

New York State P-12 Science Learning Standards

P. Physical Sciences

Students who demonstrate understanding can:

- P-PS1-1.** **Ask questions and use observations to test the claim that different kinds of matter exist as either solid or liquid.**
[Clarification Statement: Emphasis should be on observing and describing similarities and differences between solids and liquids based on their physical properties. Solids and liquids can be compared and categorized (sorted) based on those properties.]
- P-PS2-1.** **Use tools and materials to design and build a device that causes an object to move faster with a push or a pull.***
[Clarification Statement: Emphasis should be on developing an interest in investigating forces (pushes or pulls). Examples of forces could include a string attached to an object being pulled or a ramp to increase the speed of an object.] [Assessment Boundary: Assessment is limited to relative measures of speed (slower, faster)]
- P-PS4-1.** **Plan and conduct investigations to provide evidence that sound is produced by vibrating materials.** [Clarification Statement: Examples of vibrating materials could include percussion instruments (e.g. drum, triangle), string instruments (e.g. guitar, piano), wind instruments (e.g. recorder, whistle), and audio speakers.]

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>Asking Questions and Defining Problems Asking questions and defining problems in grades PK–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.</p> <ul style="list-style-type: none"> ▪ Ask questions based on observations to find more information about the designed world. (P-PS1-1) <p>Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in PK–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"> ▪ With guidance, plan and conduct an investigation in collaboration with peers. (P-PS2-1),(P-PS4-1) <p>Analyzing and Interpreting Data Analyzing data in PK–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> ▪ Record information (observations, thoughts, and ideas). (P-PS1-1) ▪ Analyze data from tests of an object or tool to determine if it works as intended. (P-PS2-1) <p style="text-align: center;">----- <i>Connections to Nature of Science</i> -----</p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> ▪ Scientists use different ways to study the world. (P-PS2-1), (P-PS4-1) | <p>PS1.A: Structure and Properties of Matter</p> <ul style="list-style-type: none"> ▪ (NYSED) Different kinds of matter exist and many of them can be either solid or liquid. Matter can be described, categorized, and sorted by its observable properties. (P-PS1-1) <p>PS2.A: Forces and Motion</p> <ul style="list-style-type: none"> ▪ Pushes and pulls can have different strengths and directions. (P-PS2-1) ▪ Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (P-PS2-1) <p>PS3.C: Relationship Between Energy and Forces</p> <ul style="list-style-type: none"> ▪ (NYSED) A push or a pull may cause stationary objects to move, and a stronger push or pull in the same or opposite direction makes an object in motion speed up or slow down more quickly. (<i>secondary to P-PS2-1</i>) <p>PS4.A: Wave Properties</p> <ul style="list-style-type: none"> ▪ Sound can make matter vibrate, and vibrating matter can make sound. (P-PS4-1) <p>ETS1.A: Defining Engineering Problems</p> <ul style="list-style-type: none"> ▪ 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. (P-PS2-1) | <p>Patterns</p> <ul style="list-style-type: none"> ▪ Patterns in the natural and human designed world can be observed and used as evidence. (P-PS1-1),(P-PS4-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> ▪ Simple tests can be designed to gather evidence to support or refute student ideas about causes. (P-PS2-1),(P-PS4-1) |

Connections to other DCIs in prekindergarten: **P.LS1.A** (P-PS2-1); **P.LS1.D** (P-PS4-1)

Articulation of DCIs across grades K-1: **K.PS1.A** (P-PS1-1); **K.PS2.A** (P-PS2-1); **K.PS2.B** (P-PS2-1); **K.PS3.C** (P-PS2-1); **1.PS4.A** (P-PS4-1)

New York State P-12 Common Core Learning Standards Connections:

