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 these 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: Practices, Cross-Cutting Concepts, and Core Ideas* unless it is preceded by (NYSED).
### Science and Engineering Practices

**Developing and Using Models**
- Modeling in PK–2 builds on prior experiences and progresses to physical replica, diorama, dramatization, or storyboard that represent concrete events or design solutions.
  - 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)

**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.
  - With guidance, plan and conduct an investigation in collaboration with peers. (P-LS1-2)

**Analyzing and Interpreting Data**
- Analyzing data in PK–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
  - 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)

**Obtaining, Evaluating, and Communicating Information**
- Obtaining, evaluating, and communicating information in PK–2 builds on prior experiences and uses observations and tests to communicate new information.
  - Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (P-LS1-1)

### Disciplinary Core Ideas

**Obtaining, Evaluating, and Communicating Information in PK–2**
- Students who are capable of communicating new information.
- Builds on prior experiences and uses observations and texts to communicate new information.
- Provides data to support explanations or design solutions.
- Progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

### Crosscutting Concepts

**Elicit the connections between DCIs in prekindergarten:**

**Articulation of DCIs across grades:**

### New York State Next Generation Learning Standards Connections:

**ELA/Literacy:**
- **PKR1** Participate in discussions about a text. (P-LS1-1), (P-LS1-2), (P-LS3-1)
- **PKR4** Exhibit an interest in learning new vocabulary. (P-LS1-1), (P-LS1-2), (P-LS3-1)

**Mathematics:**
- **MP.1** Make sense of problems and persevere in solving them. (P-LS1-1), (P-LS3-1)
- **MP.5** Use appropriate tools strategically. (P-LS1-1), (P-LS1-2), (P-LS3-1)

**NY-PK.OA.2** Duplicate and extend (e.g., What comes next?) simple patterns using concrete objects. (P-LS1-2), (P-LS3-1)

**NY-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)

**NY-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-LS1-1)

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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-ESS3-1.** 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 is limited to relative measures: e.g. warm, cool, bright, dark.]

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### Science and Engineering Practices

**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.
- Ask questions based on observations to find more information about the designed world. (P-ESS2-1)

**Planning and Carrying Out In 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.
- 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)

**Analyzing and Interpreting Data**

- Analyzing data in PK-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. (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)

**Connections to Nature of Science**

**Scientific Investigations Use a Variety of Methods**

- Scientists use different ways to study the world. (P-ESS1-1), (P-ESS2-1), (P-PS3-1)

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### Disciplinary Core Ideas

**P-PS1.B: Conservation of Energy and Energy Transfer**

- Sunlight warms Earth’s surface. (P-PS3-1)

**P-PS4.B: Electromagnetic Radiation**

- Objects can be seen if light is available to illuminate them or if they give off their own light. (P-PS3-1)

**ESS1.A: The Universe and Its Stars**

- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (P-ESS1-1)

**ESS1.B: Earth and the Solar System**

- Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (P-ESS1-2)

**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. (P-ESS2-1)

**ESS3.B: Natural Hazards**

- 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)

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### Crosscutting Concepts

**Patterns**

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (P-ESS1-1), (P-ESS2-1)

**Causation and Effect**

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (P-ESS2-1), (P-PS3-1)

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**Connections to Other Disciplines in Prekindergarten:** P-PK.S.A (P-ESS1-1)

**Articulation of DCIs across grades K-1: K-PSS2.A (P-ESS1-1); K-PSS2.D (P-ESS2-1); K-PSS3.B (P-ESS2-1); 1.PSS1.A (P-ESS1-1); 1.PSS1.B (P-ESS1-1);**

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**New York State Next Generation Learning Standards Connections:**

