



# K-PS3 Energy

## K-PS3 Energy

Students who demonstrate understanding can:

**K-PS3-1. Make observations to determine the effect of sunlight on Earth’s surface.** [Clarification Statement: Examples of Earth’s surface could include sand, soil, rocks, and water] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]

**K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.\*** [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

#### Planning and Carrying Out Investigations

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.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1)

#### Constructing Explanations and Designing Solutions

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.

- 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)

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#### Connections to Nature of Science

#### Scientific Investigations Use a Variety of Methods

- Scientists use different ways to study the world. (K-PS3-1)

### Disciplinary Core Ideas

#### PS3.B: Conservation of Energy and Energy Transfer

- Sunlight warms Earth’s surface. (K-PS3-1),(K-PS3-2)

### Crosscutting Concepts

#### Cause and Effect

- Events have causes that generate observable patterns. (K-PS3-1),(K-PS3-2)



#### ECO-SCHOOLS USA PATHWAY ALIGNMENT K-PS3-1 and K-PS3-2

Students can use the outdoor environment to better engage and facilitate the learning process through heightened sensory perception. Experiential learning opportunities allow students to make concrete connections about the Earth’s surface and between the Earth’s properties relative to temperature. Utilize student’s natural curiosity of the natural world to design and build structures that will allow them to explore and make observation about temperature relative to a variety of Earth materials.

Connections to other DCIs in kindergarten: **K.ETS1.A** (K-PS3-2); **K.ETS1.B** (K-PS3-2)

Articulation of DCIs across grade-bands: **1.PS4.B** (K-PS3-1),(K-PS3-2); **2.ETS1.B** (K-PS3-2), **3.ESS2.D** (K-PS3-1); **4.ETS1.A** (K-PS3-2)

Common Core State Standards Connections:

**ELA/Literacy – W.K.7** Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS3-1),(K-PS3-2)

**Mathematics – K.MD.A.2** 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-PS3-1),(K-PS3-2)

\*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

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# K-LS1 From Molecules to Organisms: Structures and Processes

## K-LS1 From Molecules to Organisms: Structures and Processes

Students who demonstrate understanding can:

- K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.** [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<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>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>-----</p> <p style="text-align: center;"><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>Patterns</b></p> <ul style="list-style-type: none"> <li>Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1)</li> </ul>



**ECO-SCHOOLS USA PATHWAY ALIGNMENT**  
**K-LS1-1**

Utilizing your Schoolyard Habitat's™, wildlife or vegetable garden is a great way to address this Performance Expectation as students will have hands-on experiences, using their senses to better describe the patterns they observe. This is a good time to instill the idea of water conservation related to soil moisture, look at the leaves of those plants that require more water than others, what are the patterns observed in schoolyard wildlife? If you lack wildlife to observe, it's an opportunity to introduce biodiversity in its simplest form and possibly work on a biodiversity project with older students.

Anytime a lesson or an activity can be carried out outside you increase the level of student engagement. Also, by using the outdoors as a learning laboratory you increase the connections students make with the concept being taught.

Connections to other DCIs in kindergarten: N/A

Articulation of DCIs across grade-bands: **1.LS1.A** (K-LS1-1); **2.LS2.A** (K-LS1-1); **3.LS2.C** (K-LS1-1); **3.LS4.B** (K-LS1-1); **5.LS1.C** (K-LS1-1); **5.LS2.A** (K-LS1-1)

Common Core State Standards Connections:

ELA/Literacy –

**W.K.7** 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)

Mathematics –

**K.MD.A.2** 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-LS1-1)

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# K-ESS2 Earth's Systems

## K-ESS2 Earth's Systems

Students who demonstrate understanding can:

**K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.** [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.] [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]

**K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.** [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

#### 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. (K-ESS2-1)

#### Engaging in Argument from Evidence

Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

- Construct an argument with evidence to support a claim. (K-ESS2-2)

#### Connections to Nature of Science

#### Science Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (K-ESS2-1)

### Disciplinary Core Ideas

#### ESS2.D: Weather and Climate

- 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)

#### ESS2.E: Biogeology

- Plants and animals can change their environment. (K-ESS2-2)

#### ESS3.C: Human Impacts on Earth Systems

- 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)

### Crosscutting Concepts

#### Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

#### Systems and System Models

- Systems in the natural and designed world have parts that work together. (K-ESS2-2)



**ECO-SCHOOLS USA PATHWAY ALIGNMENT**  
K-ESS2-1 and K-ESS2-2

**NWF does not support teaching children below grade 4 about climate change.** However, the study of weather conditions and change over time and how plants and animals can change their environment to meet their needs, as stated in the Performance Expectations, lay the foundation for understanding climate change and the impacts related to climate change as they get older and are cognitively able to process this topic.

