

## 2nd Grade Science Year-at-a-Glance

Interdependent Relationships in Ecosystems	Structure and Properties of Matter	Earth's Systems:	Earth's Systems: Processes that Shape the Earth
September-November	December-February	March-April	April-June
2-LA2-1 (LS2.A)	2-PS1-1 (PS1.A)	2-ESS2-1 (ESS2.A)	2-ESS1-1 (ESS1.C)
2-LS2-2 (LS2.A) (ETS1.B)	2-PS1-2 (PS1.A)	2-ESS2-2 (ESS2.B)	2-ESS2-1 (ESS2.A)
2-LS4-1 (LS4.D)	2-PS1-3 (PS1.A)	2-ESS2-3 (ESS2.C)	2-ESS2-2 (ESS2.B)
	2-PS1-4 (PS1.B)		2-ESS2-3 (ESS2.C)

**Standards are listed in a numerical order only and may be taught in any order within the unit.**

\*The standards listed in red are the Disciplinary Core ideas as they relate to the Performance Expectations within the units.

**NOTE: The Science and Engineering Practices are interwoven and should be addressed throughout the year in as many different units and tasks as possible in order to stress the natural connections that exist among mathematical concepts.**

## Science Curriculum - 2nd Grade

### Unit 1 Interdependent Relationships in Ecosystems

#### Performance Expectation(s)

**2-LS2-1.** Plan and conduct an investigation to determine if plants need sunlight and water to grow.  
[Assessment Boundary: Assessment is limited to testing one variable at a time.]

**2-LS2-2.** Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.\*

**2-LS4-1.** Make observations of plants and animals to compare the diversity of life in different habitats.  
[Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.][Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

#### Essential Vocabulary

seed dispersal  
habitats  
pollinate  
interdependent  
plants

#### Essential Question(s)

- What do plants need to live and grow?
- How do plants depend on animals to pollinate or disperse seeds?
- How are plants and animals different within specific habitats?
- There are many different habitats around the world, how are the living things found in those habitats similar or different?

#### Learning Plan

Science/Engineering Practices	Disciplinary Core Idea(s)	Crosscutting Concept(s)
<p><b>Developing and Using Models</b> Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.</p> <ul style="list-style-type: none"> <li>● Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)</li> </ul> <p><b>Planning and Carrying Out Investigations</b> Planning and carrying out</p>	<p><b>LS2.A. Interdependent Relationships in Ecosystems</b></p> <ul style="list-style-type: none"> <li>● Plants depend on water and light to grow. (2-LS2-1)</li> <li>● Plants depend on animals for pollination or to move their seeds around.(2-LS2-2)</li> </ul> <p><b>LS4.D. Biodiversity and Humans</b></p> <ul style="list-style-type: none"> <li>● There are many different kinds of living things in any area, and they exist in different places on land and in water.(2-LS4-1)</li> </ul> <p><b>TS1.B: Developing Possible Solutions</b></p> <ul style="list-style-type: none"> <li>● Designs can be conveyed through sketches, drawings, or physical models. These</li> </ul>	<p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>● Events have causes that generate observable patterns. (2-LS2-1)</li> </ul> <p><b>Structure and Function</b></p> <ul style="list-style-type: none"> <li>● The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)</li> </ul>

investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1)
- Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)

### **Analyzing and Interpreting Data**

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

representations are useful in communicating ideas for a problem's solutions to other people. (secondary to 2-LS2-2)

### **Resources and Links**

#### **Videos**

Magic School Bus Goes to Seed  
Magic School Bus Gets Planted  
Magic School Bus Exploring the World of Animals  
BrainPop Jr.: Parts of a Plant  
BrainPop Jr. Plant Adaptation

#### **Other Resources**

### Mystery Science-

Plant Adventures, Mystery 1: How did a tree travel halfway around the world?

Plant Adventures, Mystery 2: Do plants eat dirt?

Plant Adventures, Mystery 3: Why do trees grow so tall?

Plant Adventures, Mystery 4: Should you water a cactus?

Plant Adventures, Mystery 5: Where do plants grow best?