**ELA/Literacy-**

- PKR1 Participate in discussions about a text. (P-ESS1-1), (P-ESS2-1), (P-PS3-1)
- PKR4 Exhibit an interest in learning new vocabulary. (P-ESS1-1), (P-ESS2-1), (P-PS3-1)
- PKW2 Use a combination of drawing, dictating, oral expression, and/or emergent writing to name a familiar topic and supply information in child-centered, authentic, play-based learning. (P-ESS1-1), (P-ESS2-1), (P-PS3-1)
- PKW3 Use a combination of drawing, dictating, oral expression, and/or emergent writing to narrate an event or events in a sequence. (P-ESS1-1), (P-ESS2-1), (P-PS3-1)
- PKW7 Engage in a discussion using gathered information from experiences or provided resources. (P-ESS1-1), (P-ESS2-1), (P-PS3-1)
- PKSL2 Interact with diverse formats and texts. (P-ESS1-1), (P-ESS2-1), (P-PS3-1)
- PKSL3 Identify the speaker. (P-ESS1-1), (P-ESS2-1), (P-PS3-1)
- PKSL5 Create a visual display. (P-ESS1-1), (P-ESS2-1), (P-PS3-1)

**Mathematics-**

- 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)
- NY-PK.M.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)
- NY-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)
- NY-PK.G.2 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)
- NY-PK.G.4 Create and build shapes from components (e.g., sticks and clay balls). (P-ESS1-1), (P-PS3-1)

**Note:** Connection boxes updated as of September 2018

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### K. Matter and Its Interactions

**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*  

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

<table>
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- 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) |
| Investigations | | Cause and Effect |
| 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. | | 
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS1-1) |
| Analyzing and Interpreting Data | | Energy and Matter |
| Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations. | | 
- Students observe objects may break into smaller pieces, be put together into larger pieces, or change shapes. (K-PS1-1) |
| - With guidance, plan and conduct an investigation in collaboration with peers. (K-PS1-1) | | |
| - 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) | | |
| Connections to Nature of Science | | |
| Scientific Investigations Use a Variety of Methods | | |
| - Scientists use different ways to study the world. (K-PS1-1) | | |
| Connections to other DCIs in kindergarten: **K.ETS1.A** (K-PS2-2); **K.ETS1.B** (K-PS2-2) | | |
| 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) | | |
| New York State Next Generation Learning Standards | | |
| Connections: ELA/Literacy – | | |
| - KR1 Develop and answer questions about a text. (K-PS1-1) | | |
| - KW6 Develop questions and participate in shared research and exploration to answer questions and to build and share knowledge. (K-PS1-1) | | |
| - KSL3 Develop and answer questions to clarify what the speaker says. (K-PS1-1) | | |
| Mathematics – | | |
| - MP.2 Reason abstractly and quantitatively. (K-PS1-1) | | |
| - NY.K.MD.1 Describe measurable attributes of object(s), such as length or weight, using appropriate vocabulary. (K-PS1-1) | | |
| - NY.K.MD.2 Directly compare two objects with a common measurable attribute and describe the difference. (K-PS1-1) | | |
| *Connection boxes updated as of September 2018* | | |

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### 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.
  - With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1)

**Analyzing and Interpreting Data**
- Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
  - Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2)

### Disciplinary Core Ideas

**PS2.A: Forces and Motion**
- 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)

**PS2.B: Types of Interactions**
- When objects touch or collide, they push on one another and can change motion. (K-PS2-1)

**PS3.C: Relationship Between Energy and Forces**
- A bigger push or pull makes things speed up or slow down more quickly. (secondary to K-PS2-1)

**ETS1.A: Defining Engineering Problems**
- 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. (secondary to K-PS2-2)

### Crosscutting Concepts

**Cause and Effect**
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1), (K-PS2-2)

### Connections to Nature of Science

**Scientific Investigations Use a Variety of Methods**
- Scientists use different ways to study the world. (K-PS2-1)

### New York State Next Generation Learning Standards Connections

**ELA/Literacy -**
- KR1 Develop and answer questions about a text. (K-PS2-2)
- KW6 Develop questions and participate in shared research and exploration to answer questions and to build and share knowledge. (K-PS2-1)
- KSL3 Develop and answer questions to clarify what the speaker says. (K-PS2-2)
- MP.2 Reason abstractly and quantitatively. (K-PS2-1)

**Mathematics -**
- NY-K.MD.1 Describe measurable attributes of object(s), such as length or weight, using appropriate vocabulary. (K-PS2-1)
- NY-K.MD.2 Directly compare two objects with a common measurable attribute and describe the difference. (K-PS2-1)

*Connection boxes updated as of September 2018*

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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.]

