

# **Rhode Island Alternate Assessment Grade Span Expectations**

## **Science**

***About the Rhode Island K-12 Alternate Assessment Grade Span Expectations in Science***

Rhode Island Alternate Assessment Grade Span Expectations in Science

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The Rhode Island **Alternate Assessment Grade Span Expectations** (AAGSEs) are derived and expanded from the New England Common Assessment Program (NECAP) Grade Level Expectations in mathematics, reading, and writing and the NECAP Grade Span Expectations (GSEs) in science. The document, the *Rhode Island Alternate Assessment K-12 Grade Span Expectations in Science*, has been developed as a means to identify the science concepts and skills expected of all students participating in the RIAA; however, these AAGSEs can be used for instruction in any classroom. The NECAP GSEs encompass the content eligible for inclusion on RIAA of science in grades 4, 8, and 11. They are not intended to represent the full science curriculum at each grade span, but are meant to capture the “major ideas” of science that can be assessed in a state assessment. The goal is that the sciences GSEs focus the curriculum, but do not restrict it.

The science AAGSEs are written for grade spans K-4, 5-8, and high school. They describe the science knowledge and abilities students should demonstrate at the end of each grade span. The science AAGSEs are extracted from the assessment targets developed as part of the framework for the common science assessment conducted in New Hampshire, Vermont and Rhode Island and the NECAP K-12 Grade Span Expectations in Science.

As you review the *Rhode Island Alternate Assessment K-12 Grade Span Expectations in Science*, the following information is important to understand, particularly the relationship between the science GSEs and the science assessment targets.

The science AAGSEs are organized into three **domains; Life Science, Earth and Space Science; and Physical Science.**

1. The three domains are further subdivided into ten **Statements of Enduring Knowledge** (EK) listed in Table 1 that
  - a. are intended to identify the fundamental knowledge/concepts for each domain of science.
  - b. cut across grade levels, so that learning is developmental/built upon and across grades (although not all aspects of the EK may be addressed at all grade levels).
  - c. are of comparable grain size?
  - d. encompass, as a set, the *essential learning for each domain of science*.
  - e. imply topics of study (and therefore, lead to focused instruction, as identified in science standards/benchmarks/GSEs).
2. Each **Assessment Target** is linked to one Statement of Enduring Knowledge, as indicated with the target’s coding (e.g., LS1 means Life Science and the first EK statement, LS2 means Life Science and the second EK, etc.)
3. Each Assessment Target incorporates one or more **Unifying Themes**, the broader universal principles that integrate the different scientific disciplines. Six Unifying Themes of Science were chosen after an extensive review of the literature and are further described in Table 2.

4. Assessment Targets for high school, middle school, and elementary school were developed by applying the Unifying Themes of science to the Statements of Enduring Knowledge for each of the science domains of Life Science, Earth and Space Science, and Physical Science. **Not every Unifying Theme has an “intersection” with every Statement of Enduring Knowledge.** Development committees used prioritization strategies and field reviews to determine which assessment targets would provide the richest opportunities for large-scale assessment purposes.

<b>Statements of Enduring Knowledge (EK) by Domain</b> <b>Table 1</b>	
<b>Life Science</b>	<b>LS 1</b> All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, and species).
	<b>LS 2</b> Matter cycles and energy flows through an ecosystem.
	<b>LS 3</b> Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).
	<b>LS 4</b> Humans are similar to other species in many ways, and yet are unique among Earth’s life forms.
<b>Earth &amp; Space Science</b>	<b>ESS 1</b> The Earth and earth materials as we know them today have developed over long periods of time, through continual change processes.
	<b>ESS 2</b> The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.
	<b>ESS 3</b> The origin and evolution of galaxies and the universe demonstrate fundamental principles of physical science across vast distances and time.
<b>Physical Science</b>	<b>PS 1</b> All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another ( <i>independent of size or amount of substance</i> ).
	<b>PS 2</b> Energy is necessary for change to occur in matter. Energy can be stored, transferred and transformed, but cannot be destroyed.
	<b>PS 3</b> The motion of an object is affected by forces.

## Unifying Themes of Science

### Table 2

(Subheadings under each Unifying Theme/Big Idea suggest but are not limited to what might be addressed)

Scientific Inquiry	Nature of Science	Systems & Energy	Models & Scale	Patterns of Change	Form & Function
<ul style="list-style-type: none"> <li>• Collect data</li> <li>• Communicate understanding &amp; ideas</li> <li>• Design, conduct, and critique investigations</li> <li>• Represent, analyze, and interpret data</li> <li>• Experimental design</li> <li>• Observe</li> <li>• Predict</li> <li>• Question and hypothesize</li> <li>• Use evidence to draw conclusions</li> <li>• Use tools, and techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Accumulation of science knowledge (evidence and reasoning, looking at work of others)</li> <li>• Attitudes and dispositions of science (avoiding bias, divergent ideas, healthy skepticism)</li> <li>• History of Science</li> <li>• Science/Tech/Society</li> <li>• Scientific Theories</li> </ul>	<ul style="list-style-type: none"> <li>• Cycles</li> <li>• Energy Transfer</li> <li>• Equilibrium</li> <li>• Interactions</li> <li>• Interdependence</li> <li>• Order and Organization</li> </ul>	<ul style="list-style-type: none"> <li>• Evidence provided through...</li> <li>• Explanations provided through...</li> <li>• Relative distance</li> <li>• Relative sizes</li> </ul> <p><i>Models include - experimental models, simulations, and representations used to demonstrate abstract ideas</i></p>	<ul style="list-style-type: none"> <li>• Constancy and Change</li> <li>• Cycles</li> <li>• Evolutionary Change</li> </ul>	<ul style="list-style-type: none"> <li>• Natural World</li> </ul>

5. Reading the AAGSEs in Science: The *Rhode Island Alternate Assessment K-12 Grade Span Expectations in Science* are sequenced from number 1 to 5.
1. **Domain**
  2. **Statement of Enduring Knowledge (EK) within the domain.**
  3. **Assessment Target** that addresses the EK and a specific Unifying Theme
  4. **Grade Span** grades that address the assessment target
  5. **Alternate Assessment Grade Span Expectation (AAGSE)** for this EK  
(*Underlined word indicates new content added.*)

**Earth and Space Science (ESS)  
Earth Materials**

<b>(EK) ESS1 – The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.</b>		
<b>(Assessment Target) 1. Students demonstrate an understanding of earth materials.</b>		
Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<b>(AAGSE) ESS1.1 Describe soils using their physical properties.</b>	<b>(AAGSE) ESS1.1 Describe soils using their physical properties.</b>	<b>(AAGSE) ESS1.1 <u>Identify</u> soils using their physical properties.</b>
1.1a Distinguish soil from other objects or materials. (e.g., grass, wood, leaves, paper, rubber, food, etc.)	1.1a Distinguish soil from other objects or materials. (e.g., grass, wood, leaves, paper, rubber, food, etc.)	1.1a Distinguish soil from other objects or materials. (e.g., grass, wood, leaves, paper, rubber, food, etc.)

6. While the Statements of Enduring Knowledge are the same across all grade spans, the set of related targets within a grade span *do not address all aspects of the EK Statement*. This was done intentionally to focus instruction and assessment on the essential learning for the grade span, as well as on the developmentally appropriate concepts and skills. For example, at the elementary grade span, LS1 will focus on organisms and external structures, while the middle school grade span will move to internal structures and include organisms and population.

## Domain: Life Science

LS1 – All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, species).		
1. Students demonstrate an understanding of the diversity of organisms.		
Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>LS1.1.1 Distinguish between living and non-living things.</b></p> <p>LS1.1.1a Recognize self as living.</p> <p>LS1.1.1b Identify at least one characteristic of living things. (e.g., Living things need food and water.)</p> <p>LS1.1.1c Discriminate between a living thing and a non-living thing.</p> <p>LS1.1.1d Sort living things from a group of living and non-living things.</p> <p>(Suggestion: Select a living thing from a group of non-living things.)</p>	<p><b>LS1.1.1 Distinguish between living and non-living things.</b></p> <p>LS1.1.1a <u>Identify</u> self as living, <u>therefore needing food and water.</u></p> <p>LS1.1.1b <u>Identify</u> at least <u>two</u> characteristics of living things. (e.g., Living things need food, water <u>and air.</u>)</p> <p>LS1.1.1c Discriminate between living <u>things</u> and non-living <u>things</u>.</p> <p>LS1.1.1d Sort living things from a group of living and non-living things.</p> <p>(Suggestion: Select a living thing from a group of non-living things.)</p>	<p><b>LS1.1.1 Distinguish between living and non-living things.</b></p> <p>LS1.1.1a Identify self as living, therefore needing food and water.</p> <p>LS1.1.1b Identify <u>two or more</u> characteristics of living things. (e.g., Living things need food, water, air, <u>proper temperature, growth and habitat.</u>)</p> <p>LS1.1.1c Discriminate between living things and non-living things.</p> <p>LS1.1.1d Sort living things from a group of living and non-living things.</p> <p>LS1.1.1e <u>Classify living things and non-living things into two groups.</u></p>

**LS1.1.2 Match organisms with similar features.**

LS1.1.2a Given an external feature of an organism, match organisms with the same feature. (e.g., head, legs, fur, wings, tail).

LS1.1.2b Sort organisms based on one or two similar or different external features.

(Suggestion: Use a graphic organizer to show the common features of the organisms, such as fur, two legs.)

**LS1.1.2 Compare similarities and differences between organisms.**

LS1.1.2a Match similar organisms based on one or two external features. (e.g., match two similar animals such as fish to fish and bird to bird)

NOTE: classification, sort and compare - depends on the selection of the organisms for degree of difficulty.

LS1.1.2b Sort organisms based on one or two similar or different external features.

LS1.1.2c Compare one or more external features of a group of organisms.

(Suggestions: Use a graphic organizer to show the common features of the organisms, such as fur, two legs. Use a Venn diagram to compare features of a group of organisms.)

**LS1.1.2 Compare similarities and differences between organisms.**

LS1.1.2a Match similar organisms based on two or more external features. (e.g., match two similar animals such as fish to fish and bird to bird)

NOTE: classification, sort and compare - depends on the selection of the organisms for degree of difficulty.

LS1.1.2b Sort organisms based on two or more similar or different external features.

LS1.1.2c Compare two or more external features of a group of organisms.

LS1.1.2d Group organisms by two or more similarities.

(Suggestions: Use a graphic organizer to show the common features of the organisms, such as fur, two legs. Use a Venn diagram to compare features of a group of organisms.)

**LS1.1.3 Distinguish plants from animals.**

LS1.1.3a Recognize a plant.

LS1.1.3b Recognize an animal.

LS1.1.3c Distinguish a plant within a group of organisms.

LS1.1.3d Distinguish an animal within a group of organisms.

**LS1.1.3 Distinguish plants from animals.**

LS1.1.3a Identify a plant.

LS1.1.3b Identify an animal.

LS1.1.3c Distinguish a plant within a group of organisms.

LS1.1.3d Distinguish an animal within a group of organisms.

LS1.1.3e Compare two or more plants to each other.

LS1.1.3f Compare two or more animals to each other.

(Suggestion: Use a Venn diagram or other graphic organizer.)

**LS1.1.3 Distinguish plants from animals.**

LS1.1.3a Identify a plant.

LS1.1.3b Identify an animal.

LS1.1.3c Distinguish a plant within a group of organisms.

LS1.1.3d Distinguish an animal within a group of organisms.

LS1.1.3e Compare two or more plants to each other.

LS1.1.3f Compare two or more animals to each other.

LS1.1.3g Distinguish an organism as a plant or an animal.

LS1.1.3h Compare similarities and differences between a plant and an animal.

(Suggestion: Use a Venn diagram or other graphic organizer.)

