

# **Cedar Grove School District**

## **Cedar Grove, NJ**

# **2017 | Kindergarten**

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# **Science**



*Approved by the Cedar Grove Board of Education*

Superintendent of Schools  
**Mr. Michael J. Fetherman**

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# Science - Kindergarten

## Course Description

**This curriculum was written in accordance with the  
NEW JERSEY STUDENT LEARNING STANDARDS  
for SCIENCE.**

These standards can be viewed at <http://www.state.nj.us/education/cccs/2016/science/>

# Science - Kindergarten

## Unit 1: Weather

**Instructional Time: 33 Days**

### *Inspire Science Alignment: Weather (70A-97)*

In this unit of study, students will make observations about weather and the seasons. Students will describe different types of weather and name tools used to measure and predict weather. Students will engage in scientific experiences to understand what weather patterns are observed in different seasons and what a weather forecast can tell us about severe weather.

The crosscutting concepts of *cause and effect* and *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *analyzing and interpreting data, asking questions and defining problems, and obtaining, evaluating, and communicating information*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

### Student Learning Objectives

#### New Jersey Student Learning Standards for Science/ NGSS

<b>K-ESS2-1</b>	Use and share observations of local weather conditions to describe patterns over time.
<b>K-ESS3-2</b>	Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.
<b>K-PS3-1</b>	Make observations to determine the effect of sunlight on Earth's surface.
<b>K-PS3-2</b>	Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.
<b>K-2-ETS1-1</b>	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

### Unit Sequence

#### Part A: How do we measure and describe weather?

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence</li> <li>Use weather patterns to make predictions about future weather.</li> <li>Predict effects of wind on various objects.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Observe and use patterns in the natural world as evidence and to describe phenomena.</li> <li>Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.</li> <li>Make observations (e.g., blowing a variety of objects with a fan) to construct an evidence-based account of the effects wind has on various objects.</li> </ul>

### Unit Sequence

#### Part B: What weather patterns do you observe in the seasons?

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence</li> <li>Observe evidence that helps determine the current season.</li> <li>Show changes that occur with each season.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Observe and use patterns in the natural world as evidence and to describe phenomena.</li> <li>Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.</li> <li>Describe of different types of weather.</li> <li>Describe the number of sunny, windy, or rainy days in a month</li> </ul>

### What It Looks Like in the Classroom

In this unit of study, students plan and conduct investigations and make observations as they explore weather patterns. Students will learn that weather can be predicted and sometimes severe weather can happen. Students will perform hands-on investigation to practice making weather predictions. They will also learn ways people

can prepare for severe weather.

Students will answer the question “How do time and weather conditions affect rainfall levels?” and create these conditions with a digital simulation. Students will observe that sunny and overcast conditions produce no rain and that heavy rain gives higher levels of rainfall than light rain. Students will also observe that the longer the rain lasts, the higher the level of rainfall under either rainy condition. Students will answer the question “What is the weather today?” and record the weather for three days. Students will observe and record weather conditions to predict future weather conditions. Students will answer the question “What can the temperature tell us about the weather?” Students will measure the temperature inside and outside. They should see that the temperature correlates to the way the air feels. For example, a higher temperature feels warmer. Students will answer the question “What are the effects of wind on different objects?” Students will observe that wind affects objects differently depending on how heavy objects are.

Students will investigate their environment for evidence about the current season. Students will play detective to find clues about the current season. Clues will vary depending on the time of year the activity is conducted and may include items such as fallen leaves in fall or new flowers in spring. Students will compare a current forecast with a forecast for a different season. Students will compare and contrast forecasts in different seasons and recognize patterns. Students will use X marks to count the number of students who prefer each season. Students will name their favorite season and then use X marks to count how many students prefer each season.

**Performance Expectations**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Asking Questions and Defining Problems</b></p> <ul style="list-style-type: none"> <li>Ask questions based on observations to find out more information about the designed world. <b>(K-ESS3-2)</b></li> </ul> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Make observations (firsthand or from media) to collect data that can be used to make comparisons. <b>(K-PS3-1)</b></li> </ul> <p><b>Analyzing and Interpreting Data</b></p> <ul style="list-style-type: none"> <li>Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. <b>(K-ESS2-1)</b></li> </ul> <p><b>Constructing Explanations and Designing Solutions</b></p> <ul style="list-style-type: none"> <li>Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. <b>(K-PS3-2)</b></li> </ul> <p><b>Obtaining, Evaluating, and Communicating Information</b></p> <ul style="list-style-type: none"> <li>Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. <b>(K-ESS3-2)</b></li> </ul> <hr/> <p><b>Connections to Nature of Science</b></p>	<p><b>PS3.B: Conservation of Energy and Energy Transfer</b></p> <ul style="list-style-type: none"> <li>Sunlight warms Earth’s surface. <b>(K-PS3-1), (K-PS3-2)</b></li> </ul> <p><b>ESS2.D: Weather and Climate</b></p> <ul style="list-style-type: none"> <li>Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. <b>(K-ESS2-1)</b></li> </ul> <p><b>ESS3.B: Natural Hazards</b></p> <ul style="list-style-type: none"> <li>Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events <b>(K-ESS3-2)</b></li> </ul> <p><b>ETS1.A: Defining and Delimiting an Engineering Problem</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. <b>(K-2-ETS1-1)</b></li> <li>Asking questions, making observations, and gathering information are helpful in thinking about problems. <b>(K-2-ETS-1)</b></li> <li>Before beginning to design a</li> </ul>	<p><b>Patterns</b></p> <ul style="list-style-type: none"> <li>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. <b>(K-ESS2-1)</b></li> </ul> <p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Events have causes that generate observable patterns. <b>(K-PS3-1), (K-PS3-2), (K-ESS3-2)</b></li> </ul> <p><b>Connections to Engineering, Technology, and Applications of Science</b></p> <p><b>Interdependence of Science, Engineering, and Technology</b></p> <ul style="list-style-type: none"> <li>People encounter questions about the natural world every day. <b>(K-ESS3-2)</b></li> </ul> <p><b>Influence of Engineering, Technology, and Science, on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>People depend on various technologies in their lives; human life would be very different without technology. <b>(K-ESS3-2)</b></li> </ul>