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**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-ESS2-2. 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.*

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### Science and Engineering Practices

**Asking Questions and Defining Problems**

- **K-PS3-1:** Make observations to determine the effect of sunlight on Earth’s surface.
- **K-PS3-2:** Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

**Planning and Carrying Out Investigations**

- **K-PS3-1:** Make observations to determine the effect of sunlight on Earth’s surface.
- **K-PS3-2:** Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

**Analyzing and Interpreting Data**

- **K-PS3-1:** Make observations to determine the effect of sunlight on Earth’s surface.
- **K-PS3-2:** Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

**Constructing Explanations and Designing Solutions**

- **K-PS3-1:** Make observations to determine the effect of sunlight on Earth’s surface.
- **K-PS3-2:** Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

### Disciplinary Core Ideas

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

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

**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)

**ESS3.B: Natural Hazards**

- 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)

**ETS1.A: Defining and Delimiting an Engineering Problem**

- Asking questions, making observations, and gathering information are helpful in thinking about problems. (secondary to K-ESS3-2)

### Crosscutting Concepts

**Patterns**

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

**Cause and Effect**

- Events have causes that generate observable patterns. (K-PS3-1), (K-PS3-2), (K-ESS3-2)

**Connections to Engineering, Technology and Applications of Science**

- Interdependence of Science, Engineering, and Technology
  - People encounter questions about the natural world every day. (K-ESS3-2)

- Influence of Engineering, Technology, and Science on Society and the Natural World
  - People depend on various technologies in their lives; human life would be very different without technology. (K-ESS3-2)

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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)

- **Science Knowledge is Based on Empirical Evidence**
  - Scientists look for patterns and order when making observations about the world. (K-ESS2-1)

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New York State P-12 Science Learning Standards

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.ESS1.B** (K-PS3-2); **3.ESS2.D** (K-PS3-1),(K-ESS2-1); **3.ESS3.B**

New York State Next Generation Learning Standards Connections:

ELA/Literacy -

**KR1** Develop and answer questions about a text. (K-ESS3-2)

**KW6** Develop questions and participate in shared research and exploration to answer questions and to build and share knowledge. (K-PS3-1),(K-PS3-2),(K-ESS2-1)

**KSL3** Develop and answer questions to clarify what the speaker says. (K-ESS3-2)

Mathematics -

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

**MP.4** Model with mathematics. (K-ESS2-1),(K-ESS3-2)

**NY-K.CC** Counting and Cardinality (K-ESS2-1),(K-ESS3-2)

**NY-K.MD.1** Describe measurable attributes of objects, such as length or weight, using appropriate vocabulary. (K-ESS2-1)

**NY-K.MD.2** Directly compare two objects with a common measurable attribute and describe the difference. (K-PS3-1),(K-PS3-2)

**NY-K.MD.3** Classify objects into given categories; count the objects in each category and sort the categories by count. (K-ESS2-1)

*Connection boxes updated as of September 2018

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### 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.

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1, 1-PS4-3)

**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.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena (1-PS4-2)
- Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)

### Disciplinary Core Ideas

**PS4.A: Wave Properties**
- Sound can make materials vibrate, and vibrating matter can make sound. (1-PS4-1)

**PS4.B: Electromagnetic Radiation**
- Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)
- Some materials allow light to pass through them; others allow only some light through and others block all the light and create a dark shadow on any surface beyond them; where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels in a straight line is not included) (1-PS4-3)

