A.1 Structure and Properties of Matter: 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. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.

Supporting: Crosscutting Concepts and Science and Engineering Practice

- 5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen.
- Scale, Proportion, and Quantity → Natural Objects- Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.

- Developing and Using Models → Predict Phenomena-Develop and/or use models to describe and/or predict phenomena.

Detailed Description/Instructions:

Standard	5 E's	Suggested # of Days	Notes
5-PS1.A.1 CC: Natural Objects	Engage: Investigative Phenomena Accessing Prior Knowledge Graphic Organizer Hook	1-2 Days	Watch the setup video. Investigative Phenomena: How do we know matter exists, even if it cannot be seen? Make note of misconceptions so you can guide students throughout instruction but do not answer the APK sheet for them as they will come to their own correct conclusion at the end of the scope. ELL strategy useful. APK: By the end of this activity the students will classify things that are composed of matter and those things that are not composed of matter. Graphic Organizer: Where is the Matter? In each box, draw and label a picture of a time when you knew matter was there but could not see it. Use the lines below your picture to explain how you knew matter was there. Hook: By the end of this activity the students will observe that air is matter because it takes up space.
5-PS1.A.1 CC: Natural Objects	Explore 1: Activity-Where's The Sugar? Students dissolve sugar in water to learn that matter is still there, even though it cannot be seen.	1 Day	Activity has to be done in one setting (1 hour) Fast Track: Solution could be made ahead of time. Review dissolving vs. melting Explore 1: By the end of this activity the students will recognize that matter is still there even though it cannot be seen.
	Explore 2:	Optional:	Assign groups of 4 and decide how to

5-PS1.A.1 CC: Natural Objects	Engineering Solutions-Contaminated Water Students will use the scientific knowledge they gained as well as the 21st Century Skill of collaboration to design a solution that will help them figure out which water sample has been contaminated	1-2 Days	assign expert roles. Consider making badges for experts to wear. Try prompting student background knowledge using the deposits left behind after water has evaporated from wet shoes or vehicles. Explore 2: By the end of this activity the students will identify which sample was contaminated with salt by the evaporated water leaving only salt behind.
5-PS1.A.1	Explain: Picture Vocabulary Strategy: In this activity, students will play a headband game to review vocabulary terms. This would be a great center or station activity. STEMscopedia Elaborate: Science Rock Interactive Science Today-Watch It!	2-3 Days	Video Glossary Tool box optional. Picture Vocabulary STEMscopedia-use pan balance with gram weights instead of triple-beam balance. Pick 2-3 activities to extend the concept, consider adding voice and choice for students. Have students revisit the APK and solidify final answers. By the end of these activities students should be able to identify properties of matter such as mass, magnetism, solubility, and density as well as describe differences between solids, liquids, and gases.
5-PS1.A.1	Evaluate: Claim Evidence Reasoning Multiple Choice Assessment or Open- Ended Response Assessment	2 Days	Since this is students' first CER, take time to explain how to answer these types of claims and reasoning. Option: Do Multiple Choice Assessment in with the Expand centers from above.

Topic 2: Changes to Matter

Suggested Length of Time: 8-9 Days

Essential Questions (Student Wondering):

- [Can matter just disappear?](#)

Enduring Understanding (Learning Objectives):

- The student is expected to measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

Standards Addressed

Missouri Learning Standards

- 5-PS1.A.2 Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

Priority: Disciplinary Core Ideas

- 5-PS1.A.2 Structure and Properties of Matter: The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.
- 5-PS1.B.2 Chemical Reactions: No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.)

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-PS1-2 Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
- Scale, Proportion, and Quantity → Standard Units-Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.
- Using Mathematics and Computational Thinking → Addressing Questions and Problems-Describe, measure, estimate, and/or charts generated from simple algorithms to compare alternative solutions to an engineering problem.

Detailed Description/Instructions:

Standard	5 E's	Suggested # of Days	Notes
5-PS1.A.2 5-PS1.B.2 CC: Standard Units	Engage: Investigative Phenomena Access Prior Knowledge Graphic Organizer:	1 Day	Watch the setup video. Investigative Phenomena: Can matter just disappear? Use pan balance instead of triple beam balance. ELL Three Corners Activity