<p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>Scientists use different ways to study the world. <b>(K-PS3-1)</b></li> </ul> <p><b>Science 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. <b>(K-ESS2-1)</b></li> </ul>	<p>solution, it is important to clearly understand the problem. <b>(K-2-ETS1-1)</b></p>	
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**Connecting with English Language Arts/Literacy and Mathematics**

**English Language Arts/Literacy**

To integrate the New Jersey Student Learning Standards for English Language Arts into this unit, students need opportunities to read informational texts in order to gather information about light sound. With adult guidance, they identify the main topic and 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 different weather patterns in seasons. In pairs or small groups, students can use pictures and words to create simple books about local weather conditions. The students’ books should include drawings with labels. Throughout the unit of study, students need multiple opportunities to share their experiences with weather and temperature, in collaborative conversations with adults and peers, in small and large group settings.

**Mathematics**

To integrate mathematics into this unit, students reason abstractly and quantitatively and use appropriate tools strategically as they collect and organize data, and use it to solve problems. For example, when students gather information about the number of rainy or sunny days in a month:

- ✓ Use grade-level-appropriate tools and strategies to count, compare, and order days by number of each type of weather.
- ✓ Organize data (e.g., number of sunny days) into simple graphs or tables, and then use strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to make comparisons.
- ✓ Count and graph how many students prefer each season
- ✓ Compare the number of X ‘s for each season to see which is preferred by the class.

Use drawings and equations as they solve problems (e.g., more or less, total amount, how many in each).

<b>English/Language Arts Standards</b>	<b>Mathematics Standards</b>
<ul style="list-style-type: none"> <li>With prompting and support, ask and answer questions about key details in a text. <b>(K-PS2-2) RI.K.1</b></li> <li>Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). <b>(K-PS2-1) W.K.7</b></li> <li>Ask and answer questions in order to seek help, get information, or clarify something that is not understood. <b>(K-PS2-2) SL.K.3</b></li> </ul>	<ul style="list-style-type: none"> <li>Reason abstractly and quantitatively. <b>(K-ESS2-1) MP.2</b></li> <li>Model with mathematics, <b>(K-ESS2-1), (K-ESS3-2) MP.4</b></li> <li>Counting and Cardinality <b>(K-ESS3-2) K.CC</b></li> <li>Know number names and the count sequence. <b>(K-ESS2-1) K.CC.A</b></li> <li>Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. <b>(K-PS2-2) K.MD.A.1</b></li> <li>Directly compare two objects with a measurable attribute in common, to see which object has “more of”/ “less of” the attribute, and describe the difference. <b>(K-PS2-1) K.MD.A.2</b></li> <li>Classify objects into given categories; count the number of objects in each category and sort the categories by count. <b>(K-ESS2-1) K.MD.B.3</b></li> </ul>

# Science - Kindergarten

## Unit 2: Pushes and Pulls

Instructional Time: 27 Days

### Inspire Science Alignment: Forces and Motion (2A-42)

In this unit of study, students will make observations about the effect that forces such as pushes and pulls have on motion. Students will describe ways they can change a push or pull and have resulting change in motion. They will also investigate how an object in motion changes directions. Students will engage in scientific experiences to answer Essential Questions such as: How do pushes and pulls affect the way objects move? What happens when objects touch or collide? How can pushes or pulls change an object's direction?

The crosscutting concept of *cause* and *effect* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

### Student Learning Objectives

#### New Jersey Student Learning Standards for Science/ NGSS

<b>K-PS2-1</b>	Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
<b>K-PS2-2</b>	Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.
<b>K-2-ETS1-1</b>	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
<b>K-2-ETS1-2</b>	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

### Unit Sequence

#### Part A: How do pushes and pulls affect the way objects move?

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Simple tests can be designed to gather evidence to support or refute student ideas about causes.</li> <li>Pushing or pulling a toy car will cause it to move in different ways.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Design simple tests to gather evidence to support or refute ideas about cause and effect relationships.</li> <li>Make observations (firsthand or from media) to construct an evidence-based account for how a push or a pull can affect an object.</li> <li>Make observations (e.g., pushing or pulling a toy car) to construct an evidence-based account that objects' movements can be affected by a push or a pull.</li> </ul>

### Unit Sequence

#### Part B: What happens when objects touch or collide?

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Objects change direction after a collision.</li> <li>Simple tests can be designed to gather evidence to support or refute student ideas about causes.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Understand how balls of different sizes move after they collide.</li> <li>Make observations (e.g., collide balls of different sizes) to construct an evidence-based account of how objects move after a touch or collision.</li> </ul>

### Unit Sequence

#### Part C: How can pushes and pulls change an object's direction?

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Simple tests can be designed to gather evidence to support or refute student ideas about causes.</li> <li>Objects can change the way they travel.</li> <li>How objects can change the direction of their travel.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Plan and conduct investigations to provide evidence that objects can change the direction in which they travel.</li> <li>Identify what makes an object change the direction in</li> </ul>

which they travel.