<p><b>LS1.1.4 Use observations and data collection tools (e.g., hand lens, dissecting microscope) to identify external features common to familiar animals (including self).</b></p> <p>LS1.1.4a Identify legs on a variety of animal species (e.g., dog, cat, person, bird, insect).</p> <p>LS1.1.4b Identify head on a variety of animal species (e.g., dog, cat, person, bird, insect)</p> <p>LS1.1.4c Identify tails on a variety of animal species. (e.g., dog, cat, tiger, monkey).</p> <p>LS1.1.4d Identify arms on a variety of animal species (e.g., person, primates).</p>	<p><b>LS1.1.4 Use observations and data collection tools (e.g., hand lens, dissecting microscope) to identify external features common to familiar animals (including self).</b></p> <p>LS1.1.4a Identify legs on a variety of animal species (e.g., dog, cat, person, bird, insect).</p> <p>LS1.1.4b Identify head on a variety of animal species (e.g., dog, cat, person, bird, insect)</p> <p>LS1.1.4c Identify tails on a variety of animal species (e.g., dog, cat, tiger, monkey).</p> <p>LS1.1.4d Identify arms on a variety of animal species (e.g., person, primates).</p> <p>LS1.1.4e <u>Identify wings</u> on a variety of animal species (e.g., bird, insect).</p> <p>LS1.1.4f <u>Identify antennae</u> on a variety of animal species (e.g., insect).</p> <p>LS1.1.4g <u>Identify shells</u> on a variety of animal species (e.g., snail, clam, turtle, hermit crab).</p> <p>LS1.1.4h <u>Identify fins of a variety of animal species</u> (e.g., fish, swimming mammals – dolphin, whale)</p>	<p><b>LS1.1.4 Use observations and data collection tools (e.g., hand lens, dissecting microscope) to identify external features common to animals (including self).</b></p> <p>LS1.1.4a Identify legs on a variety of animal species (e.g., dog, cat, person, bird, insect).</p> <p>LS1.1.4b Identify head on a variety of animal species (e.g., dog, cat, person, bird, insect)</p> <p>LS1.1.4c Identify tails on a variety of animal species (e.g., dog, cat, tiger, monkey).</p> <p>LS1.1.4d Identify arms on a variety of animal species (e.g., person, primates).</p> <p>LS1.1.4e Recognize wings on a variety of animal species (e.g., bird, insect).</p> <p>LS1.1.4f Recognize antennae on a variety of animal species (e.g., insect).</p> <p>LS1.1.4g Recognize shells on a variety of animal species (e.g., snail, clam, turtle, hermit crab).</p> <p>LS1.1.4h Recognize fins of a variety of animal species (e.g., fish, swimming mammals – dolphin, whales).</p> <p>LS1.1.4i <u>Compare the external features of two organisms from different groups.</u></p>
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<p><b>LS1.1.5 Use observations and data collection tools, (e.g., hand lens, dissecting microscope) to recognize external features common to familiar plants.</b></p> <p>LS1.1.5a Recognize roots.</p> <p>LS1.1.5b Recognize stems.</p> <p>LS1.1.5c Recognize leaves.</p> <p>LS1.1.5d Recognize flowers.</p> <p>LS1.1.5e Recognize seeds.</p> <p>LS1.1.5f Recognize fruit.</p>	<p><b>LS1.1.5 Use observations and data collection tools (e.g., hand lens, dissecting microscope) to identify external features common to familiar plants.</b></p> <p>LS 1.1.5a <u>Identify</u> roots.</p> <p>LS 1.1.5b <u>Identify</u> stems.</p> <p>LS 1.1.5c <u>Identify</u> leaves.</p> <p>LS 1.1.5d <u>Identify</u> flowers.</p> <p>LS 1.1.5e <u>Identify</u> seeds.</p> <p>LS 1.1.5f <u>Identify</u> fruit.</p> <p><b>LS1.1.6 Associate functions with the external features of animals.</b></p> <p>LS1.1.6a <u>Identify that animals move using structures such as legs, wings, tails, or fins</u></p> <p>LS1.1.6b <u>Identify that animals can be protected by features such as shells (e.g., snail), claws (e.g., tiger), quills (e.g., porcupine), color of skin or fur, etc.</u></p> <p>LS1.1.6c <u>Identify that animals obtain food using structures or characteristic features such as beaks, claws, fast speed, good eyesight, sense of smell, etc.</u></p>	<p><b>LS1.1.5 Use observations and data collection tools (e.g., hand lens, dissecting microscope) to identify external features common to familiar plants.</b></p> <p>LS 1.1.5a Identify roots <u>and their function.</u></p> <p>LS 1.1.5b Identify stems <u>and their function.</u></p> <p>LS1.1.5c Identify leaves <u>and their function.</u></p> <p>LS1.1.5d Identify flowers <u>and their function.</u></p> <p>LS1.1.5e Identify seeds <u>and their function.</u></p> <p>LS1.1.5f Identify fruit <u>and their function.</u></p> <p>LS1.1.5g <u>Compare the features of two different plants.</u></p> <p><b>LS1.1.6 Associate functions with the external features of animals</b></p> <p>LS1.1.6a <u>Identify structures that specific animals use to move, such as legs, wings, tails, fins, etc.</u></p> <p>LS1.1.6b <u>Identify features that animals use to protect themselves such as shells (e.g., snail), claws (e.g., tiger), quills (e.g., porcupine), color of skin or fur, etc.</u></p> <p>LS1.1.6c <u>Compare how animals obtain food using structures or characteristic features such as beaks, claws, fast speed, good eyesight, sense of smell, etc.</u></p>
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	<p><b>LS1.1.7 Classify organisms.</b></p> <p>LS1.1.7a <u>Identify one or more major group of organisms from a selection of different organisms. (Groups should include: mammals, fish, birds, and reptiles.)</u></p> <p>(Suggestion: Ask the student to identify the fish when given several different organisms.)</p>	<p><b>LS1.1.7 Classify organisms</b></p> <p>LS1.1.7a Identify one or more major group of organisms from a selection of different organisms. (Groups should include: mammals, fish, birds, <u>amphibians</u>, and reptiles.)</p> <p>LS1.1.7b <u>Identify two or more arthropods. (Suggestion: Use common language such as insects, bugs, crabs, and spiders.)</u></p> <p>LS1.1.7c <u>Recognize that some organisms are neither plants nor animals (e.g., mushrooms, yeast, bacteria).</u></p> <p>(Suggestion: Ask the student to identify the fish when given several different organisms.)</p> <p><b><u>LS1.1.8 Associate the external features of plants with their functions.</u></b></p> <p>LS1.1.8a <u>Identify that roots hold the plant in place and bring nutrients and water from the soil to the plant.</u></p> <p>LS1.1.8b <u>Identify that water and nutrients move to other parts of the plant through the stem.</u></p> <p>LS1.1.8c <u>Identify that plants use leaves to make food.</u></p> <p>LS1.1.8d <u>Identify that flowers, seeds, and fruits are related to flowering plant reproduction.</u></p>
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## Domain: Life Science

LS1 – All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, species).		
2. Students demonstrate an understanding that the structures of organisms fulfill functions needed for survival.		
Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>LS1.2.1 Describe the things that plants need in order to grow and survive.</b></p> <p>LS1.2.1a Identify one or more conditions a plant needs in order to grow and survive (e.g., light, soil, water, space, food and/or air).</p>	<p><b>LS1.2.1 Describe the things that plants need in order to grow and survive.</b></p> <p>LS1.2.1a Identify one or more conditions a plant needs in order to grow and survive (e.g., light, soil, water, space, food and/or air).</p> <p>LS1.2.1b <u>Predict what happens to a plant under different conditions (e.g., blue light instead of white light).</u></p>	<p><b>LS1.2.1 Describe the things that plants need in order to grow, survive, <u>and reproduce.</u></b></p> <p>LS1.2.1a Identify <u>two or more</u> conditions a plant needs to grow, <u>reproduce</u> and survive, (e.g., light, soil, water, space, food, and/or air; <u>reproduction: self-pollination or cross pollination</u>).</p> <p>LS1.2.1b Predict what happens to a plant under different conditions. (e.g., blue light instead of white light)</p> <p>LS1.2.1c <u>Describe one or more conditions a plant needs in order to grow, survive, and reproduce. (e.g., light, soil, water, space, food and/or air; reproduction: self-pollination or cross pollination).</u></p> <p>LS1.2.1d <u>Investigate what happens to a plant under different conditions (e.g., blue light instead of white light).</u></p>
<p><b>LS1.2.2 Describe the things that animals need in order to grow and survive.</b></p> <p>LS1.2.2a Identify one or more conditions an animal needs in order to grow and survive (e.g., food, water, shelter and/or air).</p>	<p><b>LS1.2.2 Describe the things that animals need in order to grow and survive.</b></p> <p>LS 1.2.2a Identify one or more conditions an animal needs in order to grow and survive (e.g., food, water, shelter, <u>space</u>, and/or air).</p> <p>LS 1.2.2b <u>Predict what happens to an animal under different conditions (e.g., different temperatures).</u></p>	<p><b>LS1.2.2 Describe the things that animals need in order to grow, survive, <u>and reproduce.</u></b></p> <p>LS 1.2.2a Identify <u>two or more</u> conditions an animal needs in order to grow, survive, and <u>reproduce</u> (e.g., food, water, shelter, space, and/or air).</p> <p>LS1.2.2b Predict what happens to an animal under different conditions. (e.g., different temperatures).</p>

	<p><b><u>LS1.2.3 Identify adaptations within organisms that help them survive in their environment.</u></b></p> <p><u>LS1.2.3a Identify one or more adaptations needed for survival in common animals (e.g., adaptations such as claws, odor, teeth, tail, for defense, food/eating and maintaining body temperature).</u></p> <p><b><u>LS1.2.4 Identify the characteristics of living things.</u></b></p> <p><u>LS1.2.4a Identify at least five of the ten characteristics of living things (e.g., need source of energy, need water, made of cells, movement, growth, respiration, excretion, response, reproduction, and life span/death).</u></p>	<p><u>LS1.2.2c Describe one or more conditions an animal needs in order to grow, survive, and reproduce (e.g., food, water, shelter, space, and/or air).</u></p> <p><u>LS1.2.2d Investigate what happens to an animal under different conditions (e.g., different temperatures).</u></p> <p><b><u>LS1.2.3 Identify adaptations within organisms that help them survive in their environment.</u></b></p> <p><u>LS1.2.3a Identify two or more adaptations needed for survival in common animals (e.g., adaptations such as claws, odor, teeth, tail, for defense, food/eating and maintaining body temperature).</u></p> <p><b><u>LS1.2.4 Describe the ten characteristics of living things.</u></b></p> <p><u>LS1.2.4a Identify the ten characteristics of living things (e.g., need source of energy, need water, made of cells, movement, growth, respiration, excretion, response, reproduction, and life span/death).</u></p> <p><u>LS1.2.4b Describe five of the ten characteristics of living things (i.e., need source of energy, need water, made of cells, movement, growth, respiration, excretion, response, reproduction, and life span/death).</u></p>
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	<p><b><u>LS1.2.5 Recognize that organisms are made of cells.</u></b></p> <p>LS1.2.5a <u>Recognize that most organisms are made of many cells.</u></p> <p>LS1.2.5b <u>Recognize that some organisms are made of only one cell.</u></p>	<p><b><u>LS1.2.5 Recognize that organisms are made of cells.</u></b></p> <p>LS1.2.5a Recognize that most organisms are made of many cells.</p> <p>LS1.2.5b Recognize that some organisms are made of only one cell.</p> <p>LS1.2.5c <u>Recognize that some cells are specialized for certain functions.</u></p> <p>LS1.2.5d <u>Recognize that individual cells have the same needs for survival as organisms.</u></p>
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## Domain: Life Science

LS1 – All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, species).

3. Students demonstrate an understanding of reproduction.

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>LS1.3.1 Identify the life stages of common organisms.</b></p> <p>LS1.3.1a Recognize the early stage of common organisms (e.g., seedlings, ducklings, human baby).</p> <p>LS1.3.1b Recognize the mature stage of common organisms.</p> <p><b>LS1.3.2 Identify similarities between parents and offspring.</b></p> <p>LS1.3.2a Match offspring with parent. (e.g., calf to a cow, chick to a hen, lamb to a sheep, puppy to a dog).</p>	<p><b>LS1.3.1 Identify the life stages of common organisms.</b></p> <p>LS1.3.1a <u>Identify</u> the early stage of common organisms (e.g., seedlings, ducklings, human baby).</p> <p>LS1.3.1b <u>Identify</u> the mature stage of common organisms.</p> <p><b>LS1.3.2 Identify similarities between parents and offspring.</b></p> <p>LS1.3.2a Match offspring with parent (e.g., calf to a cow, chick to a hen, lamb to a sheep, puppy to a dog, <u>acorn to oak tree, pinecone to pine trees</u>).</p>	<p><b>LS1.3.1 Identify the life stages of common organisms.</b></p> <p>LS1.3.1a Identify the early stage of common organisms (e.g., seedlings, ducklings, human baby).</p> <p>LS1.3.1b Identify the mature stage of common organisms.</p> <p><b>LS1.3.2 Identify similarities between parents and offspring.</b></p> <p>LS1.3.2a Match offspring with parent (e.g., calf to a cow, chick to a hen, lamb to a sheep, puppy to a dog, acorn to oak tree, pinecone to pine trees).</p> <p>LS1.3.2b <u>From up to 4 kinds of plants or animals, select the offspring that belongs with a given adult.</u></p> <p>LS1.3.2c <u>Match offspring and parents when given up to four different offspring and up to four different parents.</u></p> <p>(Suggestion: Select the offspring of the adult rabbit from pictures of baby rabbit, elephant, horse, and bear. Match the parent that belongs with each baby given pictures of adult and baby rabbits and adult and baby elephants).</p>