The Schoolyard Habitat is an impactful learning space, giving students the ability to absorb their natural world and better make sense of the Performance Expectations. Actually seeing a squirrel digging or going on a schoolyard walk about to observe the strength of tree and grass roots is more powerful first hand over discussion in the class or out of a story. Combining all three elements increases the likelihood that the content will make it into the student's long term memory.

Connections to other DCIs in kindergarten: N/A

Articulation of DCIs across grade-bands: **2.ESS2.A** (K-ESS2-1); **3.ESS2.D** (K-ESS2-1); **4.ESS2.A** (K-ESS2-1); **4.ESS2.E** (K-ESS2-2); **5.ESS2.A** (K-ESS2-2)

Common Core State Standards Connections:

- ELA/Literacy –
- W.K.1** 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 book. (K-ESS2-2)
- W.K.2** 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)
- W.K.7** Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-ESS2-1)
- RI.K.1** With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)
- Mathematics –
- MP.2** Reason abstractly and quantitatively. (K-ESS2-1)
- MP.4** Model with mathematics. (K-ESS2-1)
- K.CC.A** Know number names and the count sequence. (K-ESS2-1)
- K.MD.A.1** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)
- K.MD.B.3** Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)

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# K-ESS3 Earth and Human Activity

<b>K-ESS3 Earth and Human Activity</b>
Students who demonstrate understanding can:
<b>K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.</b> [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]
<b>K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.*</b> [Clarification Statement: Emphasis is on local forms of severe weather.]
<b>K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.*</b> [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Crosscutting Concepts</b>
<p><b>Asking Questions and Defining Problems</b> Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.</p> <ul style="list-style-type: none"> <li>▪ Ask questions based on observations to find more information about the designed world. (K-ESS3-2)</li> </ul> <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, storyboard) that represent concrete events or design solutions.</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>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/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)</li> <li>▪ Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3)</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>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>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. (K-ESS3-3)</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. (secondary to K-ESS3-2)</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>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>▪ Events have causes that generate observable patterns. (K-ESS3-2),(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-ESS3-1)</li> </ul> <p style="text-align: center;">-----</p> <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 style="text-align: center;"><b>ECO-SCHOOLS USA PATHWAY ALIGNMENT</b> <b>K-ESS3-1 and K-ESS3-3</b></p> <p>Climate Change and Schoolyard Habitats fit well with these Performance Expectations, but the other 4 pathways listed have a connection as well. <b>Remember, NWF does not support the teaching of climate change before grade 4.</b> That said, each of these PE’s give students a foundation in which they are building their content knowledge and science literacy.</p> <p><b>Consumption and Waste</b> – specific to PE: K-ESS3-3 – More and more our students are coming to us proficient in “recycling”, take this time to introduce and/or reinforce the complete cycle – Reduce (your consumption)/ Reuse (what you consume) Recycle (what’s left)</p> <p><b>Biodiversity</b> – specific to PE: K-ESS3-1 – utilizing the outdoor classroom for hands-on, minds-on interaction with the natural world will allow students to use a model to represent the needs of plants and animals (including humans) in the place they live.</p> <p><b>Transportation</b> – specific to PE: K-ESS3-3 – What did it look like before my school was here? Google Earth (1995 to present) or HistoricAerials.com – Why did it change?</p> <p><b>Water</b> – K-ESS3-1 – Gaining knowledge related to the water needs of plants and animals help students better understand the need for water conservation in the future. Right now they just know they are told not to waste water, but why? Lay the groundwork now.</p>
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Connections to other DCIs in kindergarten: <b>K.ETS1.A</b> (K-ESS3-2),(K-ESS3-3)
Articulation of DCIs across grade-bands: <b>1.LS1.A</b> (K-ESS3-1); <b>2.ESS1.C</b> (K-ESS3-2); <b>2.ETS1.B</b> (K-ESS3-3); <b>3.ESS3.B</b> (K-ESS3-2); <b>4.ESS3.A</b> (K-ESS3-3); <b>4.ESS3.B</b> (K-ESS3-2); <b>5.LS2.A</b> (K-ESS3-1); <b>5.ESS2.A</b> (K-ESS3-1); <b>5.ESS3.C</b> (K-ESS3-3)
Common Core State Standards Connections:
ELA/Literacy –
<b>RI.K.1</b> With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2)
<b>W.K.2</b> 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-ESS3-3)
<b>SL.K.3</b> Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-ESS3-2)
<b>SL.K.5</b> Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1)
Mathematics –
<b>MP.2</b> Reason abstractly and quantitatively. (K-ESS3-1)
<b>MP.4</b> Model with mathematics. (K-ESS3-1),(K-ESS3-2)
<b>K.CC</b> Counting and Cardinality (K-ESS3-1),(K-ESS3-2)

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