### What It Looks Like in the Classroom

In this unit of study, students will conduct investigations make observations about the effect that forces such as pushes and pulls have on motion. Students will describe ways they can change a push or pull and have resulting change in motion. They will also investigate how an object in motion changes directions. Students will engage in scientific experiences to answer Essential Questions such as: How do pushes ad pulls affect the way objects move? What happens when objects touch or collide? How can pushes or pulls change an object’s direction? Throughout the unit, students will use their observations and data as evidence to determine cause-and-effect relationships in the natural world.

Students begin this unit by investigating the effect of a push and pull on a heavy and light bag or marbles. They will observe the difference each force has on objects of different weights. They will have the opportunity to change the strength of the push and pull and observe the differences. Students need opportunities to observe the effects of both pushes and pulls on an object. Students can also watch videos of different objects being pushed or pulled and the effects of the different forces. With experiences such as these, they will come to understand that objects can be moved by a force, such as a push or a pull.

Next, students plan and conduct simple investigations to determine what happens to an object when it is pushed or pulled with different amounts of force. Students need the opportunity to explore the interaction of pushes and pulls with objects using a variety of materials, and they should record what they observe with each one. When selecting materials, teacher should use some materials that are easier to push and pull, or more difficult to push and pull. Examples could include marbles, basketballs, wagons, tables, doors, and chairs.

As students observe the interactions between pushes and pulls and various materials, they should notice how objects change direction after a collision. Students will roll two same-sized marbles into one another to observe what happens when they collide. They will notice their direction changes. When two-different sized marbles are rolled into one another, the bigger marble has the ability to change the direction or motion of the smaller marble. Students will observe how changing the force of a push changes the effect of a collision. They will notice the change in speed and direction of an object’s movement. Students will observe how balls of different sizes move after they collide.

Students will investigate how objects can change direction with a push or a pull. Students will investigate how to change the way an object travels. They will observe how a ball changes direction and will record the data. Students should see how the direction of the call can be changed by several different ways, including a push from a hand, a collision from the floor, and a pull on the ball. Students will design and construct a maze to investigate how a marble moves and changes directions. Students may need the teacher to demonstrate how to use the materials to create a maze. Students may have to push the marble in the maze. The marble may collide with the maze to change direction. Students will construct a pulley device and investigate how a pull can be used to change the direction of a basket. Students should use their observations as evidence to support their explanations of how light interacts with various objects.

After investigating pushes and pulls, students continue to plan and conduct investigations to develop an understanding of some basic properties of forces such as push and pull. Students can use a variety of objects and materials to observe that a push or a pull can have various effects on an object. Students need multiple opportunities to experiment with a variety of objects to understand how an object can be effected and/or movement changed due to a push or pull. Some opportunities could include:

- Pushing a desk.
- Pulling a door open.
- Colliding same-sized balls into each other.
- Soda bottle bowling to see what kind of push makes the ball move faster and knock down the pins.
- Construct a ramp to change the speed of a toy car.

As students conduct these simple investigations, they will notice that when objects are pushed or pulled they move and that when objects collide, they can change direction or movement. They will also notice that the strength of the push or pull will have different effects on the object (pushing a bowling ball hard will cause it to move faster and knock the pins down. Students should use these types of observations as evidence when explaining the cause and effect relationship between pushes and pulls and the movement of an object.

### Performance Expectations

Science and Engineering Practices

Disciplinary Core Ideas

Crosscutting Concepts

<p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1)</li> </ul> <p><b>Analyzing and Interpreting Data</b></p> <ul style="list-style-type: none"> <li>• Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</li> <li>• Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2)</li> </ul> <p><b>Asking Questions and Defining Problems</b></p> <ul style="list-style-type: none"> <li>• Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)</li> <li>• Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-TS1-1)</li> </ul> <p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>• Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)</li> </ul> <p><b>Connections to Nature of Science</b></p> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>• Scientists use different ways to study the world. (K-PS2-1)</li> </ul>	<p><b>PS2.A: Forces and Motion</b></p> <ul style="list-style-type: none"> <li>• Pushes and pulls can have different strengths and directions. (K-PS2-1), (K-PS2-2)</li> <li>• Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1), (K-PS2-2)</li> </ul> <p><b>PS2.B: Types of Interactions</b></p> <ul style="list-style-type: none"> <li>• When objects touch or collide, they push on one another and can change motion (K-PS2-1)</li> </ul> <p><b>PS3.C: Relationship Between Energy and Forces</b></p> <ul style="list-style-type: none"> <li>• A bigger push or pull makes things speed up or slow down more quickly. (secondary to K-PS2-1)</li> </ul> <p><b>ETS1.A Defining 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. Such problems may have many acceptable solutions. (K-2-ETS1-1)</li> <li>• Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)</li> <li>• Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)</li> </ul>	<p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>• Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1), (K-PS2-2)</li> </ul>
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**Connecting with English Language Arts/Literacy and Mathematics**

**English Language Arts/Literacy**

To integrate the New Jersey Student Learning Standards for English Language Arts into this unit, students need opportunities to read informational texts in order to gather information about forces and interactions. With adult guidance, they identify the main topic and 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 forces and interactions. Students should ask and answer questions in order to seek help, get information, or clarify something that is not understood.