	<p><b><u>LS1.3.3 Identify the life cycle of a familiar plant or animal.</u></b></p> <p>LS1.3.3a <u>Identify a life cycle for an organism that does not undergo metamorphosis (e.g., bear, rabbit).</u></p> <p>LS1.3.3b <u>Identify a life cycle for an organism that undergoes metamorphosis (e.g., butterfly).</u></p>	<p><b><u>LS1.3.3 Sequence the life cycle of a familiar plant or animal.</u></b></p> <p>LS1.3.3a Identify a life cycle for an organism that does not undergo metamorphosis (e.g., bear, rabbit).</p> <p>LS1.3.3b Identify a life cycle for an organism that undergoes metamorphosis (e.g., butterfly).</p> <p>LS1.3.3c <u>Sequence a life cycle for an organism with similar appearance at each stage (e.g., bear, rabbit).</u></p> <p>LS1.3.3d <u>Sequence a life cycle for an organism that undergoes metamorphosis (e.g., butterfly).</u></p> <p><b><u>LS1.3.4 Compare life cycles of different organisms.</u></b></p> <p>LS1.3.4a <u>Compare life cycles of two or more plants.</u></p> <p>LS1.3.4b <u>Compare life cycles of two or more animals.</u></p> <p><b><u>LS1.3.5 Describe reproduction.</u></b></p> <p>LS1.3.5a <u>Recognize reproduction as the process by which new individuals (offspring) receive genetic information from parents.</u></p> <p>LS1.3.5b <u>Identify asexual reproduction as the process by which offspring receive genetic information from one parent (e.g., cuttings from plants, cell division).</u></p> <p><b><u>LS1.3.5c Identify sexual reproduction as the process by which offspring receive genetic information from two parents (e.g., male, female).</u></b></p>
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## Domain: Life Science

### LS2 – Matter cycles and energy flows through an ecosystem.

#### 1. Students demonstrate an understanding of energy flow in an ecosystem.

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>LS2.1.1. Identify sources of energy for survival of organisms.</b></p> <p>LS2.1.1a Identify that sunlight is a source of energy for plants.</p> <p>LS2.1.1b Identify that some animals get their energy (food) by eating plants.</p> <p>LS2.1.1c Identify that some animals get their energy (food) by eating other animals.</p> <p>LS2.1.1d Care for plants and/or animals by identifying and providing for their needs.</p> <p><b>LS2.1.2 Identify the relationships between organisms in a food web.</b></p> <p>LS2.1.2a Identify an animal that eats plants.</p> <p>LS2.1.2b Identify an animal that eats other animals.</p> <p>LS2.1.2c Identify an animal that eats both plants and animals.</p> <p>LS2.1.2d Identify that the relationships between plants and animals can be represented by simple food webs.</p>	<p><b>LS2.1.1 Identify sources of energy for survival of organisms.</b></p> <p>LS2.1.1a Identify that sunlight is a source of energy for plants.</p> <p>LS2.1.1b Identify that some animals get their energy (food) by eating plants.</p> <p>LS2.1.1c Identify that some animals get their energy (food) by eating other animals.</p> <p>LS2.1.1d Care for plants and/or animals by identifying and providing for their needs.</p> <p><b>LS2.1.2 <u>Describe the relationships between plants and animals that depend on each other for food.</u></b></p> <p>LS2.1.2a Identify an animal that eats plants.</p> <p>LS2.1.2b Identify an animal that eats other animals.</p> <p>LS2.1.2c Identify an animal that eats both plants and animals.</p> <p>LS2.1.2d Identify the relationships between plants and animals by a creating simple food web.</p>	<p><b>LS2.1.1 <u>Describe</u> the sources of energy for survival of organisms.</b></p> <p>LS2.1.1a <u>Describe</u> that sunlight is a source of energy for plants.</p> <p>LS2.1.1b <u>Describe</u> that some animals get their energy (food) by eating plants.</p> <p>LS2.1.1c <u>Describe</u> that some animals get their energy (food) by eating other animals.</p> <p>LS2.1.1d Care for plants and/or animals by identifying and providing for their needs.</p> <p><b>LS2.1.2 <u>Describe the relationships between plants and animals that depend on each other for food.</u></b></p> <p>LS2.1.2a <u>Describe</u> an animal that eats plants.</p> <p>LS2.1.2b <u>Describe</u> an animal that eats other animals.</p> <p>LS2.1.2c <u>Describe</u> an animal that eats both plants and animals.</p> <p>LS2.1.2d <u>Describe</u> the relationships between plants and animals by a creating simple food web.</p> <p>LS2.1.2e <u>Recognize, identify or describe the role of decomposers in a food web</u> (e.g., earthworms).</p>

		<p>LS2.1.2f <u>Recognize a host/parasite relationship.</u></p>
	<p><b><u>LS2.1.3 Discuss living and non-living factors in an ecosystem.</u></b></p> <p>LS2.1.3a <u>Identify one or more living factor(s) that affect organisms in an ecosystem (e.g., introduction of coyote to a forest, effects of a hurricane on an ecosystem, effect of pollution on an ecosystem).</u></p> <p>LS2.1.3b <u>Identify one or more non-living factor(s) on organisms (e.g., extended drought leads to death of plant life and lack of food for herbivores.).</u></p> <p>LS2.1.3c <u>Predict the impact of various living (e.g., disease, population shifts, non-native invasive species) and non-living (e.g., flood, drought, fires) factors on organisms.</u></p>	<p><b><u>LS2.1.3 Discuss living and non-living factors in an ecosystem.</u></b></p> <p>LS2.1.3a Identify two or more living factors that affect organisms in an ecosystem (e.g., introduction of coyote to a forest, effects of a hurricane on an ecosystem, effect of pollution on an ecosystem).</p> <p>LS2.1.3b Identify <u>two or more</u> non-living factors that affect organisms (e.g., extended drought leads to death of plant life and lack of food for herbivores).</p> <p>LS2.1.3c Predict the impact of various living (e.g., disease, population shifts, non-native invasive species) and non-living (e.g., flood, drought, fires) factors on organisms.</p> <p>LS2.1.3d <u>Describe the impact of various living (e.g., disease, population shifts, non-native invasive species) and non-living (e.g., flood, drought, fires) factors on organisms.</u></p> <p>LS2.1.3e <u>Describe how humans modify the environment and affect other organisms.</u></p> <p>LS2.1.3f <u>Identify how organisms meet their life needs through their relationships with other organisms and what they can acquire from their environment.</u></p> <p><b><u>LS2.1.4 Determine the relationship among photosynthesis, the sun, and the production of food by plants.</u></b></p> <p>LS2.1.4a <u>Associate photosynthesis with plants absorbing energy from the sun and producing food.</u></p>

## Domain: Life Science

**LS3 – Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).**

**1. Students demonstrate an understanding of natural selection.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>LS3.1.1 Identify the responses of plants and animals to changes in their environment.</b></p> <p>LS3.1.1a Identify the responses of plants and animals to a change in their food supply.</p> <p>LS3.1.1b Identify the responses of plants and animals to habitat destruction or changes in habitat. (e.g., flood, fire, housing developments)</p> <p>LS3.1.1c Identify the responses of plants and animals to seasonal and weather-related changes.</p> <p>(Suggestion: Move a plant to a container and provide for its needs, and observe how the habitat change affects the plant.)</p>	<p><b>LS3.1.1 Identify the responses of plants and animals to changes in their environment.</b></p> <p>LS3.1.1a Identify the responses of plants and animals to a change in their food supply.</p> <p>LS3.1.1b Identify the responses of plants and animals to habitat destruction or changes in habitat (e.g., flood, fire, housing developments).</p> <p>LS3.1.1c Identify the responses of plants and animals to seasonal and weather-related changes.</p> <p>(Suggestion: Move a plant to a container and provide for its needs, and observe how the habitat change affects the plant.)</p>	<p><b>LS3.1.1 Identify the responses of plants and animals to changes in their environment.</b></p> <p>LS3.1.1a Identify the responses of plants and animals to a change in their food supply.</p> <p>LS3.1.1b Identify the responses of plants and animals to habitat destruction or changes in habitat (e.g., flood, fire, housing developments).</p> <p>LS3.1.1c Identify the responses of plants and animals to seasonal and weather-related changes.</p> <p>(Suggestion: Move a plant to a container and provide for its needs, and observe how the habitat change affects the plant.)</p>

<p><b>LS3.1.2 Describe how some organisms are better adapted for specific environments than other organisms.</b></p> <p>LS3.1.2a Match animals to their environment (e.g., camel in desert, polar bear in arctic, fish in water environment).</p>	<p><b>LS3.1.2 Describe how some organisms are better adapted for specific environments than other organisms.</b></p> <p>LS3.1.2a Match animals to their environment (e.g., camel in desert, polar bear in arctic, fish in water environment)</p> <p>(Suggestion: Select a white rabbit over a brown or black rabbit as better adapted to a snowy, winter environment.)</p>	<p><b>LS3.1.2 Describe how some organisms are better adapted for specific environments than other organisms.</b></p> <p>LS3.1.2a <u>Select the animal that can best live in a given environment when given a choice between two to four animals.</u></p> <p>(Suggestion: Select a land animal over an aquatic animal)</p> <p>LS3.1.2b <u>Identify a fossil as remains of something that was once alive.</u></p> <p>LS3.1.2c <u>Match fossils of organisms with the likely organism from which they came</u></p> <p>LS3.1.2d <u>Explain how a fossil is formed.</u></p>
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## Domain: Life Science

**LS4 – Humans are similar to other species in many ways, and yet are unique among Earth’s life forms.**

**1. Students demonstrate an understanding of human body systems.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>LS4.1.1 Identify the senses.</b></p> <p>LS4.1.1a Identify one to two of the senses.</p> <p>LS4.1.1b Match the external body part with the senses known (e.g., ear: hearing, finger: feeling).</p> <p><b>LS4.1.2 Identify patterns of human health and disease.</b></p> <p>LS4.1.2a Identify signs or feelings of being sick, hurt/injured, or discomfort (e.g., cut on finger, headache, dizziness, etc.)</p> <p>LS4.1.2b Identify the connection between hygiene and wellness.</p>	<p><b>LS4.1.1 Identify the senses.</b></p> <p>LS4.1.1a Identify one to <u>three</u> of the senses.</p> <p>LS4.1.1b Match the external body part with the senses known (e.g., ear: hearing, finger: feeling).</p> <p><b>LS4.1.2 Identify patterns of human health and disease.</b></p> <p>LS4.1.2a Identify signs or feelings of being sick, hurt/injured, or discomfort (e.g., cut on finger, headache, dizziness, etc.)</p> <p>LS4.1.2b Identify the connection between hygiene and wellness.</p> <p>LS4.1.2c <u>Identify a treatment for an illness, injury (e.g., medicine for headache, Band-Aid for cut).</u></p>	<p><b>LS4.1.1 <u>Describe</u> the senses.</b></p> <p>LS4.1.1a Identify one to <u>five</u> of the senses.</p> <p>LS4.1.1b Match the external body part with the senses known (e.g., ear: hearing, finger: feeling).</p> <p>LS4.1.1c <u>Describe one to five of the senses.</u></p> <p><b>LS4.1.2 Identify patterns of human health and disease.</b></p> <p>LS4.1.2a Identify signs or feelings of being sick, hurt/injured, or discomfort (e.g., cut on finger, headache, dizziness, etc.)</p> <p>LS4.1.2b Identify the connection between hygiene and wellness.</p> <p>LS4.1.2c Identify a treatment for an illness, injury (e.g., medicine for headache, Band-Aid for cut).</p>

	<p><b><u>LS4.1.3 Compare voluntary to involuntary body responses.</u></b></p> <p>LS4.1.3a <u>Identify an involuntary response</u> (e.g., breathing, reflexes, blinking, heartbeat).</p> <p>LS4.1.3b <u>Identify a voluntary response</u> (e.g., chewing, swallowing, moving an arm).</p>	<p><b><u>LS4.1.3 Compare voluntary to involuntary body responses.</u></b></p> <p>LS4.1.3a Identify an involuntary response (e.g., breathing, reflexes, blinking, heartbeat).</p> <p>LS4.1.3b Identify a voluntary response (e.g., chewing, swallowing, moving an arm).</p> <p><b><u>LS4.1.4 Compare instinctual to learned behaviors.</u></b></p> <p>LS4.1.4a <u>Identify one to three automatic behaviors</u> (e.g., breathing).</p> <p>LS4.1.4b <u>Identify one to three learned behaviors.</u></p>
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## LIFE SCIENCE GLOSSARY

- **Abiotic:** non-living factor.
- **Adaptation:** the development of physical and behavioral characteristics that allow organisms to survive and reproduce in their habitats.
- **Asexual reproduction:** reproduction that does not include the union of sex cells and in which one parent produces offspring that are genetically identical to the parent.
- **Biotic:** living factor.
- **Carnivores:** meat eaters.
- **Commensalism:** a relationship between organisms of two different species in which one derives food or other benefits from the association while the other remains unharmed and unaffected.
- **Consumer:** an organism that feeds on other organisms or on material derived from them.
- **Decomposer:** an organism, especially a bacterium or fungus, which causes organic matter to rot or decay.
- **Diurnal:** used to describe animals that are active during the day rather than at night.
- **Ecosystem:** a localized group of interdependent organisms together with the environment that they inhabit and depend on.
- **Food chain:** a hierarchy of different living things, each of which feeds on the one below.
- **Food web:** the interlocking food chains within an ecological community.
- **Fossil:** the remains of an animal or plant preserved from an earlier era inside a rock or other geological deposit, often as an impression or in a petrified state.
- **Herbivore:** plant eaters.
- **Hibernation:** a sleeplike dormant state over the winter during which an organism lives off reserves of body fat, with a decrease in body temperature and pulse rate and slower metabolism.
- **Host:** a human, animal, plant, or other organism in or on which another organism, especially a parasite, lives.
- **Life cycle:** the complete process of change and development during organism's lifetime.

