

DRAFT - New York State P-12 Science Learning Standards – DRAFT

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).

DRAFT - New York State P-12 Science Learning Standards – DRAFT

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; border-top: 1px dashed black; margin-top: 20px;"><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)

Connections to other DCIs in prekindergarten: **P.ESS2.D** (P-LS1-1); **P.PS3.B** (P-LS1-2)

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)

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-LS1-1),(P-LS1-2),(P-LS3-1)
- 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)
- 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)
- 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)
- 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)
- 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)
- 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)
- 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)
- 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)
- 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)

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

*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).

DRAFT - New York State P-12 Science Learning Standards – DRAFT

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

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 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)

Disciplinary Core Ideas

PS3.B: Conservation of Energy and Energy Transfer

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

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)

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)

Cause and Effect

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

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- People encounter questions about the natural world every day. (P-ESS2-1)

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. (P-ESS2-1)

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- 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);

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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)

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)
- 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)
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