**Mathematics**

Students need opportunities to use tools for a variety of purposes as they design and build devices to learn about how

devices move. They can use objects such as interlocking cubes or paper clips to describe length in nonstandard units, expressing their measurements as whole numbers. Students can also compare two objects with a measurable attribute in common, to see which object has “more of”/” less of” the attribute, and describe the difference. Students will compare the length or weight of an object to determine if that causes a push or a pull to happen more easily. Students will reason abstractly and quantitatively as they determine the effects of different strengths or different directions of pushes and pulls on the motion of an object of varying size and weight.

English/Language Arts Standards	Mathematics Standards
<ul style="list-style-type: none"> <li>• With prompting and support, ask and answer questions about key details in a text. (K-PS2-2) <b>RI.K.1</b></li> <li>• Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1) <b>W.K.7</b></li> <li>• Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2) <b>SL.K.3</b></li> </ul>	<ul style="list-style-type: none"> <li>• Reason abstractly and quantitatively. (K-PS2-2) <b>MP.2</b></li> <li>• Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-2) <b>K.MD.A.1</b></li> <li>• Directly compare two objects with a measurable attribute in common, to see which object has “more of”/”less of” the attribute, and describe the difference. (K-PS2-1) <b>K.MD.A.2</b></li> </ul>

# Science - Kindergarten

## Unit 3: Effects of the Sun

**Instructional Time: 24 Days**

### *Inspire Science Alignment: Energy and the Sun (44A-68)*

In this unit of study, students will make observations about the Sun's warming effects on Earth's surface. Students will describe different ways the warmth of the sun can be offset. Students will understand how the Sun affects the Earth's surface and how we can stay cool in the sun.

The crosscutting concept of *cause* and *effect* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations*, *constructing explanations and designing solutions*, and *developing and using models*. Students are also expected to use these practices to demonstrate understanding of the core ideas

### Student Learning Objectives

#### New Jersey Student Learning Standards for Science/ NGSS

<b>K-PS3-1</b>	Make observations to determine the effect of sunlight on Earth's surface
<b>K-PS3-2</b>	Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.
<b>K-ESS2-1</b>	Use and share observations of local weather conditions to describe patterns over time.
<b>K-ESS3-2</b>	Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.
<b>K-2-ETS1-1</b>	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
<b>K-2-ETS1-2</b>	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
<b>K-2-ETS1-3</b>	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

### Unit Sequence

#### Part A: *How does the Sun affect the Earth's surface?*

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence</li> <li>Observe evidence of how water changes when left in the Sun.</li> <li>Observe if the Sun can warm rocks, soil, and sand.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Observe and use patterns in the natural world as evidence and to describe phenomena.</li> <li>Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.</li> <li>Describe effects of the Sun on water, rocks, soil, and sand</li> </ul>

### Unit Sequence

#### Part B: *How can we stay cool in the sun?*

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Simple tests can be designed to gather evidence to support or refute student ideas about causes.</li> <li>Investigate a design that will reduce the warming effect of the sun.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Design simple tests to gather evidence to support or refute ideas about cause and effect relationships.</li> <li>Plan and conduct investigate the shade's effect on temperature.</li> <li>Design shade or shelters for animals.</li> </ul>

### What It Looks Like in the Classroom

In this unit of study, students plan and conduct investigations and make observations as they explore the effects of the Sun's warmth on Earth's surface. Students describe the relationships between the Sun and the Earth and how it impacts the environments on Earth.

Students will investigate what happens to water when it is exposed to the Sun. Students will observe the Sun warming

the water. Depending on where you live, the time of the year, and how cloudy it is, the amount of warming will vary. Students will investigate if the Sun can warm rocks, soil, and sand. The students will observe that the Sun has warmed all of the materials, although some may feel warmer than others.

Students will investigate sunlight and shade at different times of day. Students will engage in an online simulation. They will point out the two identical sets of foods on the picnic table and the two thermometers.

Students will choose a Sun on the bottom of the screen to represent different times of day. When the button is clicked, the thermometers will change to show the temperature at that time of day. Students will choose a shade button to represent different amounts of shade. The thermometer on the right will change to show the shade's effect on temperature. Have students explore the simulation and experiment with different times of day and different shades to demonstrate the effects both can have on temperature. Students will select an animal and draw a shelter for it to make a class book. Students will be able to identify different shelters or shades in the environment animals use to help reduce the effect of the Sun's warmth.