- **Living:** anything that utilizes energy to, grows, responds to stimuli, moves, respire, and eliminates waste.
- **Metamorphosis:** to undergo a complete or marked change of bodily form while developing into an adult animal.
- **Migration:** the seasonal movement of organisms from one location to another.
- **Mutualism:** a relationship between two organisms of different species that benefits both and harms neither.
- **Nocturnal:** any organism that is active at night.
- **Non-living:** anything that does not (or never did) exhibit the characteristics of living things.
- **Offspring:** the descendants of organisms.
- **Omnivores:** organisms that consume both plants and meat.
- **Organism:** a living thing.
- **Parasite:** a plant or animal that lives on or in another, usually larger, host organism in a way that harms or is of no advantage to the host.
- **Photosynthesis:** a process by which green plants and other organisms produce simple sugars and oxygen from carbon dioxide and water, using energy that chlorophyll or other pigments absorb from the Sun.
- **Reproduce:** to produce offspring or new individuals through a sexual or asexual process.
- **Respiration:** an energy producing process in the cells in which oxygen is delivered and carbon dioxide and water are given off.
- **Sexual reproduction:** reproduction that involves the union of male and female reproductive cells, each contributing half of the genetic makeup of the resulting offspring.
- **Survive:** to manage to stay alive or continue to exist, especially in difficult situations.
- **Symbiosis:** when one organism lives off of another that is often, but not always, of mutual benefit.

# Domain: Earth and Space Science

## Earth Materials

**ESS1 – The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.**

**1. Students demonstrate an understanding of earth materials.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>ESS1.1.1 Describe soils using their physical properties.</b></p> <p>ESS1.1.1a Distinguish soil from other objects or materials. (e.g., grass, wood, leaves, paper, rubber, food, etc.)</p> <p>ESS1.1.1b Describe soil using one physical property (see NOTE below)</p> <p>(Suggestions: Feel soil; use hand lens to examine make-up of soil; select soil when given soil and grass etc.)</p> <p>NOTE: Properties of soil include: color, texture/feel, size or shape of particles, structure, drainage, stoniness, easily eroded, and amount of organic material (e.g., decaying leaf or root parts)</p>	<p><b>ESS1.1.1 Describe soils using their physical properties.</b></p> <p>ESS1.1.1a Distinguish soil from other objects or materials. (e.g., grass, wood, leaves, paper, rubber, etc.)</p> <p>ESS1.1.1b Describe soil using <u>one or more</u> physical properties (see NOTE below).</p> <p>(Suggestions: Feel soil; <u>use microscope or hand lens to examine make-up of soil; select soil when given soil and grass etc.; describe or draw pictures of soil.</u>)</p> <p>NOTE: Properties of soil include: color, texture/feel, size or shape of particles, structure, drainage, stoniness, easily eroded, and amount of organic material (e.g., decaying leaf or root parts)</p>	<p><b>ESS1.1 <u>Identify</u> soils using their physical properties.)</b></p> <p>ESS1.1.1a Distinguish soil from other objects or materials. (e.g., grass, wood, leaves, paper, rubber, etc.)</p> <p>ESS1.1.1b Describe soil using two or more physical properties (see NOTE below).</p> <p>ESS1.1.1c <u>Identify soils with specified physical properties.</u></p> <p>(Suggestions: Feel soil; use microscope or hand lens to examine <u>and describe make-up of soil or draw pictures of what they see.</u>)</p> <p>NOTE: Properties of soil include: color, texture/feel, size or shape of particles, structure, drainage, stoniness, easily eroded, and amount of organic material (e.g., decaying leaf or root parts).</p>

<p><b>ESS1.1.2 Describe rocks and minerals using their physical properties.</b></p> <p>ESS1.1.2a Distinguish rocks and minerals from other objects or materials. (e.g., grass, wood, leaves, paper, rubber, food, etc.)</p> <p>ESS1.1.2b Describe rocks and minerals using one physical property (See NOTES below) (Suggestions: Examine minerals and rocks with various properties; compare properties of different minerals or rocks; select the rock or mineral when given one along with one other object.)</p> <p>NOTE: Properties of rocks include: color, texture/feel, size or shape of particles in them, hardness, and structure based on how they were formed (igneous, sedimentary, and metamorphic)</p> <p>NOTE: Properties of minerals include: color (one or several), luster (how it reflects light), crystal shape, cleavage and fracture (how it breaks).</p>	<p><b>ESS1.1.2 Describe rocks and minerals using their physical properties.</b></p> <p>ESS1.1.2a Distinguish rocks and minerals from other objects or materials. (e.g., grass, wood, leaves, paper, rubber, food, etc.)</p> <p>ESS1.1.2b Describe rocks and minerals using one <u>or more</u> physical properties (See NOTES below); (e.g., compare rocks and minerals and (gems) in jewelry; do a hardness test; scratch for color; hammer on minerals to determine cleavage and fracture.)</p> <p>NOTE: Properties of rocks include: color, texture/feel, size or shape of particles in them, hardness, and structure based on how they were formed (igneous, sedimentary, and metamorphic)</p> <p>NOTE: Properties of minerals include: color (one or several), luster (how it reflects light), <u>streak (use power form of crystal and rub across unglazed streak plate)</u>, crystal shape, cleavage and fracture (how it breaks).</p>	<p><b>ESS1.1.2 <u>Identify</u> rocks and minerals using their physical properties.</b></p> <p>ESS1.1.2a Distinguish rocks and minerals from other objects or materials. (e.g., grass, wood, leaves, paper, rubber, food, etc.)</p> <p>ESS1.1.2b Describe rocks and minerals using <u>two or more</u> physical properties (See NOTES below).</p> <p>NOTE: Properties of rocks include: color, texture/feel, size or shape of particles in them, hardness, and structure based on how they were formed (igneous, sedimentary, and metamorphic).</p> <p>NOTE: Properties of minerals include: color (one or several), luster (how it reflects light), streak (use power form of crystal and rub across unglazed streak plate), crystal shape, cleavage and fracture (how it breaks).</p> <p>ESS1.1.2c <u>Identify rocks and minerals with specified physical properties</u> (See NOTES above). (Suggestions: Feel rocks; use microscope to examine and describe or draw pictures; compare rocks and minerals (gems) in jewelry; do a hardness test, scratch for color; hammer on minerals to determine cleavage and fracture.)</p>
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<p><b>ESS1.1.3 Compare different soils to each other using their physical properties.</b></p> <p>ESS1.1.3a Match soils using one physical property.</p> <p>ESS1.1.3b Sort soils using one physical property.</p> <p>ESS1.1.3c Compare soils using one physical property.</p> <p>(Suggestions: Provide bowls with organic soil/loam, clay, silt, and sand, and have students describe and compare the different soils. Conduct tests to see differences in percolation/drainage of soils.)</p> <p><b>ESS1.1.4 Compare different rocks and minerals to each other using their physical properties.</b></p> <p>ESS1.1.4a Match rocks and minerals using one physical property.</p> <p>ESS1.1.4b Sort rocks and minerals using one physical property.</p> <p>ESS1.1.4c Compare rocks and minerals using one physical property.</p> <p>(Suggestions: Examine a variety of rocks and minerals, sort them into categories and compare rocks to each other, compare minerals to each other, and compare rocks to minerals.)</p>	<p><b>ESS1.1.3 Compare different soils to each other using their physical properties.</b></p> <p>ESS1.1.3a Match soils using <u>one or more</u> physical properties.</p> <p>ESS1.1.3b Sort soils using <u>one or more</u> physical properties.</p> <p>ESS1.1.3c Compare soils using <u>one or more</u> physical properties.</p> <p>ESS1.1.3d <u>Classify soils by type</u> (clay, sand, silt, or loam) <u>using one or more physical properties.</u></p> <p>(Suggestions: Provide bowls with organic soil/loam, clay, silt, and sand, and have students describe and compare the different soils. Conduct tests to see differences in percolation/drainage property of soils.)</p> <p><b>ESS1.1.4 Compare different rocks and minerals to each other using their physical properties.</b></p> <p>ESS1.1.4a Match rocks and minerals using <u>one or more</u> physical properties.</p> <p>ESS1.1.4b Sort rocks and minerals using <u>one or more</u> physical properties.</p> <p>ESS1.1.4c Compare rocks and minerals using <u>one or more</u> physical properties.</p> <p>(Suggestions: Examine a variety of rocks and minerals, sort them into categories and compare rocks to each other, compare minerals to each other, and compare rocks to minerals.)</p>	<p><b>ESS1.1.3 Compare different soils to each other using their physical properties.</b></p> <p>ESS1.1.3a Match soils using <u>two or more</u> physical properties.</p> <p>ESS1.1.3b Sort soils using <u>two or more</u> physical properties.</p> <p>ESS1.1.3c Compare soils using <u>two or more</u> physical properties.</p> <p>ESS1.1.3d Classify soils by type (clay, sand, silt, loam) using <u>two or more</u> physical properties.</p> <p>(Suggestions: Provide bowls with organic soil/loam, clay, silt, and sand and have students describe and compare the different soils. Conduct tests to see differences in percolation/drainage properties of soils.)</p> <p><b>ESS1.1.4 Compare different rocks and minerals to each other using their physical properties.</b></p> <p>ESS1.1.4a Match rocks and minerals using <u>two or more</u> physical properties.</p> <p>ESS1.1.4b Sort rocks and minerals using <u>two or more</u> physical properties.</p> <p>ESS1.1.4c Compare rocks and minerals using <u>two or more</u> physical properties.</p> <p>(Suggestions: Examine a variety of rocks and minerals, sort them into categories and compare rocks to each other, compare minerals to each other, and compare rocks to minerals.)</p>
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<p><b>ESS1.1.5 Compare different rocks and minerals to each other using their physical properties.</b></p> <p>ESS1.1.5a Sort and separate soils from rocks and minerals.</p> <p>ESS1.1.5b Compare soils to rocks and minerals using one physical property. (See NOTES on properties of soils, rocks, and minerals above).</p> <p>(Suggestion: Examine a rock or mineral and soil and describe the differences.)</p>	<p><b>ESS1.1.5 Compare different rocks and minerals to each other using their physical properties.</b></p> <p>ESS1.1.5a Sort and separate soils from rocks and minerals.</p> <p>ESS1.1.5b Compare soils to rocks and minerals using <u>one or more</u> physical properties (See NOTES on properties of soils, rocks, and minerals above)</p> <p><u>ESS1.1.5c Make and test predictions about physical properties of soils, rocks and minerals. (Suggestion: Predict which rock is harder and then test prediction with a scratch test; predict which soil will hold more water and then conduct a percolation test.)</u></p> <p><u>ESS1.1.5d Collect data about the properties of soils, rocks and minerals.</u></p> <p>(Suggestion: Visit quarry/landscape store; gather soil from various areas around the school; using various soils plant seeds to determine which soil is best for growing that plant; gather rocks in the area; use a rock tumbler; compare how much water a particular soil will hold (predict; create a chart that reflects the properties or types of the class's collected rocks; identify uses of rocks in the environment based on their physical qualities, such as walkways (hardness), building materials (color, beauty, luster), etc.)</p>	<p><b>ESS1.1.5 Compare different rocks and minerals to each other using their physical properties.</b></p> <p>ESS1.1.5a Sort and separate soils from rocks and minerals.</p> <p>ESS1.1.5b Compare soils to rocks and minerals using <u>two or more</u> physical properties (See NOTES on properties of soils, rocks, and minerals above)</p> <p>ESS1.1.5c Make and test predictions/<u>hypotheses</u> about physical properties of soils, rocks and minerals. (Suggestion: Predict which rock is <u>harder and then test prediction with a scratch test; predict which soil will hold more water and then conduct a percolation test.</u>)</p> <p>ESS1.1.5d Collect data about the properties of soils, rocks and minerals.</p> <p>(Suggestion: Visit quarry/landscape store; gather soil from various areas around the school; using various soils plant seeds to determine which soil is best for growing that plant; gather rocks in the area; use a rock tumbler; compare how much water a particular soil will hold (predict); create a chart that reflects the properties or types of the class's collected rocks; identify uses of rocks in the environment based on their physical qualities, such as walkways (hardness), building materials (color, beauty, luster), etc.)</p>
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		<p>ESS1.1.5e <u>Use data to accept or reject prediction/hypotheses about physical properties of soils, rocks and minerals.</u></p> <p>ESS1.1.5f <u>Indicate why some earth materials are classified together and some are not.</u></p> <p>(Suggestions: Choose the one that doesn't belong by feeling rocks, comparing rocks and minerals (gems) in jewelry; doing a hardness test, scratch for color, hammer on minerals to show fracture.)</p> <p>ESS1.1.5g <u>Complete charts showing hardness, color, streak, density, etc. of given rocks and minerals.(e.g., create a Venn diagram to classify rocks, soils, and minerals according to their properties.</u></p>
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## Earth Materials