ELA/Literacy –

- RI.PK.1** With prompting and support, ask and answer questions about details in a text. (P-PS1-1),(P-PS2-1),(P-PS4-1)
- RI.PK.4** Exhibit curiosity and interest in learning new vocabulary (e.g., ask questions about unfamiliar vocabulary). (P-PS1-1),(P-PS2-1),(P-PS4-1)
- RI.PK.10** With prompting and support, actively engage in group reading activities with purpose and understanding. (P-PS1-1),(P-PS2-1),(P-PS4-1)
- W.PK.1** With prompting and support, use a combination of drawing, dictating, or writing to express an opinion about a book or topic (e.g., I like.... because...) (P-PS1-1),(P-PS2-1),(P-PS4-1)
- W.PK.2** With prompting and support, use a combination of drawing, dictating, or writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (P-PS1-1),(P-PS2-1),(P-PS4-1)
- W.PK.3** With prompting and support, use a combination of drawing, dictating, or writing to narrate a single event and provide a reaction to what happened. (P-PS1-1),(P-PS2-1),(P-PS4-1)
- W.PK.8** With guidance and support, recall information from experiences or gather information from provided sources to answer a question. (P-PS1-1),(P-PS2-1),(P-PS4-1)
- SL.PK.2** With guidance and support, confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood. (P-PS1-1),(P-PS2-1),(P-PS4-1)
- SL.PK.3** With guidance and support, ask and answer questions in order to seek help, get information, or clarify something that is not understood. (P-PS1-1),(P-PS2-1),(P-PS4-1)
- SL.PK.5** Add drawings or other visual displays to descriptions as desired to provide additional detail. (P-PS1-1),(P-PS2-1),(P-PS4-1)

Mathematics –

- MP.4** Model with mathematics. (P-PS2-1)
- MP.5** Use appropriate tools strategically. (P-PS1-1),(P-PS2-1),(P-PS4-1)
- MP.6** Attend to precision. (P-PS2-1)
- PK.MD.1** Identify measurable attributes of objects, such as length, and weight. Describe them using correct vocabulary (e.g., small, big, short, tall, empty, full, heavy, and light). (P-PS2-1)
- PK.MD.2** Sort objects into categories; count the numbers of objects in each category. 1 (limit category counts to be less than or equal to 10) (P-PS1-1)
- PK.G.3** Analyze, compare, and sort two- and three-dimensional shapes and objects, in different sizes, using informal language to describe their similarities, differences, and other attributes (e.g., color, size, and shape). (P-PS1-1)
- PK.G.4** Create and build shapes from components (e.g., sticks and clay balls). (P-PS2-1)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea. The text in the "Disciplinary Core Ideas" section is reproduced verbatim from *A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas* unless it is preceded by (NYSED).

New York State P-12 Science Learning Standards

P. Life Sciences

Students who demonstrate understanding can:

P-LS1-1. Observe familiar plants and animals (including humans) and describe what they need to survive. [Clarification Statement: Emphasis should be on determining what a variety of living organisms need to live and grow.]

P-LS1-2. Plan and conduct an investigation to determine how familiar plants and/or animals use their external parts to help them survive in the environment. [Clarification Statement: Emphasis should be on the relationships between the physical and living environment. Examples of external parts could include roots, stems, leaves for plants and eyes, ears, mouth, arms, legs for animals.]

P-LS3-1. Develop a model to describe that some young plants and animals are similar to, but not exactly like, their parents. [Clarification Statement: Emphasis is on observation and pictorial representations of familiar plants and animals.]