Performance Expectations		
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Asking Questions and Defining Problems</b></p> <ul style="list-style-type: none"> <li>Ask questions based on observations to find out more information about the designed world. (K-ESS3-2)</li> </ul> <p><b>Planning and Carrying Out Investigations</b></p> <ul style="list-style-type: none"> <li>Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1)</li> </ul> <p><b>Analyzing and Interpreting Data</b></p> <ul style="list-style-type: none"> <li>Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1)</li> </ul> <p><b>Constructing Explanations and Designing Solutions</b></p> <ul style="list-style-type: none"> <li>Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)</li> </ul> <hr/> <p><b>Asking Questions and Defining Problems</b></p> <ul style="list-style-type: none"> <li>Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)</li> <li>Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)</li> </ul> <p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)</li> </ul> <p><b>Analyzing and Interpreting Data</b></p> <ul style="list-style-type: none"> <li>Analyze data from tests of an object</li> </ul>	<p><b>PS3.B: Conservation of Energy and Energy Transfer</b></p> <ul style="list-style-type: none"> <li>Sunlight warms Earth's surface. (K-PS3-1), (K-PS3-2)</li> </ul> <p><b>ESS2.D: Weather and Climate</b></p> <ul style="list-style-type: none"> <li>Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)</li> </ul> <p><b>ESS3.B: Natural Hazards</b></p> <ul style="list-style-type: none"> <li>Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events (K-ESS3-2)</li> </ul> <p><b>ETS1.A: Defining and Delimiting an Engineering Problem</b></p> <ul style="list-style-type: none"> <li>Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)</li> <li>Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)</li> </ul>	<p><b>Patterns</b></p> <ul style="list-style-type: none"> <li>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)</li> </ul> <p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Events have causes that generate observable patterns. (K-PS3-1), (K-PS3-2), (K-ESS3-2)</li> </ul> <hr/> <p><b>Connections to Engineering, Technology, and Applications of Science</b></p> <p><b>Interdependence of Science, Engineering, and Technology</b></p> <ul style="list-style-type: none"> <li>People encounter questions about the natural world every day. (K-ESS3-2)</li> </ul> <p><b>Influence of Engineering, Technology, and Science, on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>People depend on various technologies in their lives; human life would be very different without technology. (K-ESS3-2)</li> </ul>

<p>or tool to determine if it works as intended. (K-2-ETS1-3)</p> <p><b>Obtaining, Evaluating, and Communicating Information</b></p> <ul style="list-style-type: none"> <li>• Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)</li> </ul> <p><b>Connections to Nature of Science</b></p> <p><b>Scientific Investigations Use a Variety of Methods</b></p> <ul style="list-style-type: none"> <li>• Scientists use different ways to study the world. (K-PS3-1)</li> </ul> <p><b>Science 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. (K-ESS2-1)</li> </ul>		
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**Connecting with English Language Arts/Literacy and Mathematics**

**English Language Arts/Literacy**

To integrate the New Jersey Student Learning Standards for English Language Arts into this unit, students need opportunities to read informational texts in order to gather information about the effects of sunlight on Earth’s surface. With adult guidance, they identify the main topic and 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 sunlight and shade. In pairs or small groups, students can use pictures and words to create simple books that show different animals and the what they use to reduce the warming effects of the sun. Their pictures should have labels. Throughout the unit of study, students need multiple opportunities to share their experiences with light and sound in collaborative conversations with adults and peers, in small and large group settings.

**Mathematics**

To integrate mathematics into this unit, students will observe the effects of the Sun on Earth’s surface and directly compare two objects (for example, a rock in the shade and a rock in the sun). They will be asked to describe the temperature of the objects in and out of the sun to determine if the sun has a warming effect on the object left in it. Students will describe the difference in temperature by explaining which is warmer and which is cooler.

<b>English/Language Arts Standards</b>	<b>Mathematics Standards</b>
<ul style="list-style-type: none"> <li>• With prompting and support, ask and answer questions about key details in a text. (K-PS2-2) <b>RI.K.1</b></li> <li>• Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1) <b>W.K.7</b></li> <li>• Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2) <b>SL.K.3</b></li> </ul>	<ul style="list-style-type: none"> <li>• Reason abstractly and quantitatively. (K-ESS2-1) <b>MP.2</b></li> <li>• Model with mathematics, (K-ESS2-1), (K-ESS3-2) <b>MP.4</b></li> <li>• Counting and Cardinality (K-ESS3-2) <b>K.CC</b></li> <li>• Know number names and the count sequence. (K-ESS2-1) <b>K.CC.A</b></li> <li>• Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-2) <b>K.MD.A.1</b></li> <li>• Directly compare two objects with a measurable attribute in common, to see which object has “more of”/ “less of” the attribute, and describe the difference. (K-PS2-1) <b>K.MD.A.2</b></li> <li>• Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1) <b>K.MD.B.3</b></li> </ul>

# Science - Kindergarten

## Unit 4: Basic Needs of Living Things

Instructional Time: 40 Days

*Inspire Science Alignment: Plants and Animals (114A-152)*

**Impacts on Earth's Ecosystem (154A-194)**

In this unit of study, students will use observations and models to describe, represent, and ask scientific questions about needs, relationships, and environments of plants and animals, as well as why all living things are natural resources. Students will engage in scientific experiences to understand what plants and animals need to live, where different kinds of plants grow, and where do different kinds of animals live. Students will make observations about how living things change their environments to meet their needs. Students will investigate the needs of plants, animals, and people and the ways they change their environment to meet them. Students will understand how animals and plants change their environments.