ESS1 – The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

1. Students demonstrate an understanding of earth materials.

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
	<p><b><u>ESS1.1.6 Identify the four basic materials of the earth (i.e., water, soil, rocks and air.)</u></b></p> <p>ESS1.1.6a <u>Identify water as a basic earth material.</u></p> <p>ESS1.1.6b <u>Identify soil as a basic earth material.</u></p> <p>ESS1.1.6c <u>Identify rocks as a basic earth material.</u></p> <p>ESS1.1.6d <u>Identify air as a basic earth material.</u></p> <p>(Suggestions: Identify a basic earth material when given two different basic earth materials; compare the basic earth materials.)</p> <p><b><u>ESS1.1.7 Identify the uses of the four basic earth materials (i.e., water, soil, rocks and air).</u></b></p> <p>ESS1.1.7a <u>Identify one or more uses of water.</u></p> <p>ESS1.1.7b <u>Identify one or more uses of soil.</u></p> <p>ESS1.1.7c <u>Identify one or more uses of rocks.</u></p> <p>ESS1.1.7d <u>Identify one or more uses of air.</u></p> <p>(Suggestions: Involve students in a scavenger hunt to find water, soil, rocks, and air; make a collage using magazine pictures of the four basic earth materials; observe videos and photographs, read books, build a home for a pet (fish, hermit crab); build a biosphere; work with balloons to understand air.)</p>	<p><b><u>ESS1.1.6 Identify the four basic materials of the earth (i.e., water, soil, rocks and air.)</u></b></p> <p>ESS1.1.6a Identify water as a basic earth material.</p> <p>ESS1.1.6b Identify soil as a basic earth material.</p> <p>ESS1.1.6c Identify rocks as a basic earth material.</p> <p>ESS1.1.6d Identify air as a basic earth material.</p> <p>(Suggestions: Identify a basic earth material when given different basic earth materials; compare the basic earth materials.)</p> <p><b><u>ESS1.1.7 Identify the uses of the four basic earth materials (i.e., water, soil, rocks and air).</u></b></p> <p>ESS1.1.7a Identify <u>two or more</u> uses of water.</p> <p>ESS1.1.7b Identify <u>two or more</u> uses of soil.</p> <p>ESS1.1.7c Identify <u>two or more</u> uses of rocks.</p> <p>ESS1.1.7d Identify <u>two or more</u> uses of air.</p> <p>ESS1.1.7e <u>Determine the best earth materials for specific purposes.</u></p> <p>(Suggestions: Drink (taste) water; use water - plants/animals/vapor or list their uses; grow plants in soil; touch and use rocks – build a model wall/house, build a model dam; raise a guppy in a jar with a plant to demonstrate that the guppy needs water and air and the plant recycles the</p>

		carbon dioxide and provides oxygen for the guppy.)
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# Water Cycle

**ESS1 – The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.**

**2. Students demonstrate an understanding of processes and change over time within earth systems.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>ESS1.2.1 Identify the forms of water in the water cycle.</b></p> <p>ESS1.2.1a Identify water in the liquid form.</p> <p>ESS1.2.1b Identify water in the solid form.</p> <p>ESS1.2.1c Identify water in the gas form.</p> <p>(Suggestions: Compare liquid water to ice, boil water and watch the steam, use cool-mist humidifier to feel steam.)</p>	<p><b><u>ESS1.2.1 Identify the components and changes represented by the water cycle.</u></b></p> <p>ESS1.2.1a Identify water in the liquid form.</p> <p>ESS1.2.1b Identify water in the solid form.</p> <p>ESS1.2.1c Identify water in the gas form.</p> <p><u>ESS1.2.1d Identify the three forms of water in the water cycle.</u></p> <p><u>ESS1.2.1e Identify the water cycle and its parts, including evaporation, precipitation, run-off, condensation, groundwater, and transpiration.</u></p> <p><u>ESS1.2.1f Identify the changes between the parts of the water cycle (with arrows).</u></p> <p>(Suggestions: Heat water on a hot plate to produce steam, then place a cold surface above the hot plate so the steam will condense into liquid water again; measure evaporation from a glass of water left on a windowsill or table; read or watch age appropriate materials; work with ice in a glass of water; make a diagram showing the relationships between ice, liquid water, and steam.)</p>	<p><b>ESS1.2.1 Identify the components and changes represented by the water cycle.</b></p> <p>ESS1.2.1a Identify water in the liquid form.</p> <p>ESS1.2.1b Identify water in the solid form.</p> <p>ESS1.2.1c Identify water in the gas form.</p> <p>ESS1.2.1d Identify the three forms of water in the water cycle.</p> <p>ESS1.2.1e Identify the water cycle and its parts, including evaporation, precipitation, run-off, condensation, groundwater, and transpiration.</p> <p>ESS1.2.1f Identify the changes between the parts of the water cycle (with arrows).</p> <p>ESS1.2.1g <u>Use arrows to show the relationship between the parts of the water cycle.</u></p> <p>(Suggestions: Identify the water cycle and its parts; observe steam in bathroom and compare to rain, observe condensation on a mirror and compare to rain; label a transparency showing the water cycle and show with an overhead projector; fill a graduated jar with water and let the water evaporate and student observe change, observe leaves through the microscope to see openings where transpiration occurs.)</p>

		<p><b><u>ESS1.2.2 Identify that water moves rocks and soils.</u></b></p> <p><u>ESS1.2.2a Identify the different ways water moves rocks and soils (e.g., floods, tides, raindrops, rivers, etc.).</u></p> <p><u>ESS1.2.2b Identify erosion.</u></p> <p><u>ESS1.2.2c Communicate an</u></p> <p>(Suggestions: Use a stream table to do different investigations with rocks and soils and water intensities observe erosion in the schoolyard if possible, observe pictures of floods, tides etc., use an Environmental Control Unit (ECU) and a switch for different investigations; use water to make rocks move.)</p>
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## Earth's Surface and Layers

ESS1 – The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

2. Students demonstrate an understanding of processes and change over time within earth systems.

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>ESS1.2.3 Identify the earth's surface.</b></p> <p>ESS1.2.3a Identify the surface of different objects or materials as models of the earth's surface (e.g., egg, ball, orange, globe).</p> <p>ESS1.2.3b Identify the earth's surface (e.g., ground) and distinguish the earth's surface from earth's atmosphere (air around us)</p> <p>(Suggestions: Maintain an ant farm to examine the relationship between the surface and the underground tunnels; locate earth's surface on globe.)</p>	<p><b>ESS1.2.3 Identify the earth's surface <u>and that it changes with time.</u></b></p> <p>ESS1.2.3a Identify the surface <u>and core</u> of different objects or materials as models of the earth's surface (e.g., egg, ball, orange, globe).</p> <p>ESS1.2.3b Identify the earth's surface (e.g., ground) and distinguish the earth's surface from earth's atmosphere (air around us)</p> <p><u>ESS1.2.3c Identify ways that the earth's surface changes with time (e.g., erosion of soils near drainage ditches, rock or mudslides in the news media).</u></p> <p>(Suggestions: Keep an ant farm in the classroom to show visually how the surface and underground change; collect and discuss news photos/satellite pictures of areas before and after major storms.)</p>	<p><b>ESS1.2.3 Identify the earth's surface and that it changes with time.</b></p> <p>ESS1.2.3a Identify the surface and core of different objects or materials as models of the earth's surface (e.g., egg, ball, orange, globe).</p> <p>(Suggestion: Give students a globe and have them indicate on the globe where the surface is, where the earth's atmosphere is, and describe where the core is.)</p> <p>ESS1.2.3b Identify the earth's surface (e.g., ground) and distinguish the earth's surface from earth's atmosphere (air around us)</p> <p><u>ESS1.2.3c Identify ways that the earth's surface changes with time (e.g., erosion of soils near drainage ditches, rock or mudslides in the news media).</u></p> <p>(Suggestions: Keep an ant farm in the classroom to show visually how the surface and underground change; collect and discuss news photos/satellite pictures of areas before and after major storms.)</p> <p><u>ESS1.2.3d Explore models of the earth showing the crust, mantle and core. (The idea that there are different layers in the earth is important, not the ability to identify the names of the layers.)</u></p> <p>(Suggestions: Make models of the layers of the earth, using various materials, such as colored clay.)</p>

# Change

**ESS1 – The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.**

**2. Students demonstrate an understanding of processes and change over time within earth systems.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>ESS1.2.4 Describe some changes on the earth that happen faster than others.</b></p> <p>ESS1.2.4a Identify relatively fast changes to the earth’s surface (e.g., flash floods, heavy rain and resulting erosion, several very hot days dry and crack the soil, larger rock breaks to make smaller rocks, such as when bulldozers move them or water gets into a crack and freezes).</p>	<p><b>ESS1.2.4 Describe some changes on the earth that happen faster than others.</b></p> <p>ESS1.2.4a Identify relatively fast changes to the earth’s surface (e.g., flash floods, heavy rain and resulting erosion, several very hot days dry and crack the soil, larger rock breaks to make smaller rocks, <u>earthquake, volcano erupts, a hurricane or tropical storm occurs</u>).</p> <p>ESS1.2.4b <u>Identify relatively slow changes to the earth’s surface (e.g., a large rock slowly breaks down over many many years from water washing over it in a stream or river; compare photos of slowly moving glaciers taken in different years or a lake drying up over several years)</u></p> <p>ESS1.2.4c <u>Compare the results of relatively faster and slower changes (Suggestion: Compare smooth rocks collected from a stream to breaking a rock quickly; compare pictures of older – and smoother - mountains on the East coast of the US to younger Rocky Mountains which are higher and pointier)</u></p>	<p><b>ESS1.2.4 Describe some changes on the earth that happen faster than others.</b></p> <p>ESS1.2.4a Identify relatively fast changes to the earth’s surface (e.g., flash floods, heavy rain and resulting erosion, several very hot days dry and crack the soil, larger rock breaks to make smaller rocks, earthquake, volcano erupts, a hurricane or tropical storm occurs).</p> <p>ESS1.2.4b Identify relatively slow changes to the earth’s surface (e.g., a large rock slowly breaks down over many many years from water washing over it in a stream or river; )</p> <p>ESS1.2.4c Compare the results of relatively faster and slower changes (Suggestion: Compare smooth rocks collected from a stream to breaking a rock quickly; compare pictures of older – and smoother - mountains on the East coast of the US to younger Rocky Mountains which are higher and pointier)</p>

<p><b>ESS1.2.5 Identify air and water of different temperatures.</b></p> <p>ESS1.2.5a Identify that air can have different temperatures.</p> <p>(Suggestions: Feel that the air above an ice cube is cooler than the air above a warm object.)</p> <p>ESS1.2.5b Identify that water can have different temperatures.</p> <p>(Suggestion: Feel cool water and warm water, feel how the air above an ice cube is cooler than the air above a warm object.)</p>	<p><b>ESS1.2.5 Identify <u>how</u> air and water can have different temperatures.</b></p> <p>ESS1.2.5a <u>Identify the cause of changes in air temperatures.</u></p> <p>(Suggestions: Feel that the air above an ice cube is cooler than the air above a warm object.)</p> <p>ESS1.2.5b <u>Identify the cause of changes in water temperatures.</u></p> <p>(Suggestion: Relate warm temperatures to sun, ice cube in water.)</p> <p><b><u>ESS1.2.6 Describe how wind and water change Earth.</u></b></p> <p><u>ESS1.2.6a Describe how erosion by wind, water (including floods), and glaciers change the earth.</u></p> <p><u>ESS1.2.6b Describe deposition of sediment.</u></p> <p><u>ESS1.2.6c Identify landforms.</u></p> <p>(Suggestion: Use visits, pictures, videos, or audio descriptions to show landforms to students.)</p>	<p><b>ESS1.2.5 Identify how air and water can have different temperatures.</b></p> <p>ESS1.2.5a Identify the cause of changes in air temperatures.</p> <p>ESS1.2.5b Identify the cause of changes in water temperatures.</p> <p><u>ESS1.2.5c Predict temperature in various environments.</u></p> <p><u>ESS1.2.5d Compare air temperatures to water temperatures in the same environment.</u></p> <p>(Suggestion: Feel cool water and warm water, feel how the air above an ice cube is cooler than the air above a warm object.)</p> <p><b>ESS1.2.6 Describe how wind and water shape land.</b></p> <p>ESS1.2.6a Describe how erosion by wind, water (including floods), and glaciers shapes land.</p> <p>ESS1.2.6b <u>Simulate</u> deposition of sediment.</p> <p>ESS1.2.6c Identify landforms.</p> <p>(Suggestion: Use visits, pictures, videos, or audio descriptions to show landforms to students.)</p>
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**ESS1.2.7 Identify that rocks change into other rocks.**

ESS1.2.7a Match rocks by type to descriptions or pictures of igneous, sedimentary, and metamorphic.

ESS1.2.7b Sort rocks into groups by type using descriptions of characteristics and/or pictures of each type (i.e., igneous, sedimentary and metamorphic).

ESS1.2.7c Compare igneous, sedimentary and metamorphic rocks.