**PS4.C: Information Technologies and Instrumentation**
- People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

### Crosscutting Concepts

**Cause and Effect**
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1, 1-PS4-2, 1-PS4-3)

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<td><strong>Constructing Explanations and Designing Solutions</strong></td>
<td><strong>LS1.A: Structure and Function</strong></td>
<td><strong>Patterns</strong></td>
</tr>
<tr>
<td>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.</td>
<td>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. (1-LS1-1)</td>
<td><strong>Patterns</strong></td>
</tr>
<tr>
<td>- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)</td>
<td><strong>LS1.B: Growth and Development of Organisms</strong></td>
<td><strong>Structure and Function</strong></td>
</tr>
<tr>
<td>- Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS3-1)</td>
<td>Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)</td>
<td><strong>The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)</strong></td>
</tr>
<tr>
<td><strong>Obtaining, Evaluating, and Communicating Information</strong></td>
<td><strong>LS1.D: Information Processing</strong></td>
<td><strong>Connections to Engineering, Technology, and Applications of Science</strong></td>
</tr>
<tr>
<td>Obtaining, evaluating, and communicating information in K-2 builds on prior experiences and uses observations and texts to communicate new information.</td>
<td>Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)</td>
<td><strong>Influence of Engineering, Technology, and Science on Society and the Natural World</strong></td>
</tr>
<tr>
<td>- Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)</td>
<td><strong>LS3.A: Inheritance of Traits</strong></td>
<td>Every human-made product is designed by applying some knowledge of the natural world and is built by using materials derived from the natural world. (1-LS1-1)</td>
</tr>
<tr>
<td>Connections to Nature of Science</td>
<td><strong>NY-1.NBT.2</strong></td>
<td><strong>(1-LS1-1)</strong></td>
</tr>
<tr>
<td><strong>Science Knowledge is Based on Empirical Evidence</strong></td>
<td>An individual of the same kind of plant or animal is recognizable as similar but can also vary in many ways. (1-LS1-1)</td>
<td><strong>Science Knowledge is Based on Empirical Evidence</strong></td>
</tr>
<tr>
<td>• Scientists look for patterns and order when making observations about the world. (1-LS1-2)</td>
<td><strong>NY-1.NBT.3</strong></td>
<td><strong>(1-LS1-1)</strong></td>
</tr>
<tr>
<td>Connections to other DCIs in first grade: N/A</td>
<td><strong>NY-1.NBT.4</strong> Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10. Use concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. Relate the strategy to a written method and explain the reasoning used. (1-LS1-2)</td>
<td><strong>NY-1.MD.1</strong> Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)</td>
</tr>
</tbody>
</table>

*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).*
1. Space Systems: Patterns and Cycles

### Science and Engineering Practices

**Planning and Carrying Out Investigations**
Planned and carried 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. (1-ESS1-2)

**Analyzing and Interpreting Data**
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

### Disciplinary Core Ideas

**ESS1.A: The Universe and its Stars**
- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)

**ESS1.B: Earth and the Solar System**
- Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)

### Crosscutting Concepts

**Patterns**
- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1), (1-ESS1-2)

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**Connections to Nature of Science**

- **Scientific Knowledge Assumes an Order and Consistency in Natural Systems**
  - Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
  - Many events are repeated. (1-ESS1-1)

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### New York State Next Generation Learning Standards Connections:

**ELA/Literacy** –
- 1W6 Develop questions and participate in shared research and explorations to answer questions and to build knowledge. (1-ESS1-1), (1-ESS1-2)
- 1W7 Recall and represent relevant information from experiences or gather information from provided sources to answer a question in a variety of ways. (1-ESS1-1), (1-ESS1-2)

**Mathematics** –
- MP.2 Reason abstractly and quantitatively. (1-ESS1-2)
- MP.4 Model with mathematics. (1-ESS1-2)
- MP.5 Use appropriate tools strategically. (1-ESS1-2)
- NY-1.OA.1 Use addition and subtraction within 20 to solve one step word problems involving situations of adding to, taking from, putting together, taking apart, and/or comparing with unknowns in all positions. (1-ESS1-2)
- NY-1.MD.4 Organize, represent, and interpret data with up to three categories, ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

*Connection boxes updated as of September 2018*
### 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.
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1)

#### Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2)

#### 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.
- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3)

#### 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. (2-PS1-4)

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### Disciplinary Core Ideas

#### PS1.A: Structure and Properties of Matter
- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)
- Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

#### PS1.B: Chemical Reactions
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)

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### Crosscutting Concepts

#### Patterns
- Events have causes that generate observable patterns. (2-PS1-4)
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)

#### Cause and Effect
- Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3)

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### Connections to Engineering, Technology, and Applications of Science

#### Influence of Engineering, Technology, and Science on Society and the Natural World
- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural environment.