The crosscutting concepts of *patterns and systems and system models* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *analyzing and interpreting data, engaging in argument from evidence, and developing and using a model*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

### Student Learning Objectives

#### New Jersey Student Learning Standards for Science/ NGSS

<b>K-LS1-1</b>	Use observations to describe patterns on what plants and animals (including humans) need to survive.
<b>K-ESS2-2</b>	Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
<b>K-ESS3-1</b>	Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
<b>K-ESS3-3</b>	Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

### Unit Sequence

#### Part A: *What do plants and animals need to live?*

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence</li> <li>Observe patterns to identify what animals and plants require to survive.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Observe and use patterns in the natural world as evidence and to describe phenomena.</li> <li>Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.</li> <li>Draw pictures of various things plants and animals need to survive</li> <li>Match plants and animals with their needs</li> </ul>

### Unit Sequence

#### Part B: *Where do different kinds of plants and animals grow?*

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Systems in the natural and designed world have parts that work together.</li> <li>Objects and organisms can be described in terms of their parts.</li> <li>Plants and animals live in environments that meet their needs.</li> <li>Plants and animals depend on their environments to survive.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.</li> <li>Describe how different plants and animals need different environments to describe.</li> <li>Describe how plants and organisms have different parts that help them to survive.</li> <li>Show evidence that plants and animals live in places that have things they need.</li> </ul>

### What It Looks Like in the Classroom

In this unit of study, students plan and conduct investigations and make observations and develop models as they explore what people, plants, and animals need to live and grow. Students describe the relationships between the needs of plants and animals and the resources in their environments. They also investigate where different kinds of plants and animals live and how this is important to their survival. Throughout the unit, students will use their observations and data as evidence to determine system and system models relationships in the natural world.

Students will investigate if a plant needs sunlight to grow. They will give each of two plants the same amount of water as needed. Students will place one plant in a sunny location, such as a windowsill. They will place the second plant in a very dark location, such as a closet. Students will observe the plants each day for several days, ensuring each plant receives the same amount of water. They will observe how the plants grow and change over the course of several days. Students should observe that the plant that is kept in the dark will not grow as well as the plant that is kept in a sunny place. Students should come to the conclusion that plants need sunlight to live and grow. Students will draw pictures of each plant at the end of several days and measure the height of each plant. Students may use cube trains to measure the height of each plant to see which one showed more growth. Students will analyze the data to determine which plant grew more and what they need to survive.

Students will match a plant or animal card with something that will help it survive, such as air, water, or a specific kind of food special to that plant or animal. Students will identify the plant or animal and what they need to survive. Students will observe that all living things need water to survive, but animals need different kinds of food to survive and plants require light to survive. Students will compare and contrast the needs of plants and animals. They will answer the questions “How are the needs of plants and animals alike?” and “How are they different?”

Students will determine what an animal eats. They will make a model to show what they learned. Students will explore a digital interactive. Then they will draw an animal and a picture of what it eats. They will identify whether the animal is a plant-eater, a meat-eater, or both plant- and meat-eater. Students will sort the animals based on what they eat. Students will observe the various eating habits of different animals and understand that although all require food, all do not require the same kinds of food to live and grow. Students will draw one of the animals they saw and describe it if it is a meat-eater or a plant-eater.

Students will compare the needs of plants and animals to the needs of people. Students will create a poster to demonstrate understanding. Students will choose a plant or animal they would like to care for. They will construct a graph to show what the plant or animal needs to survive on the other side of a poster.

Students will observe where different types of plants grow in their environments. Students will walk around the school to observe various plants. Students should draw to tell about where they found plants on their walk around the school. They should look for different places they find plants growing. They should also observe the different kinds of plants that grow in the neighborhood. Have students look for both wild and cultivated plants. Students should think about how the plants might get the water they need. Have students watch videos of different environments climates that plants can grow in and identify how their parts help them to survive. For example, what helps desert cacti store water?

Students will identify desert and rainforest plants. They will be shown pictures of a rainforest and desert, as well as picture cards of plants that grow in each environment. Display the pictures of the rainforest and desert. Have students observe the plants in the pictures carefully. Allow students time to compare the different kinds of plants in each environment. Students should note the difference in the number of leaves and flowers that appear on each of the plants. Have the students sort the pictures into two piles by environment. Students should be able to describe how rainforest and desert plants are different and alike.

Students will determine where bean plants grow best. Students will place 3 bean plants in different locations. Students may choose a warm, sunny place such as on a windowsill, a dark place such as a closet, and a shady place such as under a table. Students should observe the plants each day for 5 days. They should observe that the plant in the warm, sunny place will grow best.

Students will choose an animal from a set of replicas and use different materials to build it a home. Students should draw or build an appropriate home or shelter for their animal. Students should talk about what their animal needs to

stay safe in its shelter. For example, a bird needs a nest to protect its babies. Bears may seek shelter in a cave. Have students work together, using the building materials to construct a shelter for their plastic animal. Students will identify desert and rainforest animals and understand they have different needs to live and grow. They will add to the mural of rainforest and desert plants by adding the animals that live in each environment. Students should understand that not all animals can survive in the same environment, as the environment may not have what they need to live and grow. Students will investigate what humans need to survive and will draw a picture that shows what humans need to survive. The picture may include food, air, water, and shelter. Students should understand that animals are part of the natural world and depend on their environment to live.