- Celery Experiment - recognize that stems take in water  
<https://betterlesson.com/lesson/627685/celery-experiment>
- Nature walk around school to identify different habitats and/or biodiversity.
- White tailed deer game.  
<http://ecosystems.psu.edu/youth/sftrc/lesson-plans/wildlife/k-5/keeping-the-forest-balance>

### **Books**

***Tale of a Tadpole*** by Karen Wallace

***Fish is Fish*** by Leo Lionni

***Crab Moon*** by Ruth Horowitz

***Salamander Rain: A Lake and Pond Journal*** by Kristin Joy Pratt-Serafini

***Birds Build Nests*** by Yvonne Winer, illustrated by Tony Oliver

***Animal Families*** series (12 books total, various authors)

***Butterflies Fly*** by Yvonne Winer, illustrated by Karen Lloyd-Jones

***Grandmother Oak*** by Allison Dagit

***Someday A Tree*** by Bunting

***The Tiny Seed*** by Eric Carle

***Caterpillars*** by Marilyn Singer

***Butterflies*** by Seymour Simon

***Flip, Flop, Fly: Seeds on the Move*** by Joanne Macke

***Who Will Plant a Tree?*** Jerry Pallotta

***The Bee***, Storytown Anthology

### **Summative/Formative Assessment**

#### **Formative**

##### Before

Pre-test – (identifies some key concepts and vocabulary)

KWL charts

Brainstorming

##### During

Vocabulary quiz

Concept maps Identify key concepts

Construct Venn diagrams

Think-pair-shares

Summaries

Foldables (any folded paper or booklet with vocabulary, illustrations, or diagrams)  
Observations

### Summative

After

Post-test

Presentation/Model report using rubric aligned with essential question

### Literacy Standards

**W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS2-1),(2-LS4-1)

**W.2.8** Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1),(2-LS4-1)

**SL.2.5** Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.(2-LS2-2)

### Science Example 1:

#### Math Standards

- **MP.2** Reason abstractly and quantitatively. (2-LS2-1),(2-LS4-1)
- **MP.4** Model with mathematics. (2-LS2-1),(2-LS2-2),(2-LS4-1)
- **MP.5** Use appropriate tools strategically. (2-LS2-1)
- **2.MD.D.10** Draw a picture graph and a bar graph (with single -unit scale) to represent a data set with up to four categories. Solve simple put -together, take - apart, and compare problems. (2-LS2-2),(2-LS4-1)

#### Future Learning

The following disciplinary core ideas are future learning related to concepts in this unit of study.

#### By the end of Grade 3, students know that:

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. Many characteristics of organisms are inherited from their parents.
- Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment.
- Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size.
- Different organisms vary in how they look and function because they have different inherited information. The environment also affects the traits that an organism develops.
- When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.
- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. Sometimes the differences in characteristics between individuals of the

same species provide advantages in surviving, finding mates, and reproducing. For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. Populations live in a variety of habitats, and change in those habitats affects the organisms living there.

• **By the end of Grade 5, students know that:**

- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Either way, they are “consumers.” Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil for plants to use. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.
- Scientists have identified and classified many plants and animals. Populations of organisms live in a variety of habitats, and change in those habitats affects the organisms living there. Humans, like all other organisms, obtain living and nonliving resources from their environments.

**Additional Information**

-NGSS Interactive site: <http://www.nextgenscience.org/search-standards>

**Science Curriculum - 2nd Grade**

**Unit 2**

**Structure and Properties of Matter**

**2-PS1-1** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]

**2-PS1-2** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. \*[Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]

**2-PS1-3** Make observations to construct an evidence based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]

**2-PS1-4** Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

**Performance Expectation(s)**

**2-PS1-1.** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]

**2-PS1-2.** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.\* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]

**2-PS1-3.** Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]

**2-PS1-4.** Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

**Essential Vocabulary**

Classified  
Cool

**Essential Question(s)**

- How are different forms of matter similar and different from one another?
- How do the properties of matter relate to their use.