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### ELA/Literacy

#### Develop questions and participate in shared research and explorations to answer questions and to build knowledge. (2-PS1-1),(2-PS1-2),(2-PS1-3)

#### Recall and represent relevant information from experiences or gather information from provided sources to answer a question. (2-PS1-1),(2-PS1-2),(2-PS1-3)

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### New York State P-12 Science Learning Standards

#### 2. Interdependent Relationships in Ecosystems

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

**2-LS2-2.** Develop a simple model that illustrates how plants and animals depend on each other for survival.*

*Clarification Statement: Examples could include animals dispersing seeds or pollinating plants, and plants providing food, shelter, and other materials for animals.*

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

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### Science and Engineering Practices

<table>
<thead>
<tr>
<th>Developing and Using Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
</tr>
<tr>
<td>- Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)</td>
</tr>
</tbody>
</table>

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

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### Disciplinary Core Ideas

<table>
<thead>
<tr>
<th>LS2.A: Interdependent Relationships in Ecosystems</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Animals depend on plants or other animals for food. (2-LS2-2)</td>
</tr>
<tr>
<td>- (NYSED) Plants depend on water, light and air to grow. (2-LS2-1)</td>
</tr>
<tr>
<td>- (NYSED) Some plants depend on animals for pollination and for dispersal of seeds from one location to another. (2-LS2-2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LS4.D: Biodiversity and Humans</th>
</tr>
</thead>
<tbody>
<tr>
<td>- There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ETS1.B: Developing Possible Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>- (NYSED) Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas to other people (secondary to 2-LS2-2)</td>
</tr>
</tbody>
</table>

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### Crosscutting Concepts

<table>
<thead>
<tr>
<th>Cause and Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Events have causes that generate observable patterns. (2-LS2-1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structure and Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Similarities and differences in patterns can be used to sort and classify organisms. (2-LS4-1)</td>
</tr>
</tbody>
</table>

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### Scientific Knowledge is Based on Empirical Evidence

| Scientists look for patterns and order when making observations about the world. (2-LS1-1) |

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### Connections to Nature of Science

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### Articulation of DCIs across grade levels:

| K.LS1.C (2-LS2-1); K-ESS3.A (2-LS2-1); K.ETS1.A (2-LS2-2); 3.LS4.C (2-LS4-1); 3.LS4.D (2-LS4-1); 5.LS1.C (2-LS2-1); 5.LS2.A (2-LS2-2), (2-LS4-1) |

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### New York State Next Generation Learning Standards Connections:

<table>
<thead>
<tr>
<th>ELA/Literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZW6 Develop questions and participate in shared research and explorations to answer questions and to build knowledge. (2-LS2-1), (2-LS4-1)</td>
</tr>
<tr>
<td>ZW7 Recall and represent relevant information from experiences or gather information from provided sources to answer a question. (2-LS2-1), (2-LS4-1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP.2 Reason abstractly and quantitatively. (2-LS2-1), (2-LS4-1)</td>
</tr>
<tr>
<td>MP.4 Model with mathematics. (2-LS2-1), (2-LS2-2), (2-LS4-1)</td>
</tr>
<tr>
<td>MP.5 Use appropriate tools strategically. (2-LS2-1)</td>
</tr>
</tbody>
</table>

| NY-2.MD.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 picture graph or a bar graph. (2-LS2-2), (2-LS4-1) |

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### 2. Earth’s Systems: Processes that Shape the Earth

**Science and Engineering Practices**

<table>
<thead>
<tr>
<th>Disciplinary Core Ideas</th>
<th>Crosscutting Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESS1.C: The History of Planet Earth</strong></td>
<td><strong>Patterns</strong></td>
</tr>
<tr>
<td>• Some events happen very quickly; others occur very slowly; over a time period much longer than one can observe. (2-ESS1-1)</td>
<td>• Patterns in the natural world can be observed. (2-ESS2-2),(2-ESS2-3)</td>
</tr>
<tr>
<td><strong>ESS2.A: Earth Materials and Systems</strong></td>
<td><strong>Stability and Change</strong></td>
</tr>
<tr>
<td>• Wind and water can change the shape of the land. (2-ESS2-1)</td>
<td>• Things may change slowly or rapidly. (2-ESS2-1)</td>
</tr>
<tr>
<td><strong>ESS2.B: Plate Tectonics and Large-Scale System Interactions</strong></td>
<td><strong>Connections to Engineering, Technology, and Applications of Science</strong></td>
</tr>
<tr>
<td>• Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)</td>
<td><strong>Influence of Engineering, Technology, and Science on Society and the Natural World</strong></td>
</tr>
<tr>
<td><strong>ESS2.C: The Roles of Water in Earth’s Surface Processes</strong></td>
<td>• Developing and using technology has impacts on the natural world. (2-ESS2-1)</td>
</tr>
<tr>
<td>• Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)</td>
<td><strong>Connections to Nature of Science</strong></td>
</tr>
<tr>
<td><strong>ETS1.C: Optimizing the Design Solution</strong></td>
<td><strong>Science Addresses Questions About the Natural and Material World</strong></td>
</tr>
<tr>
<td>• Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary to 2-ESS2-1)</td>
<td>• Scientists study the natural and material world. (2-ESS2-1)</td>
</tr>
</tbody>
</table>