**Performance Expectations**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>Use a model to represent relationships in the natural world. (K-ESS3-1)</li> </ul> <p><b>Analyzing and Interpreting Data</b></p> <ul style="list-style-type: none"> <li>Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1)</li> <li>Engage in Argument from Evidence</li> <li>Construct an argument with evidence to support a claim. (K-ESS2-2)</li> </ul> <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. (K-LS1-1)</li> </ul>	<p><b>LS1.C: Organization for Matter and Energy Flow in Organisms</b></p> <ul style="list-style-type: none"> <li>All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1)</li> </ul> <p><b>ESS2.E: Biogeology</b></p> <ul style="list-style-type: none"> <li>Plants and animals can change their environment. (K-ESS2-2)</li> </ul> <p><b>ESS3.A: Natural Resources</b></p> <ul style="list-style-type: none"> <li>Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1)</li> </ul>	<p><b>Patterns</b></p> <ul style="list-style-type: none"> <li>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-LS1-1)</li> </ul> <p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Events have causes that generate observable patterns. (K-ESS3-3)</li> </ul> <p><b>System and System Models</b></p> <ul style="list-style-type: none"> <li>Systems in the natural and designed world have parts that work together. (K-ESS2-2) (K-ESS3-3)</li> </ul>

**Connecting with English Language Arts/Literacy and Mathematics**

**English Language Arts/Literacy**

To integrate the New Jersey Student Learning Standards for English Language Arts into this unit, students need opportunities to read informational texts in order to gather information about animals, plants, and their environments. 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 animals, plants, and their environments. In pairs or small groups, students can use pictures and words to create simple books about various ways plants and animals interact with the environment. The students should use a combination of drawing, dictation, and writing to construct an argument for how plants and animals change the environment to meet their needs. Students should also write or draw about various items different plants and animals need to survive.

**Mathematics**

To integrate mathematics into this unit, students reason abstractly and quantitatively and use appropriate tools strategically as they collect and organize data, and use it to solve problems. For example, students use cube trains to measure the height of plants to compare heights and see which plant grew taller. For example, when students gather information about the height of the plants, they can:

- ✓ Use grade-level-appropriate tools and strategies to measure, compare, and order plants by height.
- ✓ Organize data (e.g., number of cube trains) into simple graphs or tables, and then use strategies based on place value, properties of operations, and/or the relationship between putting together and taking apart to make comparisons.

Use drawings and equations as they solve problems (e.g., more or less, total amount, how many in each).

English/Language Arts Standards	Mathematics Standards
<ul style="list-style-type: none"> <li>With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2) <b>RI.K.1</b></li> <li>Use a combination of drawing, dictating, and writing to</li> </ul>	<ul style="list-style-type: none"> <li>Reason abstractly and quantitatively. (K-ESS2-1) <b>MP.2</b></li> <li>Model with mathematics, (K-ESS2-1), (K-ESS3-2) <b>MP.4</b></li> <li>Counting and Cardinality (K-ESS3-2) <b>K.CC</b></li> </ul>

<p>compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or the book. (K-ESS2-2) <b>W.K.1</b></p> <ul style="list-style-type: none"> <li>• Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS2-2), (K-ESS3-3) <b>W.K.2</b></li> <li>• Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1) <b>W.K.7</b></li> <li>• Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1) <b>SL.K.5</b></li> </ul>	<ul style="list-style-type: none"> <li>• Know number names and the count sequence. (K-ESS2-1) <b>K.CC.A</b></li> <li>• Directly compare two objects with a measurable attribute in common, to see which object has “more of”/ “less of” the attribute, and describe the difference. (K-PS2-1) <b>K.MD.A.2</b></li> </ul>
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# Science - Kindergarten

## Unit 5: Basic Needs of Humans

Instructional Time: 33 Days

### Inspire Science Alignment: Protecting Our Earth (196A-238)

#### Impact on Earth's Ecosystem (Lesson 3)

In this unit of study, students will make observations about how living things change their environments to meet their needs. Students will investigate the needs of plants, animals, and people and the ways they change their environment to meet them. Students will understand how animals and plants change their environments.

The crosscutting concepts of *patterns and systems and system models* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *analyzing and interpreting data, engaging in argument from evidence, and developing and using a model*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

#### Student Learning Objectives

##### New Jersey Student Learning Standards for Science/ NGSS

<b>K-LS1-1</b>	Use observations to describe patterns on what plants and animals (including humans) need to survive.
<b>K-ESS2-2</b>	Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
<b>K-ESS3-1</b>	Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
<b>K-ESS3-3</b>	Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.
<b>K-2-ETS1-1</b>	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
<b>K-2-ETS1-2</b>	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

#### Unit Sequence

##### Part A: How do plants, humans, and animals change the environments?

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Systems in the natural and designed world have parts that work together.</li> <li>Objects and organisms can be described in terms of their parts.</li> <li>How plants, animals, and people change their environments</li> <li>Plants and animals depend on their environments to survive and change environments to fit their needs.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.</li> <li>Describe how different plants and animals need different environments to describe.</li> <li>Show evidence that plants and animals change environments to fit their needs</li> </ul>

#### Unit Sequence

##### Part B: How do people's actions change land, air, and water and how can we save natural resources?

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>Humans impact Earth's systems</li> <li>Communicate a solution that will help reduce impact.</li> <li>Simple tests can be designed to gather evidence to support or refute student ideas about causes.</li> <li>Humans use Earth's natural resources</li> <li>Communicate a solution that will help conserve resources</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>Investigate and communicate a solution that will help reduce impact of humans on Earth's systems</li> <li>Examples of reducing impact include reusing paper or recycling cans and bottles</li> </ul>

#### What It Looks Like in the Classroom

In this unit of study, students plan and conduct investigations and make observations and arguments as they explore the relationship between organisms and their environments. Students describe the relationships between plants and animals and the resources they need in the environment to survive. They also investigate how plants and animals

change the environment to fit their needs in order to ensure their survival.