Freeze Gas Heat Liquid Materials Matter Melt Properties Solid	<ul style="list-style-type: none"> <li>• How can materials be classified?</li> <li>• How does heating or cooling change matter? Can the change be reversed? How?</li> <li>• What is matter made of?</li> </ul>
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**Learning Plan**

Science/Engineering Practices	Disciplinary Idea	Crosscutting Concepts
<p><b>Planning and Carrying Out Investigations</b>            Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</p> <ul style="list-style-type: none"> <li>• Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1)</li> </ul> <p><b>Analyzing and Interpreting Data</b>            Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> <li>• Analyze data from</li> </ul>	<p><b>PS1.A: Structure and Properties of Matter</b></p> <ul style="list-style-type: none"> <li>• Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)</li> <li>• Different properties are suited to different purposes.(2-PS1-2), (2-PS1-3)</li> <li>• A great variety of objects can be built up from a small set of pieces. (2-PS1-3)</li> </ul> <p><b>PS1.B: Chemical Reactions</b></p> <ul style="list-style-type: none"> <li>• Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)</li> </ul>	<p><b>Patterns</b></p> <ul style="list-style-type: none"> <li>• Patterns in the natural and human designed world can be observed. (2-PS1-1)</li> </ul> <p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>• Events have causes that generate observable patterns. (2-PS1-4)</li> <li>• Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)</li> </ul> <p><b>Energy and Matter</b></p> <ul style="list-style-type: none"> <li>• Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3)</li> </ul> <p>-----            ----</p> <p><b>Connections to Engineering, Technology, and Applications of Science</b></p> <ul style="list-style-type: none"> <li>• Influence of Engineering, Technology, and Science on Society and the Natural World Every human - made product is</li> </ul>



<p>tests of an object or tool to determine if it works as intended. (2-PS1-2)</p>		<p>designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (2-PS1-2)</p>
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### Resources and Links

#### Online Simulations

- [Tinkerball](#): Students experiment with different materials to get a bouncing ball to land in a cup.
- [Grouping materials](#): Students sort objects into the materials that they are made of.
- [Sorting materials](#): Students test objects and then sort them into categories.
- [Characteristics of materials](#): Students test whether materials are flexible, waterproof, transparent, and strong.

#### Videos

Magic School Bus, How Water Changes

What in the World is Matter

Bill Nye, What is Matter?

Wild Kratts, various episodes

BrainPop Jr: Changing States of Matter

BrainPop Jr.:Physical and Chemical Changes

#### Other Resources

[Mystery Science-](#)

Properties and Phases of Matter, Mystery 1: Why do we wear clothes?

Properties and Phases of Matter, Mystery 2: Can you fry an egg on a hot sidewalk?

Properties and Phases of Matter, Mystery 3: Why are so many toys made of plastic?

Properties and Phases of Matter, Mystery 4: What materials might be invented in the future?

States of Matter, ABC Ya

#### Books

***Bartholemew and the Oobleck***, Dr. Seuss

***A Drop of Water: A Book of Science and Wonder***, Walter Wick

***Freezing and Melting***, Robin Nelson

***Sorting***, Henry Pluckrose

### Summative/Formative Assessment

**Formative**

### Before

Pre-test - (identify key concepts and vocabulary)

KWL charts

Brainstorming

### During

Vocabulary quiz

Think-pair-shares

Summaries

Foldables (any folded paper or booklet with vocabulary, illustrations, or diagrams)

Observations

### **Summative**

#### After

Post-test

Presentation/Model report using rubric aligned with essential question

### **Literacy Standards**

**NJLSA.W2.** Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content. (1-PS4-2)

**NJLSA.W7.** Conduct short as well as more sustained research projects, utilizing an inquiry based research process, based on focused questions, demonstrating understanding of the subject under investigation. (1-PS4-1, 1-PS4-2, 1-PS4-3, 1-PS4-4)

**NJLSA.W8.** Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism. (1-PS4-1, 1-PS4-2, 1-PS4-3)

**NJLSA.SL1.** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. (1-PS4-1, 1-PS4-2, 1-PS4-3)

To integrate the New Jersey Student Learning Standards for English language arts into this unit, students will participate in shared research and writing projects as they engage in engineering design. Students can use text and media resources to first gather information about devices that use light or sound to communicate over a distance. They can demonstrate understanding of key details in a text by asking and answering questions during class and small-group discussions. In addition, students recall information from experiences or gather information from provided sources to support their thinking as they design and build their device. As students complete their devices, they prepare a sketch or drawing of their device, label the components, and describe, in writing, how each component relates to the function of the device and how their communication device works. Students can also write a "how-to" book describing how to use tools and materials to build their design. Students can also use drawings or other visual displays to accompany their writing in order to describe their thought process and clarify their ideas. Adult support should be provided throughout the process.