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>Developing and Using Models Modeling in PK–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"> Compare models to identify common features and differences. (P-LS3-1) Develop a simple model based on evidence to represent a proposed object or tool. (P-LS3-1) <p>Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in PK–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"> With guidance, plan and conduct an investigation in collaboration with peers. (P-LS1-2) <p>Analyzing and Interpreting Data Analyzing data in PK–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> Record information (observations, thoughts, and ideas). (P-LS1-1) Analyze data from tests of an object or tool to determine if it works as intended. (P-PS2-1) <p>Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in PK–2 builds on prior experiences and uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (P-LS1-1) <p style="text-align: center;">----- <i>Connections to Nature of Science</i> -----</p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> Scientists use different ways to study the world. (P-LS1-2) | <p>LS1.A: Structure and Function</p> <ul style="list-style-type: none"> 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. (P-LS1-2) <p>LS1.C: Organization for Matter and Energy Flow in Organisms</p> <ul style="list-style-type: none"> (NYSED) All animals need food, air, and water in order to live, grow, and thrive. Animals obtain food from plants or from other animals. Plants need water, air, and light to live, grow, and thrive. (P-LS1-1) <p>LS1.D: Information Processing</p> <ul style="list-style-type: none"> 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. (P-LS1-2) <p>LS3.A: Inheritance of Traits</p> <ul style="list-style-type: none"> (NYSED) Some young animals are similar to, but not exactly, like their parents. Some young plants are also similar to, but not exactly, like their parents. (P-LS3-1) <p>LS3.B: Variation of Traits</p> <ul style="list-style-type: none"> Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (P-LS3-1) | <p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural and human designed world can be observed and used as evidence. (P-LS1-1),(P-LS3-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> Events have causes that generate observable patterns. (P-LS1-2) <p>Systems and System Models</p> <ul style="list-style-type: none"> Systems in the natural and designed world have parts that work together. (P-LS1-2) <p>Structure and Function</p> <ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). (P-LS1-2) |
| <p><i>Connections to other DCIs in prekindergarten: P.ESS2.D (P-LS1-1); P.PS3.B (P-LS1-2)</i></p> <p><i>Articulation of DCIs across grades K-1: K.LS1.C (P-LS1-1); K.ESS3.C (P-LS1-1); 1.LS1.A (P-LS1-1); 1.LS1.D (P-LS1-2); 1.LS3.A (P-LS3-1); 1.LS3.B (P-LS3-1)</i></p> <p><i>New York State P-12 Common Core Learning Standards Connections:</i></p> | | |
| <p><i>ELA/Literacy –</i></p> <p>RI.PK.1 With prompting and support, ask and answer questions about details in a text. (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>RI.PK.4 Exhibit curiosity and interest in learning new vocabulary (e.g., ask questions about unfamiliar vocabulary). (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>RI.PK.10 With prompting and support, actively engage in group reading activities with purpose and understanding. (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>W.PK.1 With prompting and support, use a combination of drawing, dictating, or writing to express an opinion about a book or topic (e.g., I like... because...) (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>W.PK.2 With prompting and support, use a combination of drawing, dictating, or writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>W.PK.3 With prompting and support, use a combination of drawing, dictating, or writing to narrate a single event and provide a reaction to what happened. (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>W.PK.8 With guidance and support, recall information from experiences or gather information from provided sources to answer a question. (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>SL.PK.2 With guidance and support, confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood. (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>SL.PK.3 With guidance and support, ask and answer questions in order to seek help, get information, or clarify something that is not understood. (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>SL.PK.5 Add drawings or other visual displays to descriptions as desired to provide additional detail. (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p><i>Mathematics –</i></p> <p>MP.1 Make sense of problems and persevere in solving them. (P-LS1-1),(P-LS3-1)</p> <p>MP.5 Use appropriate tools strategically. (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>PK.OA.2 Duplicate and extend (e.g., What comes next?) simple patterns using concrete objects. (P-LS1-2),(P-LS3-1)</p> <p>PK.MD.1 Identify measurable attributes of objects, such as length, and weight. Describe them using correct vocabulary (e.g., small, big, short, tall, empty, full, heavy, and light). (P-LS1-1),(P-LS1-2),(P-LS3-1)</p> <p>PK.MD.2 Sort objects into categories; count the numbers of objects in each category. 1 (limit category counts to be less than or equal to 10) (P-LS3-1)</p> | | |

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New York State P-12 Science Learning Standards

P. Earth and Space Sciences

Students who demonstrate understanding can:

P-ESS1-1. Observe and describe the apparent motions of the Sun, moon, and stars to recognize predictable patterns.