(Suggestion: Match temperatures to different environments using pictures, match relative temperatures by observing clothing of people in different pictures; use 3 stream tables and set up ahead of time, with sand and small rocks. While students are gone, move rock and sand with wind (blow-dryer), glacier (ice) and water have students figure out what caused what caused the changes; have students create containers with sand pebbles, water, silt soil and shale to watch the layering – similar to sand art, break a rock into smaller pieces using a hammer; create a sand stone.)

**ESS1.2.7 Identify that rocks change into other rocks.**

ESS1.2.7a Match rocks by type to descriptions or pictures of igneous, sedimentary, and metamorphic.

ESS1.2.7b Sort rocks into groups by type using descriptions of characteristics and/or pictures of each type (i.e., igneous, sedimentary and metamorphic).

ESS1.2.7c Compare igneous, sedimentary and metamorphic rocks.

ESS1.2.7d Identify rocks as igneous, sedimentary or metamorphic.

(Suggestion: Match temperatures to different environments using pictures, match relative temperatures by observing clothing of people in different pictures; use 3 stream tables and set up ahead of time, with sand and small rocks. While students are gone, move rock and sand with wind (blow-dryer), glacier (ice) and water have students figure out what caused what caused the changes; have students create containers with sand pebbles, water, silt soil and shale to watch the layering – similar to sand art, break a rock into smaller pieces using a hammer; create a sand stone.)

ESS1.2.7e Identify that rocks change into other rocks.

**ESS1.2.8 Describe how rocks form.**

ESS1.2.8a Describe one way that rocks form from other rocks through erosion and deposition.

ESS1.2.8b Describe one way that rocks form from melted rock material. (See 2.2)

ESS1.2.8c Describe one way that rocks

form from alteration by heat and pressure.

(Suggestions: Observe rocks from volcanoes; smash concrete with hammer to demonstrate production of sediments; Elmer's glue and sand to show compactness of sandstone.)

**ESS1.2.9 Represent processes of the rock cycle in words, models or diagrams.**

ESS1.2.9a Identify the parts of the rock cycle.

ESS1.2.9b Identify the changes represented in the rock cycle.

ESS1.2.9c Create a representation of the rock cycle.

(Suggestions: Draw pictures of the rock cycle or label a diagram of the rock cycle.)

# Earth Features

ESS1 – The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

2. Students demonstrate an understanding of processes and change over time within earth systems.

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
	<p><b><u>ESS1.2.10 Investigate volcanoes, faults and earthquakes and how they are related.</u></b></p> <p><u>ESS1.2.10a Identify physical properties of volcanoes.</u></p> <p><u>ESS1.2.10b Describe what a fault is.</u>            NOTE: A fault is the actual crack in the Earth's crust where rock has fractured due to movement. The fault is not actually what moves. Rocks move along faults past each other. Movement occurs along faults.</p> <p><u>ESS1.2.10c Recognize what happens when rocks move along a fault (crack in Earth's crust) during an earthquake.</u>            (Suggestions: Observe/feel/hear videos, pictures, models, simulate earth questions, model of a volcano; graham cracker and frosting activity to show faults and movement; create a 'town' between two desks and move desks to simulate earthquake; fossils – plaster of paris; leaf press.)</p>	<p><b><u>ESS1.2.10 Investigate volcanoes, faults and earthquakes and how they are related.</u></b></p> <p>ESS1.2.10a Identify physical properties of volcanoes.</p> <p>ESS1.2.10b <u>Describe what a fault is.</u>            NOTE: A fault is the actual cracks in the Earth's crust where rock has fractured due to movement. The fault is not actually what moves. Rocks move along faults past each other. Movement occurs along faults.</p> <p>ESS1.2.10c Recognize what happens when rocks move along a fault (crack in Earth's crust) during an earthquake.</p> <p><u>ESS1.2.10d Recognize the relationships between and among volcanoes, earthquakes and faults.</u>            (Suggestions: Observe/feel/hear videos, pictures, models, simulate earth questions, model of a volcano; graham cracker and frosting activity to show faults and movement; create a 'town' between two desks and move desks to simulate earthquake; fossils – plaster of paris; leaf press; on a map place pictures of volcanoes and earthquakes to find the connection; build a tower out of blocks and knocking it down to simulate the effects of an earthquake.)</p>

	<p><b><u>ESS1.2.11 Identify geologic processes of fossil formation.</u></b></p> <p><u>ESS1.2.11a Identify how fossils form.</u></p> <p><u>ESS1.2.11b Distinguish between fossils and other objects.</u></p> <p>(Suggestion: Make a fossil with plaster and/or crayon rubbing.)</p>	<p><b>ESS1.2.11 Identify geologic processes of fossil formation.</b></p> <p>ESS1.2.11a Identify how fossils form.</p> <p>ESS1.2.11b Distinguish between fossils and other objects.</p> <p>(Suggestion: Make a fossil with plaster and/or crayon rubbing.)</p> <p><b><u>ESS1.2.12 Identify the patterns of landforms and geologic processes.</u></b></p> <p><u>ESS1.2.12a Identify fossil patterns.(e.g., similar fossils from different parts of the world)</u></p> <p><u>ESS1.2.12b Identify patterns of earthquake, fault, and volcano location (e.g. ring of fire, mid-Atlantic Ridge).</u></p> <p>(Suggestions: Compare similar fossils that were found at different locations; plot volcano and earthquake locations on a map of the world.)</p>
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# Weather

**ESS1 – The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.**

**2. Students demonstrate an understanding of processes and change over time within earth systems.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>ESS1.2.13 Identify weather and seasonal changes throughout the year.</b></p> <p>ESS1.2.13a Use observations and data collection tools (e.g., wind vane, thermometer, rain gauge) to describe daily weather. (e.g., clouds, hot, cold, wet, dry)</p> <p>ESS1.2.13b Identify each season.</p> <p>ESS1.2.13c Describe each season.</p> <p>(Suggestion: Keep a record of seasonal changes; identify the season when given a picture showing something seasonally obvious – like snow for winter, baby birds for spring; keep a daily record of air temperature, cloud observations, and precipitation.)</p>	<p><b>ESS1.2.13 Identify weather and seasonal changes throughout the year.</b></p> <p>ESS1.2.13a Use observations and <u>one or more</u> data collection tools (e.g., wind vane, thermometer, rain gauge) to describe daily weather. (e.g., clouds, <u>cloud types</u>, hot, cold, wet, dry, <u>humidity</u>, <u>precipitation</u>)</p> <p>ESS1.2.13b Identify each season.</p> <p>ESS1.2.13c Describe each season.</p> <p><u>ESS1.2.13d Identify weather data collection tools (e.g. thermometer, weather/wind vane, rain gauge, wind sock, barometer) and what data they are used to collect.</u></p> <p>(Suggestions: Keep a daily record of air temperature, cloud observations, and precipitation, relative humidity by using a weather station; check the weather report in the newspaper each day; create weather instruments.)</p>	<p><b>ESS1.2.13 Identify weather and seasonal changes throughout the year.</b></p> <p>ESS1.2.13a Use observations and <u>two or more</u> data collection tools (e.g., wind vane, thermometer, rain gauge) to describe daily weather (e.g., clouds, cloud types, hot, cold, wet, dry, humidity, precipitation).</p> <p>ESS1.2.13b Identify each season.</p> <p>ESS1.2.13c Describe each season.</p> <p>ESS1.2.13d Identify weather data collection tools (e.g. thermometer, weather/wind vane, rain gauge, wind sock, barometer) and what data they are used to collect.</p> <p><u>ESS1.2.13f Predict weather based on gathered data.</u></p> <p>(Suggestions: Keep a daily record of air temperature, cloud observations, and precipitation, relative humidity by using a weather station; check the weather report in the newspaper each day; create weather instruments.)</p>

	<p><b>ESS1.2.14 Associate air pressure with the weight of air on the earth.</b></p> <p><u>ESS1.2.14a Identify that the weight of air varies on different parts of the earth's surface.</u></p> <p>(Suggestion: Pictures of pilots wearing air masks to illustrate air pressure; Mt. Everest climbers; empty container with another container that fits snugly inside – feel the pressure; measure the circumference of a balloon, then place the balloon in hot water then measure the circumference, then place the balloon in ice water and measure the circumference, then compare the sizes.)</p>	<p><b>ESS1.2.14 Associate air pressure with the weight of air on the earth.</b></p> <p>ESS1.2.14a Identify that the weight of air varies on different parts of the earth's surface.</p> <p>ESS1.2.14b <u>Compare differences in air pressure (the weight of air on the earth's surface) with differences in weather.</u></p> <p>(Suggestions: Pictures of pilot in plane w/air mask; scuba diver w/oxygen make; person walking down a street; measure the circumference of a balloon, then place the balloon in hot water then measure the circumference, then place the balloon in ice water and measure the circumference, then compare the sizes; <u>put air in a balloon and place in refrigerator and observe change in volume.</u>)</p> <p><b><u>ESS1.2.15 Recognize that the atmosphere is made up of different layers.</u></b></p> <p>ESS1.2.15a <u>Identify layers of the atmosphere.</u></p> <p>ESS1.2.15b <u>Describe the layers of the atmosphere.</u></p> <p>(Suggestion: Make and label diagrams of the atmospheric layers.)</p>
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# Solar System

**ESS2 – The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.**

**1. Students demonstrate an understanding of our solar system (i.e. earth-moon-sun).**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>ESS2.1.1 Identify the major effects the sun has on the earth.</b></p> <p>ESS2.1.1a Collect data to show that the sun warms the earth during daytime.</p> <p>ESS2.1.1b Collect data to show the difference in temperature between a shady spot and a sunny spot.</p> <p>ESS2.1.1c Describe the differences between night and day.</p> <p>ESS2.1.1d Identify the sun’s position as it changes throughout the day (e.g., sunrise, noon, sunset).</p> <p>(Suggestions: Take the temperature at the same location outside at different times during the day and compare the temperatures, take the temperature in a sunny spot and a shady spot and compare, Keep track of the sun’s position at different times during the day.)</p>	<p><b>ESS2.1.1 Identify the major effects the sun has on the earth.</b></p> <p>ESS2.1.1a Collect data to show that the sun warms the earth during daytime.</p> <p>ESS2.1.1b Collect data to show the difference in temperature between a shady spot and a sunny spot.</p> <p>ESS2.1.1c <u>Describe the night/day differences in temperature to the sun’s position in the sky.</u></p> <p>ESS2.1.1d Identify the sun’s position as it changes throughout the day (e.g., sunrise, noon, sunset, dawn, dusk).</p> <p>(Suggestion: Record temperature every hour in their weather station; record where the sun is in the sky at different times during the day; compare the temperature when the sun is behind clouds to the temperature when the sun is shining.)</p>	<p><b>ESS2.1.1 Identify the major effects the sun has on the earth.</b></p> <p>ESS2.1.1a Collect data to show that the sun warms the earth during daytime.</p> <p>ESS2.1.1b Collect data to show the difference in temperature between a shady spot and a sunny spot.</p> <p>ESS2.1.1c Describe the night/day differences in temperature to the sun’s position in the sky.</p> <p>ESS2.1.1d Identify the sun’s position as it changes throughout the day (e.g., sunrise, noon, sunset, dawn, dusk).</p> <p>(Suggestion: Record temperature every hour in their weather station; record where the sun is in the sky at different times during the day; compare the temperature when the sun is behind clouds to the temperature when the sun is shining.)</p> <p>ESS2.1.1e <u>Identify the sun as a star.</u></p> <p>ESS2.1.1f <u>Compare the sun to other stars.</u></p>

<p><b>ESS2.1.2 Identify the moon.</b></p> <p>ESS2.1.2a Distinguish the moon from other objects in the sky (e.g., stars, planets).</p> <p>ESS2.1.2b Identify changes in the moon's appearance.</p> <p>(Suggestion: Identify the moon, stars and planets on pictures of the night sky; make models of the moon, planets and sun; record the appearance of the moon each evening.)</p>	<p><b>ESS2.1.2 Identify the moon.</b></p> <p>ESS2.1.2a Distinguish the moon from other objects in the sky.</p> <p><u>(Suggestion: This can be done through tactile models.)</u></p> <p>ESS2.1.2b Identify <u>and record</u> changes in the moon's appearance.</p> <p>(Suggestion: Create an accurate picture of the moon and other nighttime objects in the sky; draw phases of the moon; chart on a class calendar the upcoming phases of the moon; chart on individual calendar the daily/nightly appearances of the moon; draw or cut phases of the moon from a newspaper.)</p> <p><b><u>ESS2.1.3 Identify that Earth is a planet.</u></b></p> <p>ESS2.1.3a <u>Identify that the surface we live on is the surface of the planet Earth.</u></p> <p>ESS2.1.3b <u>Identify that there are other planets in the solar system. e.g., work with globes, and models of the planets in the solar system, research the planets.</u></p>	<p><b>ESS2.1.2 Identify the moon.</b></p> <p>ESS2.1.2a Distinguish the moon from other objects in the sky.</p> <p>(Suggestion: This can be done through tactile models.)</p> <p>ESS2.1.2b Identify and record changes in the moon's appearance.</p> <p>ESS2.1.2c <u>Compare the daily times the moon becomes visible throughout the year.</u></p> <p>(Suggestion: Keep a record of the appearance of the moon and other objects in the sky; draw phases of the moon; cut out pictures of the moon phases from newspapers.)</p> <p><b>ESS2.1.3 Identify that Earth is a planet.</b></p> <p>ESS2.1.3a Identify that the surface we live on is the surface of the planet Earth.</p> <p>ESS2.1.3b No AAGSE at this grade span.</p> <p>ESS 2.1.3c. <u>Identify at least one characteristic of two or more planets other than Earth (e.g., size, distance from sun, number of moons, color), presence of rings, relative temperature.</u></p>
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## Solar System (continued)

ESS2 – The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.