### **Math Standards**

**MP.5.** Use appropriate tools strategically. (1-PS4-4)

**1.MD.A.1.** Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4)

**1.MD.A.2.** Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4)

To integrate the New Jersey Student Learning Standards for mathematics into this unit, students need opportunities to use tools to for a variety of purposes as they design and build devices for communicating with light or sound. They can use objects such as interlocking cubes or paper clips to measure length in nonstandard units, expressing their measurements as whole numbers. Students can also use indirect measurement (i.e., compare the lengths of two objects indirectly by using a third object) to order three objects by length. For example, they might compare the lengths of string used for paper-cup telephones and observe and describe the relative effectiveness of each length of string. Students can also use graphs to organize data, such as the number of drumbeats, and then analyze the data to find a pattern. Students will reason abstractly and quantitatively as they organize data into graphs, analyze the data, and use it to solve simple put-together, take-apart, and compare problems.

### **Future Learning**

The following disciplinary core ideas are future learning related to concepts in this unit of study.

**By the end of Grade 3, students know that:**

- Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion.
- The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it.
- Types of Interactions Objects in contact exert forces on each other. Electric, and magnetic forces between a pair of objects do not require that the objects be in contact.
- The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.

**By the end of 5 Grade Span, students know that:**

- Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means.
- Gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.
- Measurements of a variety of properties can be used to identify materials.
- When two or more different substances are mixed, a new substance with different properties may be formed

- No matter what reaction or change in properties occurs, the total weight of the substances does not change.

**Additional Information**

-NGSS Interactive site: <http://www.nextgenscience.org/search-standards>

<b>Science Curriculum - 2nd Grade</b>		
<b>Unit 3 Earth's Systems</b>		
<b>Performance Expectation(s)</b>		
<p><b>2-ESS2-2.</b> Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]</p> <p><b>2-ESS2-3.</b> Obtain information to identify where water is found on Earth and that it can be solid or liquid.</p>		
<b>Essential Vocabulary</b>	<b>Essential Question(s)</b>	
glacier natural resource landform mountain valley ocean river lake	<ul style="list-style-type: none"> <li>● What are the different kinds of land and bodies of water?</li> <li>● How and why have humans tried to slow or prevent wind or water from changing the shape of the land?</li> </ul>	
<b>Learning Plan</b>		
<b>Science/Engineering Practices</b>	<b>Disciplinary Idea</b>	<b>Crosscutting Concepts</b>
<b>Constructing Explanations and Designing Solutions</b> Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. <ul style="list-style-type: none"> <li>● Make observations (firsthand or from media) to construct an evidence-based account for natural</li> </ul>	<b>LS1:A: Structure and Function</b> <ul style="list-style-type: none"> <li>● All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.</li> </ul>	<b>Patterns</b> <ul style="list-style-type: none"> <li>● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2, 1-LS3-1)</li> </ul> <b>Structure and Function</b> <ul style="list-style-type: none"> <li>● The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1, 1-ETS1-2)</li> </ul>

<p>phenomena. (1-LS3-1)</p> <ul style="list-style-type: none"> <li>● Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)</li> </ul> <p><b>Obtaining, Evaluating, and Communicating Information</b> Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> <li>● Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)</li> </ul> <p><b>Asking Questions and Defining Problems</b> Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.</p> <ul style="list-style-type: none"> <li>● Ask questions based on observations to find more information about the natural and/or designed world. (1-ETS1-1)</li> <li>● Define a simple</li> </ul>	<p>(1-LS1-1)</p> <p><b>LS1.B: Growth and Development of Organisms</b></p> <ul style="list-style-type: none"> <li>● Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)</li> </ul> <p><b>LS1.D: Information Processing</b></p> <ul style="list-style-type: none"> <li>● Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)</li> </ul> <p><b>LS3.A: Inheritance of Traits</b></p> <ul style="list-style-type: none"> <li>● Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents. (1-LS3-1)</li> </ul> <p><b>LS3.B: Variation of Traits</b></p> <ul style="list-style-type: none"> <li>● Individuals of the same kind of plant or animal are recognizable as similar but can also vary</li> </ul>	<p>-----</p> <p><b>-----Connections to Engineering, Technology, and Applications of Science</b></p> <p><b>Influence of Engineering, Technology, and Science on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>● Every human-made product is designed by applying some knowledge of the natural world and is built by built using materials derived from the natural world. (1-LS1-1)</li> </ul>
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<p>problem that can be solved through the development of a new or improved object or tool. (1-ETS1-1)</p> <p><b>Developing and Using Models</b> Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.</p> <ul style="list-style-type: none"> <li>● Develop a simple model based on evidence to represent a proposed object or tool. (1-ETS1-2)</li> </ul> <hr/> <p><b>Connections to Nature of Science</b></p> <p><b>Scientific Knowledge is Based on Empirical Evidence</b></p> <ul style="list-style-type: none"> <li>● Scientists look for patterns and order when making observations about the world. (1-LS1-2)</li> </ul>	<p>in many ways. (1-LS3-1)</p> <p><b>ETS1.A: Defining and Delimiting Engineering Problems</b></p> <ul style="list-style-type: none"> <li>● A situation that people want to change or create can be approached as a problem to be solved through engineering. (1-ETS1-1)</li> <li>● Asking questions, making observations, and gathering information are helpful in thinking about problems. (1-ETS1-1)</li> <li>● Before beginning to design a solution, it is important to clearly understand the problem. (1-ETS1-1)</li> </ul> <p><b>ETS1.B: Developing Possible Solutions</b></p> <ul style="list-style-type: none"> <li>● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. (1-ETS1-2)</li> </ul>	
<p style="text-align: center;"><b>Resources and Links</b></p> <p><b>Videos</b> Brainpop Continents and Oceans Brainpop Landforms Magic Schoolbus Wet All Over</p> <p><b>Other Resources</b></p>		