[Clarification Statement: Examples of patterns could include that the Sun and moon appear to move across the sky in a predictable pathway; day and night follow predictable patterns; seasons change in a cyclical pattern (e.g. summer follows spring, autumn follows summer); the moon's shape appears to change in a cyclical pattern; and stars other than our Sun can be visible at night depending on local weather conditions.]

P-ESS2-1. Ask questions, make observations, and collect and record data using simple instruments to recognize patterns about how local weather conditions change daily and seasonally.

[Clarification Statement: Emphasis is on daily weather conditions recorded over a period of time and how those conditions impact student activities and what clothes they wear. Examples of local weather conditions could include cloud cover (sunny, partly cloudy, cloudy, foggy), precipitation (no precipitation, snow, hail, rain), wind (no wind, some wind, strong wind), and temperature (cold, cool, warm, hot).] [Assessment Boundary: Assessment is limited to qualitative measures of local weather conditions.]

P-PS3-1. Plan and conduct an investigation to determine the effect of sunlight on Earth's surface. [Clarification Statement: Examples of effects could include illumination, shadows casted, and the warming effect on living organisms and nonliving things.] [Assessment Boundary: Assessment of effects is limited to relative measures: e.g. warm/cool, bright/dark.]

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>Asking Questions and Defining Problems Asking questions and defining problems in grades PK–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.</p> <ul style="list-style-type: none"> Ask questions based on observations to find more information about the designed world. (P-ESS2-1) <p>Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in PK–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"> With guidance, plan and conduct an investigation in collaboration with peers. (P-PS3-1) Make observations (firsthand or from media) to collect data that can be used to make comparisons. (P-ESS2-1) <p>Analyzing and Interpreting Data Analyzing data in PK–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (P-ESS1-1) Analyze data from tests of an object or tool to determine if it works as intended. (P-PS3-1),(P-ESS2-1) <p style="text-align: center;">-----</p> <p style="text-align: center;"><i>Connections to Nature of Science</i></p> <p>-----</p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> Scientists use different ways to study the world. (P-ESS1-1),(P-ESS2-1),(P-PS3-1) | <p>PS3.B: Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> Sunlight warms Earth's surface. (P-PS3-1) <p>PS4.B: Electromagnetic Radiation</p> <ul style="list-style-type: none"> Objects can be seen if light is available to illuminate them or if they give off their own light. (P-PS3-1) <p>ESS1.A: The Universe and its Stars</p> <ul style="list-style-type: none"> Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (P-ESS1-1) <p>ESS1.B: Earth and the Solar System</p> <ul style="list-style-type: none"> Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (P-ESS1-2) <p>ESS2.D: Weather and Climate</p> <ul style="list-style-type: none"> 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. (P-ESS2-1) <p>ESS3.B: Natural Hazards</p> <ul style="list-style-type: none"> 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. (P-ESS2-1) | <p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (P-ESS1-1),(P-ESS2-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> Simple tests can be designed to gather evidence to support or refute student ideas about causes. (P-ESS2-1),(P-PS3-1) <p style="text-align: center;">-----</p> <p style="text-align: center;"><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>-----</p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> People encounter questions about the natural world every day. (P-ESS2-1) <p>Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> People depend on various technologies in their lives; human life would be very different without technology. (P-ESS2-1) <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> Science assumes natural events happen today as they happened in the past. (P-ESS1-1) Many events are repeated. (P-ESS1-1) |

Connections to other DCIs in prekindergarten: **P.PS2.A** (P-ESS1-1)

Articulation of DCIs across grades K-1: **K.PS3.B** (P-ESS3-1); **K.ESS2.D** (P-ESS2-1); **K.ESS3.B** (P-ESS2-1); **1.ESS1.A** (P-ESS1-1); **1.ESS1.B** (P-ESS1-1);