Students answer the question “What happens to a rock when a tree grows nearby?” and model the phenomenon with clay. Students will build a model tree with a rock next to it. They will then add clay to their model to show it growing. The tree will move or break the rock. Students should recognize systems in the activities they have done, such as the way roots and soil provide water for a plant. Students will create a poster showing an environment before and after a plant changes it. Students answer the question, “How do ants change their environment?” Students will observe an ant farm each day for five days. They will record their observations and notice the ways the ant farm changes. Students answer the question, “How do moles change their environment?” and simulate these changes with a digital simulation. Students will help the mole find grubs. As they do so, the mole will dig tunnels through the grass, leaving less grass in the field. Students should understand that systems have parts that work together. Students answer the question, “How have people changed the environment around my school?” Students will compare the area around their school to photographs or maps of the area from years ago. Students will determine that humans can make both good changes, bad changes, and some changes, and some changes that have both good and bad elements.

Students consider the effects of adding pollutants to water. Students should add common pollutants to the tank and observe how they can pollute fresh water and endanger plants and animals. Students should understand that a cause makes something happen and effect is what happens. Students listen to the story *The Lorax* to learn about effects of pollution. They will predict what will happen if the boy plants the last Truffula seed. Students will identify changes to the setting that can be seen in the pictures when pollution begins to build up in the environment. Students will observe what happens when oil and water are mixed to understand the effects of pollution on the environment.

Students will answer the question “What will happen when you leave the water running while washing dishes?” Students will observe how leaving the tap running uses much more water than one might think. Students will investigate how many things in their classroom are made from natural resources and answer the questions *How many items are made from plants?*, and *How many items are made from animals?* Students will find out that most things come from natural resources, and more things come from plants and from animals. Students will explore where their food comes from. Students should identify whether their food source is a plant or an animal. Students will investigate different items that can be recycled and answer the question “What materials do you think can be recycled?” and observe how much trash they produce. Students should understand that unless some of the trash is recycled, it will all go into a landfill site.

**Performance Expectations**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Developing and Using Models</b></p> <ul style="list-style-type: none"> <li>Use a model to represent relationships in the natural world. (K-ESS3-1)</li> </ul> <p><b>Analyzing and Interpreting Data</b></p> <ul style="list-style-type: none"> <li>Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1)</li> </ul> <p><b>Engaging in Argument From Evidence</b></p> <ul style="list-style-type: none"> <li>Construct an argument with evidence to support a claim. (K-ESS2-2)</li> </ul> <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. (K-LS1-1)</li> </ul>	<p><b>ESS3.C: Human Impacts on Earth Systems</b></p> <ul style="list-style-type: none"> <li>Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (secondary to K-ESS2-2), (K-ESS3-3)</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. (secondary to K-ESS3-3)</li> </ul> <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</li> </ul>	<p><b>Patterns</b></p> <ul style="list-style-type: none"> <li>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-LS1-1)</li> </ul> <p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Events have causes that generate observable patterns. (K-ESS3-3)</li> </ul> <p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>Systems in the natural and designed world have parts that work together. (K-ESS2-2), (K-ESS3-1)</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). (K-2-ETS1-2)</li> </ul>

	<p>engineering. (K-2-ETS1-1)</p> <ul style="list-style-type: none"> <li>• Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)</li> <li>• Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)</li> </ul>	
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**Connecting with English Language Arts/Literacy and Mathematics**

**English Language Arts/Literacy**

To integrate the New Jersey Student Learning Standards for English Language Arts into this unit, students need opportunities to read informational texts in order to gather information about light sound. With adult guidance, they identify the main topic and 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 Earth’s resources and ways to reduce and recycle. In pairs or small groups, students can use pictures and words to create simple books about different ways humans can reduce, reuse, or recycle to help conserve Earth’s natural resources. The students’ writing should a picture with labels. Throughout the unit of study, students need multiple opportunities to share their experiences of the impact of humans on Earth’s resources in collaborative conversations with adults and peers, in small and large group settings.

**Mathematics**

In order to integrate the New Jersey Student Learning Standards for Mathematics, students will have to reason abstractly and quantitatively. They will model with mathematics to compare heights of plants when determining what environments are best for growth. Students will count a number of cube trains to determine the heights of plants. They will need to know number names and the counting sequence in order to do so. Students will compare the heights of the cube trains to determine which plant grew taller. They will have to describe the difference between the two cube trains by telling which train has more or less cubes. This will help students figure out which plant grew taller and which conditions are best for plant life.

<b>English/Language Arts Standards</b>	<b>Mathematics Standards</b>
<ul style="list-style-type: none"> <li>• With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2) <b>RI.K.1</b></li> <li>• Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or the book. (K-ESS2-2) <b>W.K.1</b></li> <li>• Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS2-2), (K-ESS3-3) <b>W.K.2</b></li> <li>• Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1) <b>W.K.7</b></li> <li>• Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1) <b>SL.K.5</b></li> </ul>	<ul style="list-style-type: none"> <li>• Reason abstractly and quantitatively. (K-ESS2-1) <b>MP.2</b></li> <li>• Model with mathematics, (K-ESS2-1), (K-ESS3-2) <b>MP.4</b></li> <li>• Counting and Cardinality (K-ESS3-2) <b>K.CC</b></li> <li>• Know number names and the count sequence. (K-ESS2-1) <b>K.CC.A</b></li> <li>• Directly compare two objects with a measurable attribute in common, to see which object has “more of”/ “less of” the attribute, and describe the difference. (K-PS2-1) <b>K.MD.A.2</b></li> </ul>