### Mystery Science-

Mystery 1: Mapping, Earth's Surface and Landforms - If you floated down a river, where would you end up?

Streamer, a website created by the US Geological Survey, lets you explore rivers all over the United States.

#### **Books**

*All the Water in the World*, by Lyon, G

*How Do Wind and Water Change Earth?*, by Smith, P.

*Soil Erosion and How to Prevent It*, by Hyde, N

### **Summative/Formative Assessment**

#### **Formative**

##### Before

Pre-test - (identify key concepts and vocabulary)

KWL charts

Brainstorming

##### During

Vocabulary quiz

Summaries

Observations

#### **Summative**

##### After

Post-test

### **Literacy Standards**

**W.2.6** With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS1-1),(2-ESS2-3)

**W.2.8** Recall information from experiences or gather information from provided sources to answer a question. (2-ESS1-1),(2-ESS2-3)

**SL.2.5** Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-ESS2-2)

To integrate the New Jersey Student Learning Standards for English Language Arts into this unit, students need opportunities to read informational texts to gather information about traits and behaviors of organisms. With adult guidance, they identify the main topic, retell key details from texts, and ask and answer questions about key details. Students should also participate in shared research and writing projects. They can gather information from a variety of preselected, grade-level-appropriate texts and resources and use that information to answer questions about traits and behaviors of organisms. In pairs or small groups, students can use pictures and words to



create simple books that describe features that parents and offspring share or behaviors that parents and offspring exhibit that help offspring survive.

#### **Math Standards**

**MP.2** Reason abstractly and quantitatively. (2-ESS1-1),(2-ESS2-1),(2-ESS2-2)

**MP.4** Model with mathematics. (2-ESS1-1),(2-ESS2-1),(2-ESS2-2)

**2.NBT.A.3** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2-ESS2-2)

#### **Future Learning**

**By the end of Grade 3, students will know:**

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.

**By the end of Grade 5, students will know:**

- The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.
- The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year.

#### **Additional Information**

-NGSS Interactive site: <http://www.nextgenscience.org/search-standards>

<b>Science Curriculum - 2nd Grade</b>		
<b>Unit 4</b>		
<b>Earth's Systems: Processes That Shape the Earth</b>		
<b>Performance Expectation(s)</b>		
<p><b>2-ESS1-1.</b> Use information from several sources to provide evidence that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]</p> <p><b>2-ESS2-1.</b> Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.* [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]</p>		
<b>Essential Vocabulary</b>	<b>Essential Question(s)</b>	
erosion ocean peak valley river weathering	<ul style="list-style-type: none"> <li>● Students understand the concept weathering and erosion.</li> <li>● Why do all rivers flow downhill toward the Earth's oceans?</li> <li>● Rivers are strong enough to pick up rocks and push them into the sides of the river and into each other. This breaks the rocks into smaller pieces.</li> </ul>	
<b>Learning Plan</b>		
<b>Science/Engineering Practices</b>	<b>Disciplinary Idea</b>	<b>Crosscutting Concepts</b>
<b>Constructing Explanations and Designing Solutions</b> Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and	<b>ESS1.C: The History of Planet Earth</b> <ul style="list-style-type: none"> <li>● Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1- 1)</li> </ul>	<b>Patterns</b> <ul style="list-style-type: none"> <li>● Patterns in the natural world can be observed. (2-ESS2-2, 2-ESS2-3)</li> </ul> <b>Stability and Change</b> <ul style="list-style-type: none"> <li>● Things may change slowly or rapidly. (2-ESS2-1)</li> </ul>