New York State P-12 Common Core Learning Standards Connections:

ELA/Literacy –

| | |
|----------------------|---|
| RI.PK.1 | With prompting and support, ask and answer questions about details in a text. (P-ESS1-1),(P-ESS2-1),(P-PS3-1) |
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| W.PK.3 | With prompting and support, use a combination of drawing, dictating, or writing to narrate a single event and provide a reaction to what happened. (P-ESS1-1),(P-ESS2-1),(P-PS3-1) |
| W.PK.8 | With guidance and support, recall information from experiences or gather information from provided sources to answer a question. (P-ESS1-1),(P-ESS2-1),(P-PS3-1) |
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| SL.PK.5 | Add drawings or other visual displays to descriptions as desired to provide additional detail. (P-ESS1-1),(P-ESS2-1),(P-PS3-1) |
| <i>Mathematics –</i> | |
| MP.1 | Make sense of problems and persevere in solving them. (P-ESS1-1),(P-ESS2-1) |
| MP.5 | Use appropriate tools strategically. (P-ESS2-1) |
| PK.CC.5 | Identify whether the number of objects in one group is more, less, greater than, fewer, and/or equal to the number of objects in another group, e.g., by using matching and counting strategies. 1:1 (up to 5 objects) (P-ESS2-1) |
| PK.G.1 | Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as top, bottom, up, down, in front of, behind, over, under, and next to. (P-ESS1-1) |
| PK.OA.2 | Duplicate and extend (e.g., What comes next?) simple patterns using concrete objects. (P-ESS1-1), (P-ESS2-1) |
| PK.G.3 | Analyze, compare, and sort two- and three-dimensional shapes and objects, in different sizes, using informal language to describe their similarities, differences, and other attributes (e.g., color, size, and shape). (P-PS3-1) |
| PK.G.4 | Create and build shapes from components (e.g., sticks and clay balls). (P-ESS1-1),(P-PS3-1) |

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New York State P-12 Science Learning Standards

K. Matter and Its Interactions

Students who demonstrate understanding can:

- K-PS1-1. Plan and conduct an investigation to test the claim that different kinds of matter exist as either solid or liquid, depending on temperature.** [Clarification Statement: Emphasis should be on solids and liquids at a given temperature and that a solid may be a liquid at higher temperature and a liquid may be a solid at a lower temperature.] [Assessment Boundary: Only a qualitative description of temperature, such as hot, warm, and cool, is expected]

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| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
|--|--|---|
| <p>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.</p> <ul style="list-style-type: none"> With guidance, plan and conduct an investigation in collaboration with peers. (K-PS1-1) <p>Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> Record information (observations, thoughts, and ideas). (K-PS1-1) Analyze data from tests of an object or tool to determine if it works as intended. (K-PS1-1) <p style="text-align: center;">-----</p> <p style="text-align: center;"><i>Connections to Nature of Science</i></p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> Scientists use different ways to study the world. (K-PS1-1) | <p>PS1.A: Structure and Properties of Matter</p> <ul style="list-style-type: none"> 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. (K-PS1-1) | <p>Cause and Effect</p> <ul style="list-style-type: none"> Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS1-1) <p>Energy and Matter</p> <ul style="list-style-type: none"> Students observe objects may break into smaller pieces, be put together into larger pieces, or change shapes. (K-PS1-1) |
| <p><i>Connections to other DCIs in kindergarten: K.ETS1.A (K-PS2-2); K.ETS1.B (K-PS2-2)</i></p> <p><i>Articulation of DCIs across grade-levels: 2.ETS1.B (K-PS2-2); 3.PS2.A (K-PS2-1),(K-PS2-2); 3.PS2.B (K-PS2-1); 4.PS3.A (K-PS2-1); 4.ETS1.A (K-PS2-2)</i></p> | | |
| <p><i>Common Core State Standards Connections:</i></p> <p><i>ELA/Literacy –</i></p> <p>RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-PS1-1)</p> <p>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-PS1-1)</p> <p>SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS1-1)</p> <p><i>Mathematics –</i></p> <p>MP.2 Reason abstractly and quantitatively. (K-PS1-1)</p> <p>K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS1-1)</p> <p>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-PS1-1)</p> | | |