	Hook		APK: By the end of this activity the students will think about dissolving sugar in water and predict whether or not it would add weight to the water after it dissolved. Graphic Organizer: Changes to Matter Use this graphic organizer to take notes about the changes to matter and the weight of the matter you observed. Hook: By the end of this activity the students will better understand physical changes and determine the mass of an ice cube before and after it melts.
5-PS1.A.2 5-PS1.B.2 CC: Standard Units	Explore 1: State of Matter Changes Students melt different materials and determine whether or not a change in the physical state of matter changes the matter's total weight.	2 Days	Do the whole group avoid injuries? Use a document camera or perform in front of class while they follow along. Explore 1: By the end of this activity the students will determine whether or not a change in the physical state of matter changes the matter's total weight.
5-PS1.A.2 5-PS1.B.2 CC: Standard Units	Explore 2: Activity-Sweet Tea By making a cup of tea, students learn that the total weight of a solution or mixture is equal to the weight of the individual ingredients.	1 Day	Important to do as suggested. Students will add water/cup, tea, and sugar to determine conservation of mass. Explore 2: By the end of this activity the students will determine that the total mass of a solution/mixture is equal to the masses of the individual ingredients.
	Explore 3: Scientific Investigation- What's My Weight? (Was in Mixtures) Students investigate what happens to the weight of a mixture during a chemical reaction.	Optional	Preparation Separate each ingredient into its own paper cup for distribution to the groups. Be sure to label the cups for easy identification. Each group will need 2 cups with 1 tablespoon of baking soda in each, 1 cup with a tablespoon of lemon juice, 1 cup with an Alka-Seltzer tablet, 1 cup with a tablespoon of water, and 1 cup with a tablespoon of vinegar. Safety: Eye injuries can be very serious. Always wear the proper eye protection equipment and adhere to proper eye care guidelines.
5-PS1.B.2 CC:	Explain:	3-4 Days	Video Glossary Tool box optional. Make the STEMscopedia "Try Now" portion into

Standard Units	Picture Vocabulary Strategy: In this activity, students play a game of Go Fish to review vocabulary words. STEMscopedia Elaborate: Math Connections Science Today Career Connections		a testable question for inquiry practice. Math Connections worked well as a whole group as some students need assistance with how to read the triple beam balance. By the end of these activities the students will realize that water is in the air in the form of a gas and that it condenses back into liquid form on the ground level and that heating and cooling changes the state of matter. Math Connections has questions that mimic what is on the multiple choice assessment.
5-PS1.A.2 5-PS1.B.2	Evaluate: Claim Evidence Reasoning Multiple Choice Assessment or Open- Ended Response Assessment	1-2 Days	

Topic 3: Mixtures

Suggested Length of Time: 7-8 Days

Essential Questions (Student Wondering):

- [Do we ever create new substances?](#)

Enduring Understanding (Learning Objectives):

- The student is expected to conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Standards Addressed

Missouri Learning Standards:

- 5.PS1.B.1 Plan and conduct investigations to separate the components of a mixture/solution by their physical properties (i.e., sorting, filtration, magnets, screening).
- 5.PS1.B.2 Conduct an investigation to determine whether the combining of two or more substances results in new substances.

Priority: Disciplinary Core Ideas

Supporting: Crosscutting Concepts and Science and Engineering Practices

- 5-PS1-4 Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
- Cause and Effect-Cause and effect relationships are routinely identified, tested, and used to explain change
- Planning and Carrying Out Investigations → Variables-Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials is considered.

Detailed Description/Instructions:

Standard	5 E's	Suggested # of Days	Notes
5-PS1.B.1 CC: Cause and Effect	Engage: Investigative Phenomena Access Prior Knowledge Graphic Organizer Hook	1 Day	Watch the setup video. Investigative Phenomena: Do we ever create new substances? Will need rusted nails or hair clips and same objects not rusted. APK: By the end of this activity the students will make a prediction about what happened when baking soda and vinegar were combined. Graphic Organizer: Physical vs. Chemical Describe a physical change and list what you could observe as evidence of a physical change. Describe a chemical change and list what you could observe as evidence of a chemical change. Then give examples of each. Hook: By the end of this activity the students will determine that chemical change cannot restore an object back to its original state.
5-PS1.B.1 CC: Cause and Effect	Explore 1: Scientific Investigation- Expect the Unexpected Students explore how a change in temperature and the production of gas are signs of a chemical reaction.	1 Day	Consider how to protect children's clothing. Wear older clothes on this day perhaps. Explore 1: By the end of this activity the students will conclude that a change in temperature and the production of a gas are signs of a chemical reaction. Highlight the cross-cutting concept, cause and effect, with this observation.

5-PS1.B.1 CC: Cause and Effect	Explore 2: Scientific Investigation- Reaction or Not? Students investigate to determine if the mixing of two substances results in the formation of a new substance with different properties.	1 Day	Pull students struggling with CER writing. Guide this activity instead of small groups. Explore 2: By the end of this activity the students will determine that the combined weight of the two separate items remains the same sum even if a chemical reaction occurs. Highlight the cross-cutting concept, cause and effect, with this observation.
	Explore 3: Inquiry Investigation- My Mixtures Investigation Students will work in groups to design and conduct an investigation to determine whether mixing two or more substances results in a new substance.	Optional	Plan it! Test it! Wrap it Up!
5-PS1.B.1	Explain: Picture Vocabulary Strategy: In this activity, students will play a game of “pictionary.” STEMscopedia eScopedia Elaborate: Science Rock Science Today	3-4 Days	Video Glossary Tool box optional. By the end of these activities students will be able to identify the difference between mixtures and solutions as well as the difference between chemical changes and physical changes.
5-PS1.B.1	Evaluate: Engaging Scenario Evaluate: Assessment	1 Day	Student Mission Performance Task: Students will use their knowledge of the properties of matter to design a plan for cleaning up the water supply after a tsunami.

Engaging Scenario

Engaging Scenario (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Student Mission Performance Task:

Students will use their knowledge of the properties of matter to design a plan for cleaning up the water supply after a tsunami.

Print a Mission Log and Action Log for each student.