**Additional Information**

- Articulation of DCIs across grade-levels: K.ETS1.A (2-ESS2-1); 3.LS2.C (2-ESS1-1); 4.ESS1.C (2-ESS1-1); 4.ESS2.A (2-ESS1-1),(2-ESS2-1); 4.ESS2.B (2-ESS2-2); 4.ESS2.C (2-ESS2-2); 5.ESS2.A (2-ESS2-1); 5.ESS2.B (2-ESS2-2); 5.ESS2.C (2-ESS2-2); 5.ESS2.D (2-ESS2-2)

New York State Next Generation Learning Standards Connections:

**ELA/Literacy**

- **2RI** Develop and answer such questions to demonstrate understanding of key ideas and details in a text. (2-ESS1-1)
- **2R3** In literary texts, describe how characters respond to major events and challenges. (2-ESS1-1),(2-ESS2-1)
- **2W6** Develop questions and participate in shared research and explorations to answer questions and to build knowledge. (2-ESS1-1), (2-ESS1-1)
- **2W7** Recall and represent relevant information from experiences or gather information from provided sources to answer a question. (2-ESS1-1),(2-ESS2-3)
- **2SL2** Recount or describe key ideas or details of diverse texts and formats. (2-ESS1-1)
- **2SL5** Include digital media and/or visual displays in presentations to clarify or support ideas, thoughts, and feelings. (2-ESS2-2)

**Mathematics**

- **MP.2** Reason abstractly and quantitatively. (2-ESS2-1),(2-ESS2-1),(2-ESS2-2)
- **MP.4** Model with mathematics. (2-ESS1-1),(2-ESS2-1),(2-ESS2-2)
- **MP.5** Use appropriate tools strategically. (2-ESS2-1)
- **NY-2.NBT.1** Understand place value. (2-ESS1-1)
- **NY-2.NBT.3** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2-ESS2-2)
- **NY-2.MD.5** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., using drawings and equations with a symbol for the unknown number to represent the problem. (2-ESS2-1)

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### Science and Engineering Practices

<table>
<thead>
<tr>
<th>Asking Questions and Defining Problems</th>
<th>Disciplinary Core Ideas</th>
<th>Crosscutting Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Asking questions and defining problems in K-2 builds on prior experiences and progresses to simple descriptive questions.</td>
<td>- ETS1A: Defining and Delimiting Engineering Problems</td>
<td>- Structure and Function</td>
</tr>
<tr>
<td>- Ask questions based on observations to find more information about the natural and/or designed world. (K-2-ETS1-1)</td>
<td>- A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)</td>
<td>- The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)</td>
</tr>
<tr>
<td>- Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)</td>
<td>- Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)</td>
<td></td>
</tr>
<tr>
<td>Developing and Using Models</td>
<td>- Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)</td>
<td></td>
</tr>
<tr>
<td>- 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.</td>
<td>- ETS1B: Developing Possible Solutions</td>
<td></td>
</tr>
<tr>
<td>- Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)</td>
<td>- 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)</td>
<td></td>
</tr>
<tr>
<td>Analyzing and Interpreting Data</td>
<td>- ETS1C: Optimizing the Design Solution</td>
<td></td>
</tr>
<tr>
<td>- Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</td>
<td>- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)</td>
<td></td>
</tr>
<tr>
<td>- Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Articulation of DCIs across grade-bands:

- **3-5.E5S1A** (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3); **3-5.E5S1B** (K-2-ETS1-2),(K-2-ETS1-3); **3-5.E5S1C** (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3)