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New York State P-12 Science Learning Standards

K. Forces and Interactions: Pushes and Pulls

Students who demonstrate understanding can:

- K-PS2-1. 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.** [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]
- K-PS2-2. 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.*** [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

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>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.</p> <ul style="list-style-type: none"> With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1) <p>Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2) <p style="text-align: center;">----- <i>Connections to Nature of Science</i></p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> Scientists use different ways to study the world. (K-PS2-1) | <p>PS2.A: Forces and Motion</p> <ul style="list-style-type: none"> Pushes and pulls can have different strengths and directions. (K-PS2-1),(K-PS2-2) 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) <p>PS2.B: Types of Interactions</p> <ul style="list-style-type: none"> When objects touch or collide, they push on one another and can change motion. (K-PS2-1) <p>PS3.C: Relationship Between Energy and Forces</p> <ul style="list-style-type: none"> (NYSED) A push or a pull may cause stationary objects to move, and a stronger push or pull in the same or opposite direction makes an object in motion speed up or slow down more quickly. <i>(secondary to K-PS2-1)</i> <p>ETS1.A: Defining Engineering Problems</p> <ul style="list-style-type: none"> 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. <i>(secondary to K-PS2-2)</i> | <p>Cause and Effect</p> <ul style="list-style-type: none"> Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1),(K-PS2-2) |
| <p><i>Connections to other DCIs in kindergarten: K.ETS1.A (K-PS2-2); K.ETS1.B (K-PS2-2)</i></p> <p><i>Articulation of DCIs across grade-levels: 2.ETS1.B (K-PS2-2); 3.PS2.A (K-PS2-1),(K-PS2-2); 3.PS2.B (K-PS2-1); 4.PS3.A (K-PS2-1); 4.ETS1.A (K-PS2-2)</i></p> <p><i>Common Core State Standards Connections:</i></p> <p><i>ELA/Literacy –</i></p> <p>RI.K.1 With prompting and support, ask and answer questions about key details in a text. <i>(K-PS2-2)</i></p> <p>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-PS2-1)</p> <p>SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. <i>(K-PS2-2)</i></p> <p><i>Mathematics –</i></p> <p>MP.2 Reason abstractly and quantitatively. <i>(K-PS2-1)</i></p> <p>K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. <i>(K-PS2-1)</i></p> <p>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-PS2-1)</p> | | |

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New York State P-12 Science Learning Standards

K. Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment

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 and other materials to live, grow, and thrive.]
- 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.]
- 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.** [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.]
- K-ESS3-3. Communicate solutions that will reduce the impact of humans on living organisms and non-living things in the local environment.** * [Clarification Statement: Examples of human impact on the environment (land, water, air, plants, and animals) 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*:

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
|---|---|--|
| <p>Developing and Using Models 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"> ▪ Use a model to represent relationships in the natural world. (K-ESS3-1) <p>Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> ▪ Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1) <p>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).</p> <ul style="list-style-type: none"> ▪ Construct an argument with evidence to support a claim. (K-ESS2-2) <p>Obtaining, Evaluating, and Communicating Information 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"> ▪ Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3) | <p>LS1.C: Organization for Matter and Energy Flow in Organisms</p> <ul style="list-style-type: none"> ▪ (NYSEd) All animals need food, air, and water in order to live, grow, and thrive. Animals obtain food from plants or from other animals. Plants need water, air, and light to live, grow, and thrive. (K-LS1-1) <p>ESS2.E: Biogeology</p> <ul style="list-style-type: none"> ▪ Plants and animals can change their environment. (K-ESS2-2) <p>ESS3.A: Natural Resources</p> <ul style="list-style-type: none"> ▪ 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) <p>ESS3.C: Human Impacts on Earth Systems</p> <ul style="list-style-type: none"> ▪ 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) <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none"> ▪ 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) | <p>Patterns</p> <ul style="list-style-type: none"> ▪ Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> ▪ Events have causes that generate observable patterns. (K-ESS3-3) <p>Systems and System Models</p> <ul style="list-style-type: none"> ▪ Systems in the natural and designed world have parts that work together. (K-ESS2-2),(K-ESS3-1) |
| <p>-----</p> <p><i>Connections to Nature of Science</i></p> | | |
| <p>Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> ▪ Scientists look for patterns and order when making observations about the world. (K-LS1-1) | | |