1. Students demonstrate an understanding of our solar system (i.e. earth-moon-sun).

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
	<p><b><u>ESS2.1.4 Identify parts of the earth-moon-sun system.</u></b></p> <p>ESS1.3.4a <u>Identify the parts of an earth-moon-sun model.</u></p> <p>(Suggestion: Create a model with labels of the earth-moon-sun system; make a mobile.)</p>	<p><b><u>ESS2.1.4 Identify the parts of the earth-moon-sun system and how they move.</u></b></p> <p>ESS2.1.4a Identify the parts of an earth-moon-sun model.</p> <p><b><u>ESS2.1.4b Demonstrate the movements within the earth-moon-sun system.</u></b></p> <p>(Suggestions: Act out the motions within the earth-moon-sun system; create models with movable parts; make a mobile.)</p> <p><b><u>ESS2.1.5. Discuss stories about understandings of the solar system by different cultures and by scientists at different times in history.</u></b></p> <p>(Suggestion: Read stories from many cultures about the solar system.)</p> <p><b><u>ESS2.1.6 Recognize the impact of gravity on objects in the solar system.</u></b></p> <p>ESS2.1.6a Define gravity.</p> <p>ESS2.1.6b Recognize examples of the actions of gravity.</p> <p>(Suggestion: Drop different objects; observe what happens, and record results of these investigations.)</p>

# Universe

**ESS3 – The origin and evolution of galaxies and the universe demonstrate fundamental principles of physical science across vast distances and time.**

**1. Students demonstrate an understanding of the origin and evolution of stars.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
	<p><b><u>ESS3.1.1 Identify stars.</u></b></p> <p>ESS3.1.1a Distinguish <u>stars from other objects in the sky. (e.g., moon, planets).</u></p> <p>ESS3.1.1b <u>Identify one or more constellations.</u></p> <p>(Suggestions: Create tin can or construction paper constellations; expose students to various cultural stories/legends that explain where the constellations came from; create a night-time sky model that includes stars.)</p>	<p><b><u>ESS3.1.1 Identify stars.</u></b></p> <p>ESS3.1.1a Distinguish stars from other objects in the sky. (e.g., moon, planets).</p> <p>ESS3.1.1b Identify <u>two or more</u> constellations.</p> <p>(Suggestions: Create tin can or construction paper constellations; expose students to various cultural stories/legends that explain where the constellations came from; create a night-time sky that includes stars.)</p> <p>ESS3.1.1c Compare two or more constellations.</p> <p>ESS3.1.1d Identify that star brightness changes over time.</p> <p>ESS3.1.1e Identify that star size changes over time.</p>

## EARTH SPACE SCIENCE GLOSSARY:

- **Condensation:** the process by which water vapor becomes liquid water
- **Deposition:** when transported earth materials are dropped in another location
- **Erosion:** movement of weathered rock and soil
- **Evaporation:** the process by which liquid water becomes a gas (vapor)
- **Faults:** fracture or system of fractures that form in the earth's crust when there is great stress
- **Fossil:** traces or remains of organisms that lived in the past
- **Fossil formation:** fossils can form when the original is preserved (in ice or peat bogs), when hard parts are altered, when molds and casts form where the organism has decayed in sediments, when organisms leave traces such as footprints and waste materials
- **Gravity:** a force that acts to pull objects together
- **Ground water:** water under the land surface that is stored in rock pores
- **Hypothesis:** a tentative explanation used as a basis for further investigation
- **Igneous rock:** a rock that forms when melted rock (lava or magma) cools and crystallizes
- **Metamorphic rock:** a rock that forms when other rocks are changed by intense heat and pressure
- **Physical property:** attribute of an object or a substance that can be observed and/or measured without changing the object or substance into something else
- **Precipitation:** any form of water that falls to earth from a cloud
- **Run off:** water that flows over the land surface outside of a channel
- **Sediment:** pieces of rocks
- **Sedimentary rock:** a rock that forms through lithification (cementation) of sediments or through chemical processes such as evaporation
- **Stream table:** a large rectangular container that is used to model the effects of water on sediments (sediment is placed in the bottom, and water flows over the sediment to model erosion – can be obtained from scientific supply houses or borrowed from earth science teachers)
- **Transpiration:** loss of water vapor from plants, usually through the stomata on the leaves. This process causes water to move through the plant by way of the roots, stems, and leaves.
- **Water cycle:** a model describing the movement of water in, on, and above the earth

## Domain: Physical Science

### Matter

**PS1 – All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).**

**1. Students demonstrate an understanding of the characteristic properties of matter.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>PS1.1.1 Distinguish the physical properties of matter.</b></p> <p>PS1.1.1a Identify which object in a group has a specific physical property. (e.g. size, shape, color, texture, smell, weight)</p> <p>PS1.1.1b Identify one or more physical properties of common objects.</p> <p>PS1.1.1c Match objects using one physical property. (e.g. size, shape, color, texture, smell, weight)</p> <p>PS1.1.1d Compare objects using one physical property. (e.g. size, shape, color, texture, smell, weight, mass)</p> <p>PS1.1.1e Use observations and data collection tools (e.g., timer, balance scale, ruler) to sort objects into two groups using one physical property. (e.g., size, shape, color, texture, smell, weight).</p>	<p><b>PS1.1.1 Distinguish the physical properties of matter.</b></p> <p>PS1.1.1a Identify which object in a group has a specific physical property. (e.g., size, shape, color, texture, smell, weight, etc.)</p> <p>PS1.1.1b Identify <u>two or more</u> physical properties of common objects.</p> <p>PS1.1.1c Match objects using <u>one or more</u> physical properties. (e.g. size, shape, color, texture, smell, weight, <u>temperature</u>)</p> <p>PS1.1.1d Compare objects using <u>one or more</u> physical properties. (e.g. size, shape, color, texture, smell, weight, mass, <u>temperature</u>)</p> <p>PS1.1.1e Use observations and data collection tools (e.g., timer, balance scale, ruler, thermometer) to sort objects into groups using <u>one or more</u> physical properties. (e.g., size, shape, color, texture, smell, weight, <u>temperature</u>).</p>	<p><b>PS1.1.1 Distinguish the physical properties of matter.</b></p> <p>PS1.1.1a Identify which object in a group has a specific physical property. (e.g., size, shape, color, texture, smell, weight, mass, etc.)</p> <p>PS1.1.1b Identify two or more physical properties of common objects.</p> <p>PS1.1.1c Match objects using <u>two or more</u> physical properties. (e.g. size, shape, color, texture, smell, weight, temperature, <u>flexibility</u>)</p> <p>PS1.1.1d Compare objects using <u>two or more</u> physical properties. (e.g. size, shape, color, texture, smell, weight, mass, temperature, <u>flexibility</u>)</p> <p>PS1.1.1e Use observations and data collection tools (e.g., timer, balance scale, ruler, thermometer, spring scale) to sort objects into groups using <u>two or more</u> physical properties (e.g., size, shape, color, texture, smell, weight, temperature, <u>flexibility</u>).</p> <p>PS1.1.1f <u>Indicate which object from a group of two or three objects has the greater density.</u> (As determined from 1.1.1g, density is mass/volume)</p> <p>PS1.1.1g <u>Compare the characteristic properties of two substances (e.g. density, freezing/melting point, boiling point)</u></p> <p>PS1.1.1h <u>Describe why objects are grouped together.</u></p>

	<p><b>PS1.1.2 Identify changes in the physical properties of matter.</b></p> <p>PS1.1.2a Identify physical changes (e.g. freezing, melting, boiling, tearing paper).</p>	<p><b>PS1.1.2 Identify changes in the physical properties of matter.</b></p> <p>PS1.1.2a Identify physical changes (e.g. freezing, melting, boiling, tearing paper).</p> <p>PS1.1.2b <u>Describe physical changes.</u></p>
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## Matter

**PS1 – All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).**

**2. Students demonstrate an understanding of states of matter.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>PS1.2.1 Recognize states of matter.</b></p> <p>PS1.2.1a Recognize a solid.</p> <p>PS1.2.1b Recognize a liquid.</p> <p>PS1.2.1c Recognize a gas.</p>	<p><b>PS1.2.1 <u>Compare</u> states of matter.</b></p> <p>PS1.2.1a Recognize a solid.</p> <p>PS1.2.1b Recognize a liquid.</p> <p>PS1.2.1c <u>Recognize a gas.</u></p> <p>PS1.2.1d <u>Compare the states of matter (e.g. solids have a definite shape and definite volume, liquids have a definite volume but take the shape of their container, gases have no definite volume or shape).</u></p> <p><b>PS1.2.2 <u>Identify how states of matter can change.</u></b></p> <p>PS1.2.2a <u>Identify how states of matter can change. (e.g. solid to liquid - melting, liquid to gas - vaporization, gas to liquid - condensation, liquid to solid - freezing etc.)</u></p>	<p><b>PS1.2.1 <u>Classify</u> states of matter.</b></p> <p>PS1.2.1a Recognize a solid.</p> <p>PS1.2.1b Recognize a liquid.</p> <p>PS1.2.1c Recognize a gas.</p> <p>PS1.2.1d Compare the states of matter (e.g. solids have a definite shape and definite volume, liquids have a definite volume but take the shape of their container, gases have no definite volume or shape).</p> <p>PS1.2.1e <u>Identify a solid.</u></p> <p>PS1.2.1f <u>Identify a liquid.</u></p> <p>PS1.2.1g <u>Identify a gas.</u></p> <p>PS1.2.1h <u>Classify solids, liquids, and gases.</u></p> <p><b>PS1.2.2 Identify how states of matter can change.</b></p> <p>PS1.2.2a Identify how states of matter can change (e.g. solid to liquid - melting, liquid to gas - vaporization, gas to liquid - condensation, liquid to solid - freezing etc.)</p> <p>PS1.2.2b <u>Identify that states of matter can change by adding or subtracting energy (e.g. heating and cooling).</u></p>

## Matter

**PS1 – All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).**

**3. Students demonstrate an understanding of conservation of matter.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>PS1.3.1 Demonstrate an understanding of mass.</b></p> <p>PS1.3.1a Measure the masses of objects using balances or see-saws.</p> <p>PS1.3.1b Identify that some objects are more massive than others.</p> <p>PS1.3.1c Measure the masses of a whole object and parts of that whole object.</p> <p>PS1.3.1d Recognize that the mass of a whole object is greater than the mass of each part of that whole object.</p> <p>PS1.3.1e Compare the masses of objects measured.</p>	<p><b>PS1.3.1 Demonstrate an understanding of mass.</b></p> <p>PS1.3.1a Measure the masses of objects using balances or see-saws.</p> <p>PS1.3.1b Identify that some objects are more massive than others.</p> <p>PS1.3.1c Measure the masses of a whole object and parts of that whole object.</p> <p>PS1.3.1d <u>Identify</u> that the mass of a whole object is greater than the mass of each part of that whole object.</p> <p>PS1.3.1e Compare the masses of objects measured.</p>	<p><b>PS1.3.1 Demonstrate an understanding of mass.</b></p> <p>PS1.3.1a Measure the masses of objects using balances or see-saws.</p> <p>PS1.3.1b <u>Describe</u> that some objects are more massive than others.</p> <p>PS1.3.1c Measure the masses of a whole object and parts of that whole object.</p> <p>PS1.3.1d <u>Describe</u> that the mass of a whole object is greater than the mass of each part of that whole object.</p> <p>PS1.3.1e Compare the masses of objects measured.</p> <p>PS1.3.1f <u>Compare the masses of objects of equal volume made of different substances.</u></p> <p><b>PS1.3.2 <u>Identify conservation of matter.</u></b></p> <p>PS1.3.2a <u>Identify that the mass of a whole object is always the same as the sum of the masses of its parts.</u></p> <p>PS1.3.2b <u>Show that the mass of an object is the same before and after a physical change.</u></p>