<p>designing solutions.</p> <ul style="list-style-type: none"> <li>● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)</li> <li>● Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)</li> </ul> <p><b>Obtaining, Evaluating, and Communicating Information</b> Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> <li>● Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)</li> </ul>	<p><b>ESS2.A: Earth Materials and Systems</b></p> <ul style="list-style-type: none"> <li>● Wind and water can change the shape of the land. (2-ESS2-1)</li> </ul> <p><b>ESS2.B: Plate Tectonics and Large-Scale System Interactions</b></p> <ul style="list-style-type: none"> <li>● Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)</li> </ul> <p><b>ESS2.C: The Roles of Water in Earth’s Surface Processes</b></p> <ul style="list-style-type: none"> <li>● Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)</li> </ul> <p><b>ETS1.C: Optimizing the Design Solution</b></p> <ul style="list-style-type: none"> <li>● Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary to 2-ESS2-1)</li> </ul>	<p>-----</p> <p><b>Connections to Engineering, Technology, and Applications of Science</b></p> <p><b>Influence of Engineering, Technology, and Science on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>● Developing and using technology has impacts on the natural world. (2-ESS2-1)</li> </ul> <p>-----</p> <p>Connections to Nature of Science</p> <p><b>Science Addresses Questions About the Natural and Material World</b></p> <ul style="list-style-type: none"> <li>● Scientists study the natural and material world. (2-ESS2-1)</li> </ul>
<p style="text-align: center;"><b>Resources and Links</b></p> <p><b>Videos</b> Brainpop Fast Land Changes Brainpop Slow Land Changes Magic Schoolbus Rocks and Rolls Magic Schoolbus Rock Cycle Magic Schoolbus Blows its Top</p>		

### Other Resources

Mystery Science: Mystery 2 - Why is there sand on the beach?

Mystery Science: Mystery 3 - What is strong enough to make a canyon?

#### Books

***Everybody Needs a Rock*** by Byrd Baylor

***Rocks in His Head*** by Carol Otis Hurst

***And Still the Turtle Watched*** by Sheila MacGill-Callahan

***The Big Rock*** by Bruce Hiscock

***Sand*** by Ellen J. Prager

***Rare Treasure: Mary Anning and her Remarkable Discoveries*** by Don Brown

***Dinosaur Discovery: Everything You Need to Be a Paleontologist*** by Chris McGowan. Illustrated by Erica Lyn Schmidt.

***Thomas the T. Rex: The Journey of a Young Dinosaur to Los Angeles*** by Michael Smith. Illustrated by Gayle Garner Roski.

### Summative/Formative Assessment

#### Formative

##### Before

Pre-test - (identify key concepts and vocabulary)

KWL charts

Brainstorming

##### During

Vocabulary quiz

Summaries

Observations

#### Summative

##### After

Post-test

### Literacy Standards

**RI.2.1** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-ESS1-1)

**RI.2.3** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS1-1),(2-ESS2-1)

**RI.2.9** Compare and contrast the most important points presented by two texts on the same topic. (2-ESS2-1)

**W.2.6** With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS1-1),(2-ESS2-3)

**W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-ESS1-1)

**W.2.8** Recall information from experiences or gather information from provided sources to answer a question. (2-ESS1-1),(2-ESS2-3)

**SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1)

### Math Standards

**MP.2** Reason abstractly and quantitatively. (2-ESS1-1),(2-ESS2-1),(2-ESS2-2)

**MP.4** Model with mathematics. (2-ESS1-1),(2-ESS2-1),(2-ESS2-2)

**MP.5** Use appropriate tools strategically. (2-ESS2-1)

**2.NBT.A** Understand place value. (2-ESS1-1)

**2.NBT.A.3** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2-ESS2-2)

**2.MD.B.5** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. (2-ESS2-1)

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