Connections to other DCIs in kindergarten: **K.ETS1.A** (K-ESS3-3)

Articulation of DCIs across grade-levels: **1.LS1.A** (K-LS1-1),(K-ESS3-1); **2.LS2.A** (K-LS1-1); **2.ETS1.B** (K-ESS3-3); **3.LS2.C** (K-LS1-1); **3.LS4.B** (K-LS1-1); **4.ESS2.E** (K-ESS2-2); **4.ESS3.A** (K-ESS3-3); **5.LS1.C** (K-LS1-1); **5.LS2.A** (K-LS1-1),(K-ESS3-1); **5.ESS2.A** (K-ESS2-2),(K-ESS3-1); **5.ESS3.C** (K-ESS3-3)

Common Core State Standards Connections:

ELA/Literacy –

- RI.K.1** With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)
- 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),(K-ESS3-3)
- 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)
- SL.K.5** Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1)

Mathematics –

- MP.2** Reason abstractly and quantitatively. (K-ESS3-1)
- MP.4** Model with mathematics. (K-ESS3-1)
- K.CC** Counting and Cardinality (K-ESS3-1)
- 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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New York State P-12 Science Learning Standards

K. Weather and Climate

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-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.*** [Clarification Statement: Emphasis is on local forms of severe weather and local resources available for preparedness measures.]
- 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 | Disciplinary Core Ideas | Crosscutting Concepts |
|---|--|--|
| <p>Asking Questions and Defining Problems 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"> ▪ Ask questions based on observations to find more information about the designed world. (K-ESS3-2) <p>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.</p> <ul style="list-style-type: none"> ▪ Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1) <p>Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> ▪ Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1) <p>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.</p> <ul style="list-style-type: none"> ▪ 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) <p>Obtaining, Evaluating, and Communicating Information 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"> ▪ Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2) <p style="text-align: center;">----- <i>Connections to Nature of Science</i> -----</p> <p>Scientific Investigations Use a Variety of Methods</p> <ul style="list-style-type: none"> ▪ Scientists use different ways to study the world. (K-PS3-1) <p>Science Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> ▪ Scientists look for patterns and order when making observations about the world. (K-ESS2-1) | <p>PS3.B: Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> ▪ Sunlight warms Earth's surface. (K-PS3-1),(K-PS3-2) <p>ESS2.D: Weather and Climate</p> <ul style="list-style-type: none"> ▪ 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) <p>ESS3.B: Natural Hazards</p> <ul style="list-style-type: none"> ▪ 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) <p>ETS1.A: Defining and Delimiting an Engineering Problem</p> <ul style="list-style-type: none"> ▪ Asking questions, making observations, and gathering information are helpful in thinking about problems. (<i>secondary to K-ESS3-2</i>) | <p>Patterns</p> <ul style="list-style-type: none"> ▪ Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1) <p>Cause and Effect</p> <ul style="list-style-type: none"> ▪ Events have causes that generate observable patterns. (K-PS3-1),(K-PS3-2),(K-ESS3-2) <p style="text-align: center;">----- <i>Connections to Engineering, Technology, and Applications of Science</i> -----</p> <p>Interdependence of Science, Engineering, and Technology</p> <ul style="list-style-type: none"> ▪ People encounter questions about the natural world every day. (K-ESS3-2) <p>Influence of Engineering, Technology, and Science on Society and the Natural World</p> <ul style="list-style-type: none"> ▪ People depend on various technologies in their lives; human life would be very different without technology. (K-ESS3-2) |