## Matter

**PS1 – All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).**

**4. Students demonstrate an understanding of the structure of matter.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
	<p><b>PS1.4.1 Identify categories of matter.</b></p> <p><u>PS1.4.1a Identify substances (e.g. sugar, salt, water) that can be combined to make mixtures or solutions.</u></p> <p>NOTE: Salt, sugar and water are compounds which means they are substances made of two or more elements which have combined chemically.</p> <p><u>PS1.4.1b Identify a mixture (e.g. peas and carrots, rocks and leaves, trail mix).</u></p> <p><u>PS1.4.1c Identify solutions (e.g. Koolade, lemonade, hot chocolate).</u></p> <p><u>PS1.4.1d Identify one or more physical changes (e.g. tearing paper, breaking a pencil, food color in water, evaporation, condensation, freezing or melting).</u></p>	<p><b>PS1.4.1 Identify categories of matter.</b></p> <p>PS1.4.1a Identify substances. (e.g., sugar, salt, water) that can be combined to make mixtures or solutions.</p> <p>NOTE: Salt, sugar and water are compounds which means they are substances made of two or more elements which have combined chemically.</p> <p>PS1.4.1b Identify a mixture.(e.g., peas and carrots, rocks and leaves, trail mix).</p> <p>PS .4.1c Identify solutions (e.g. Koolade, lemonade, hot chocolate).</p> <p>PS1.4.1d Identify <u>two or more</u> physical changes (e.g. tearing paper, breaking a pencil, food color in water, evaporation, condensation, freezing or melting).</p> <p>PS1.4.1e <u>Sort substances into mixtures, solutions, and substances that were combined to make them.</u></p> <p>PS1.4.1f <u>Recognize compounds. (e.g.. sugar is a compound: heat it and it burns (chemical change) into a new substance (carbon, water vapor and carbon dioxide.)</u></p> <p><b>PS1.4.2 Distinguish between metals and nonmetals.</b></p> <p>PS1.4.2a <u>Recognize a metal</u></p> <p>PS1.4.2b <u>Recognize a nonmetal</u></p> <p>PS1.4.2c <u>Select a metal from a group of one metal and several nonmetals.</u></p> <p>PS1.4.2d <u>Select a nonmetal from a group of one nonmetal and several metals.</u></p>

# Energy

**PS2 – Energy is necessary for change to occur in matter. Energy can be stored, transferred, and transformed, but cannot be destroyed.**

**1. Students demonstrate an understanding of energy.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>PS2.1.1 Identify forms of energy.</b></p> <p>PS2.1.1a Identify light energy. (e.g., Identify shadows as places where light energy is blocked; make shadows with flashlights.)</p> <p>PS2.1.1b Identify sound energy. (e.g., Identify sound vibrations as sound energy by plucking guitar strings, feeling drums vibrate, feeling cell phones vibrate, seeing salt vibrate on a drum.)</p> <p>PS2.1.1c Identify heat energy. (e.g., Identify the sun’s feeling of warmth as heat energy. Take the students outside on a sunny day and use a solar cooker to cook hot dogs.)</p> <p>PS2.1.1d Identify electrical energy. (e.g., Identify that hair stands on end when rubbed with a balloon because of electrical energy - static electricity. Identify a static electricity shock from a carpet as electrical energy.)</p> <p>PS2.1.1e Identify mechanical energy. (R Identify mechanical energy in the movements of a wheel chair or hand mixer.)</p>	<p><b>PS2.1.1 Identify forms of energy.</b></p> <p>PS2.1.1a Identify light energy. (e.g., Identify shadows as places where light energy is blocked; make shadows with flashlights.)</p> <p>PS2.1.1b Identify sound energy. (e.g., Identify sound vibrations as sound energy by plucking guitar strings, feeling drums vibrate, feeling cell phones vibrate, seeing salt vibrate on a drum.)</p> <p>PS2.1.1c Identify heat energy. (e.g., Identify the sun’s feeling of warmth as heat energy. Take the students outside on a sunny day and use a solar cooker to cook hot dogs.)</p> <p>PS2.1.1d Identify electrical energy. (e.g., Identify that hair stands on end when rubbed with a balloon because of electrical energy - static electricity. Identify static electricity shock from a carpet as electrical energy.)</p> <p>PS2.1.1e Identify mechanical energy. (e.g., Identify mechanical energy in the movements of a wheel chair or hand mixer.)</p> <p><b>PS2.1.2 Recognize different magnitudes of energy.</b></p> <p>PS2.1.2a <u>Recognize differences in heat absorption.</u> (Suggestion: Feel how a dark material becomes hotter than a light material when they are left in the sunlight for the same amount of time.)</p> <p>PS2.1.2b <u>Recognize differences in sound energy.</u> (e.g., Hitting a drum softly produces small vibrations, hitting a drum hard produces larger vibrations.)</p>	<p><b>PS2.1.1 Describe forms of energy.</b></p> <p>PS2.1.1a <u>Describe</u> light energy. (e.g., shadows as places where light energy is blocked; make shadows with flashlights.)</p> <p>PS2.1.1b <u>Describe</u> sound energy. (e.g., sound vibrations as sound energy by plucking guitar strings, feeling drums vibrate, feeling cell phones vibrate, seeing salt vibrate on a drum.)</p> <p>PS2.1.1c <u>Describe</u> heat energy. (e.g., the sun’s feeling of warmth as heat energy. Take the students outside on a sunny day and use a solar cooker to cook hot dogs.)</p> <p>PS2.1.1d <u>Describe</u> electrical energy. (e.g., hair that stands on end when rubbed with a balloon because of electrical energy - static electricity. A static electricity shock from a carpet as electrical energy.)</p> <p>PS2.1.1e <u>Describe</u> mechanical energy. (e.g., mechanical energy in the movements of a wheel chair or hand mixer.)</p> <p><b>PS2.1.2 Identify different magnitudes of energy.</b></p> <p>PS2.1.2a <u>Identify</u> differences in heat absorption. (Suggestion: Feel how a dark material becomes hotter than a light material when they are left in the sunlight for the same amount of time.)</p> <p>PS2.1.2b <u>Identify</u> differences in sound energy. (e.g., Hitting a drum softly produces small vibrations, hitting a drum hard produces larger vibrations.)</p>

	<p>PS2.1.2c <u>Recognize differences in mechanical energy.</u> (e.g. toy car moving slowly versus a toy car moving quickly)</p>	<p>PS2.1.2c <u>Identify differences in mechanical energy.</u> (e.g. toy car moving slowly versus a toy car moving quickly)</p> <p><b><u>PS2.1.3 Recognize that energy can be transformed from one form to another.</u></b></p> <p>PS2.1.3a <u>Recognize one or more energy transformations that occur in daily life.</u> (e.g., <u>Electrical energy is changed to light and heat energy in a lamp; energy in gasoline is changed to mechanical energy when a car moves.</u>)</p>
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## Energy

PS2 – Energy is necessary for change to occur in matter. Energy can be stored, transferred, and transformed, but cannot be destroyed.

2. Students demonstrate an understanding of physical and chemical changes.

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
	<p><b><u>PS2.2.1 Recognize physical and chemical changes.</u></b></p> <p>PS2.2.1a <u>Identify physical changes (e.g., tearing paper, mixing dry ingredients of a recipe, mixing different objects together).</u></p> <p>PS2.2.1b <u>Identify chemical changes (e.g., burning a piece of paper, a nail rusting, baking the ingredients of a cake, leaves composting down to become soil).</u></p>	<p><b><u>PS2.2.1 Identify physical and chemical changes.</u></b></p> <p>PS2.2.1a Identify physical changes (e.g., tearing paper, mixing dry ingredients of a recipe, mixing different objects together).</p> <p>PS2.2.1b Identify chemical changes (e.g., burning a piece of paper, a nail rusting, baking the ingredients of a cake, leaves composting down to become soil).</p> <p>PS2.2.1c <u>Identify that in a physical change the substance stays the same although the appearance might change.</u></p> <p>PS2.2.1d <u>Identify that when chemical changes occur the substance changes into something different (a new substance with new and different characteristics).</u></p>

## Forces and Motion

**PS3 – The motion of an object is affected by forces.**

**1. Students demonstrate an understanding of motion.**

Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>PS3.1.1 Describe the relationship between force and motion.</b></p> <p>PS3.1.1a Recognize something as moving or not moving.</p> <p>PS3.1.1b Identify something as moving or not moving.</p> <p>PS3.1.1c Make something move pushing or pulling (applying force).</p>	<p><b>PS3.1.1 Describe the relationship between force and motion.</b></p> <p>PS3.1.1a Recognize something as moving or not moving.</p> <p>PS3.1.1b Identify something as moving or not moving.</p> <p>PS3.1.1c Make something move by pushing or pulling (applying force).</p> <p>PS3.1.1d <u>Identify the initial and final positions of an object that moves.</u></p> <p>PS3.1.1e <u>Identify that objects can move in different directions (e.g., horizontally, vertically, forward, backward)</u></p> <p>PS3.1.1f <u>Identify an object changing direction.</u></p> <p>PS3.1.1g <u>Identify one object moving faster/slower (speed) than another object.</u></p> <p>PS3.1.1h <u>Describe how a different amount of force on the same object causes different amounts or speeds of movement.</u> (e.g., a harder push or pull)</p>	<p><b>PS3.1.1 <u>Identify</u> the relationship between force and motion.</b></p> <p>PS3.1.1a Recognize something as moving or not moving.</p> <p>PS3.1.1b Identify something as moving or not moving.</p> <p>PS3.1.1c Make something move by pushing or pulling (applying force).</p> <p>PS3.1.1d Identify the initial and final positions of an object that moves.</p> <p>PS3.1.1e Identify that objects can move in different directions (e.g., horizontally, vertically, forward, backward)</p> <p>PS3.1.1f Identify an object changing direction.</p> <p>PS3.1.1g Identify one object moving faster/slower (speed) than <u>other objects.</u></p> <p>PS3.1.1h Describe how a different amount of force on the same object causes different amounts or speeds of movement. (e.g., a harder push or pull)</p> <p>PS3.1.1i <u>Predict the direction that an object will or will not move when a force (push or pull) is applied to it.</u></p>

## Forces and Motion

PS3 – Motion of an object is affected by forces.		
2. Students demonstrate an understanding of magnetic force.		
Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>PS3.2.1 Identify magnetic forces.</b></p> <p>PS3.2.1a Identify objects that are or are not attracted to magnets.</p>	<p><b>PS3.2.1 Identify characteristics of magnetic forces.</b></p> <p>PS3.2.1a Identify objects that are and are not attracted to magnets.</p> <p>PS3.2.1b <u>Sort objects into those that are attracted to magnets and those that are not attracted to magnets.</u></p> <p>PS3.2.1c <u>Predict whether an object will be attracted to a magnet.</u></p> <p>PS3.2.1d <u>Recognize that magnets have poles that repel and attract each other.</u></p>	<p><b>PS3.2.1 Identify characteristics of magnetic forces.</b></p> <p>PS3.2.1a Identify objects that are and are not attracted to magnets.</p> <p>PS3.2.1b Sort objects into those that are attracted to magnets and those that are not attracted to magnets.</p> <p>PS3.2.1c Predict whether an object will be attracted to a magnet.</p> <p>PS3.2.1d Identify that magnets have poles that repel and attract each other.</p> <p>PS3.2.1e <u>Recognize that magnets have different strengths.</u> (Suggestion: Work with two magnets of different strengths and compare what they can pick up.)</p>

## Forces and Motion

PS3 – The motion of an object is affected by forces.		
3. Students demonstrate an understanding of gravitational force.		
Grade Span (K-4)	Grade Span (5-8)	Grade Span (HS)
<p><b>PS3.3.1 Recognize the effect of gravity on objects.</b></p> <p>PS3.3.1a Recognize that objects fall unless something is holding them up.</p>	<p><b>PS3.3.1 Recognize the effect of gravity on objects.</b></p> <p>PS3.3.1a Recognize that objects fall <u>to the earth</u> unless something is holding them up.</p>	<p><b>PS3.3.1 <u>Identify</u> the effect of gravity on objects.</b></p> <p>PS3.3.1a Recognize that objects fall to the earth unless something is holding them up.</p> <p>PS3.3.1b <u>Identify that objects fall because of the pull of the Earth's gravity.</u></p>

## PHYSICAL SCIENCE GLOSSARY

- **Balance:** an instrument used to measure the mass of an object
- **Characteristic property:** quality of matter that helps identify or classify matter. Characteristic properties can be physical or chemical in nature (e.g., density, melting point, reactivity).
- **Chemical change:** when one or more substances are changed into new substance(s) with new and different properties
- **Chemical property:** a characteristic of matter that describes a substance's ability to be involved in chemical reactions
- **Compound:** matter that is made of two or more elements that are chemically combined. Cannot be separated by physical means
- **Condensation:** the physical change of matter going from a gaseous state to a liquid state
- **Evaporation:** vaporization that occurs only at the surface of a liquid
- **Gas:** matter that has no definite shape or volume
- **Liquid:** matter that has a definite volume but takes the shape of the container holding it
- **Mass:** amount of matter in something
- **Matter:** anything that has mass and takes up space
- **Mixture:** a combination of two or more substances that are not combined chemically but can be separated by physical means (beach sand, peas and carrots)
- **Physical change:** a change of matter from one form to another without a change in chemical properties
- **Physical property:** a characteristic of matter that does not involve a chemical change, such as density, color or hardness
- **Pure substance:** substance whose parts are identical throughout
- **Scale:** an instrument used to measure the weight of an object
- **Solid:** matter that has a definite shape and volume
- **Solution:** homogenous mixture in which one substance dissolves into another
- **Vaporization:** the physical change of a liquid to a gas
- **Weight:** measure of the force of gravity on an object.