Connections to other DCIs in kindergarten: **K.ETS1.A** (K-PS3-2),(K-ESS3-2); **K.ETS1.B** (K-PS3-2)

Articulation of DCIs across grade-levels: **1.PS4.B** (K-PS3-1),(K-PS3-2); **2.ESS1.C** (K-ESS3-2); **2.ESS2.A** (K-ESS2-1); **2.ETS1.B** (K-PS3-2); **3.ESS2.D** (K-PS3-1),(K-ESS2-1); **3.ESS3.B** (K-ESS3-2); **4.ESS2.A** (K-ESS2-1); **4.ESS3.B** (K-ESS3-2); **4.ETS1.A** (K-PS3-2)

Common Core State Standards Connections:

ELA/Literacy –

- RI.K.1** With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2)
- 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-PS3-1),(K-PS3-2),(K-ESS2-1)
- SL.K.3** Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-ESS3-2)

Mathematics –

- MP.2** Reason abstractly and quantitatively. (K-ESS2-1)
- MP.4** Model with mathematics. (K-ESS2-1),(K-ESS3-2)
- K.CC** Counting and Cardinality (*K-ESS3-2*)
- 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.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)
- 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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New York State P-12 Science Learning Standards

K-2. Engineering Design

Students who demonstrate understanding can:

- K-2-ETS1-1.** 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.
- K-2-ETS1-2.** 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.
- K-2-ETS1-3.** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

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>Asking Questions and Defining Problems 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"> ▪ Ask questions based on observations to find more information about the natural and/or designed world. (K-2-ETS1-1) ▪ Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) <p>Developing and Using Models 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"> ▪ Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2) <p>Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> ▪ Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3) | <p>ETS1.A: Defining and Delimiting Engineering Problems</p> <ul style="list-style-type: none"> ▪ A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) ▪ Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) ▪ Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) <p>ETS1.B: Developing Possible Solutions</p> <ul style="list-style-type: none"> ▪ 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. (K-2-ETS1-2) <p>ETS1.C: Optimizing the Design Solution</p> <ul style="list-style-type: none"> ▪ Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3) | <p>Structure and Function</p> <ul style="list-style-type: none"> ▪ The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2) |
| <p><i>Connections to K-2-ETS1.A: Defining and Delimiting Engineering Problems include:</i> Kindergarten: K-PS2-2, K-ESS3-2</p> <p><i>Connections to K-2-ETS1.B: Developing Possible Solutions to Problems include:</i> Kindergarten: K-ESS3-3, First Grade: 1-PS4-4, Second Grade: 2-LS2-2</p> <p><i>Connections to K-2-ETS1.C: Optimizing the Design Solution include:</i> Second Grade: 2-ESS2-1</p> | | |
| <p><i>Articulation of DCIs across grade-bands: 3-5.ETS1.A (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.B (K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.C (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3)</i></p> | | |
| <p><i>Common Core State Standards Connections:</i></p> <p>ELA/Literacy –</p> <p>RI.2.1 Ask and answer such questions as <i>who, what, where, when, why,</i> and <i>how</i> to demonstrate understanding of key details in a text. (K-2-ETS1-1)</p> <p>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. (K-2-ETS1-1),(K-2-ETS1-3)</p> <p>W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3)</p> <p>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. (K-2-ETS1-2)</p> <p>Mathematics –</p> <p>MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1),(K-2-ETS1-3)</p> <p>MP.4 Model with mathematics. (K-2-ETS1-1),(K-2-ETS1-3)</p> <p>MP.5 Use appropriate tools strategically. (K-2-ETS1-1),(K-2-ETS1-3)</p> <p>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 using information presented in a bar graph. (K-2-ETS1-1),(K-2-ETS1-3)</p> | | |

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