

Introduction: The science standards in grades K-5 are grade specific. This document serves as one reference when evaluating K-5 science curriculum. Each grade has an example storyline that provides a rationale for the performance expectations (PEs) in each grade. The storylines are organized by [Disciplinary Core Idea](#) (DCI). The hyperlinked title provides quick access to the complete storyline and its PEs when the user needs greater detail on what is expected of students.

Some districts chose to base their revised curriculum on the [NJ Model Science Curriculum](#). Each unit of instruction includes a guiding question, a unit overview, estimated number of instructional days necessary to complete the unit, and Student Learning Objectives. Sometimes the storylines in the model curriculum units have been modified from the original narratives.

[Kindergarten Science](#)

Students in kindergarten formulate answers to questions such as: *“What happens if you push or pull an object harder? Where do animals live and why do they live there? What is the weather like today and how is it different from yesterday?”*

Students are able to apply an understanding of the effects of different strengths or different directions of pushes and pulls on the motion of an object to analyze a design solution.

Students develop understandings of what plants and animals (including humans) need to survive and the relationship between their needs and where they live.

Students develop understandings of patterns and variations in local weather and the purpose of weather forecasting to prepare for, and respond to, severe weather.

The crosscutting concepts of patterns; cause and effect; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas.

Students are expected to demonstrate grade-appropriate proficiency in asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understandings.

There are 10 Performance Expectations in kindergarten.

K-PS2 Motion and Stability: Forces and Interactions

K-PS2-1

K-PS2-2*

K-PS3 Energy

K-PS3-1

K-PS3-2*

K-LS1 From Molecules to Organisms: Structures and Processes

K-LS1-1

K-ESS2 Earth’s Systems

K-ESS2-1

K-ESS2-2

K-ESS3 Earth and Human Activity

K-ESS3-1

K-ESS3-2*

K-ESS3-3*

(An asterisk indicates that the PE incorporates Engineering Practices.)

First Grade Science

Students in first grade formulate answers to questions such as: *“What happens when materials vibrate? What happens when there is no light? What are some ways plants and animals meet their needs so that they can survive and grow? How are parents and their children similar and different? What objects are in the sky and how do they seem to move?”*

Students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and ability to see objects. The idea that light travels from place to place can be understood by students at this level through determining the effect of placing objects made with different materials in the path of a beam of light.

Students also develop understandings of how plants and animals use their external parts to help them survive, grow, and meet their needs as well as how behaviors of parents and offspring help the offspring survive.

The understanding is developed that young plants and animals are like, but not exactly the same as, their parents.

Students also observe, describe, and predict some patterns of the movement of objects in the sky.

The crosscutting concepts of patterns; cause and effect; structure and function; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas.

First grade students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understandings.

There are 9 Performance Expectations in first grade.

1-PS4 Waves and their Applications in Technologies for Information Transfer

1-PS4-1

1-PS4-2

1-PS4-3

1-PS4-4*

1-LS1 From Molecules to Organisms: Structures and Processes

1-LS1-1*

1-LS1-2

1-LS3 Heredity: Inheritance and Variation of Traits

1-LS3-1

1-ESS1 Earth’s Place in the Universe K-ESS2-1

1-ESS1-1

1-ESS1-2

(An asterisk indicates that the PE incorporates Engineering Practices.)

Second Grade Science

Students in second grade formulate answers to questions such as: *“How does land change and what are some things that cause it to change? What are the different kinds of land and bodies of water? How are materials similar and different from one another, and how do the properties of the materials relate to their use? What do plants need to grow? How many types of living things live in a place?”*

Students apply their understanding of the idea that wind and water can change the shape of the land to compare design solutions to slow or prevent such change.

Students use information and models to identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth.

An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials.

Students develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination.

Students also expected to compare the diversity of life in different habitats.

The crosscutting concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas.

Students are expected to demonstrate grade appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understandings.

There are 11 Performance Expectations in second grade.

2-PS1 Matter and its Interactions

2-PS1-1

2-PS1-2*

2-PS1-3

2-PS1-4

2-LS2 Ecosystems: Interactions, Energy, and Dynamics

2-LS2-1

2-LS2-2*

2-LS4 Biological Evolution: Unity and Diversity

2-LS4-1

2-ESS1 Earth’s Place in the Universe

2-ESS1-1

2-ESS2 Earth’s Systems

2-ESS2-1*

2-ESS2-2

2-ESS2-3

(An asterisk indicates that the PE incorporates Engineering Practices.)

The Engineering Design standards are arranged in grade bands. The engineering design performance expectations are always combined with disciplinary core ideas. Below are the performance expectations for grades K-2 and the performance expectations where they are integrated.

K-2-ETS1 Engineering Design

K-2-ETS1-1

K-2-ETS1-2

K-2-ETS1-3

K-2 Performance Expectations that incorporate Engineering Practices

K-PS2-2, K-PS3-2, K-ESS3-2, and K-ESS3-3

1-PS4-4 and 1-LS1-1

2-PS1-2, 2-LS2-2, and 2-ESS2-1

Third Grade Science

Students in third grade formulate answers to questions such as: *“What is typical weather in different parts of the world and during different times of the year? How can the impact of weather-related hazards be reduced? How do organisms vary in their traits? How are plants, animals, and environments of the past similar or different from current plants, animals, and environments? What happens to organisms when their environment changes? How do equal and unequal forces on an object affect the object? How can magnets be used?”*

Students organize and use data to describe typical weather conditions expected during a particular season. By applying their understanding of weather-related hazards, students are able to make a claim about the merit of a design solution that reduces the impacts of such hazards.

Students develop an understanding of the similarities and differences of organisms’ life cycles. An understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops, is acquired by students at this level. In addition, students are able to construct an explanation using evidence for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

Third graders develop an understanding of the idea that when the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die. Students are expected to develop an understanding of types of organisms that lived long ago and also about the nature of their environments.

Students determine the effects of balanced and unbalanced forces on the motion of an object and the cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

They apply their understanding of magnetic interactions to define a simple design problem that can be solved with magnets.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas.

Students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems; developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understandings.

There are 15 Performance Expectations in third grade.

3-PS2 Motion and Stability: Forces and Interactions

- 3-PS2-1
- 3-PS2-2
- 3-PS2-3
- 3-PS2-4*

3-LS1 From Molecules to Organisms: Structures and Processes

- 3-LS1-1

3-LS2 Ecosystems: Interactions, Energy, and Dynamics

- 3-LS2-1

3-LS3 Heredity: Inheritance and Variation of Traits

- 3-LS3-1 and 3-LS3-2

3-LS4 Biological Evolution: Unity and Diversity

- 3-LS4-1
- 3-LS4-2
- 3-LS4-3
- 3-LS4-4*

3-ESS2 Earth’s Systems

- 3-ESS2-1
- 3-ESS2-2

3-ESS3 Earth and Human Activity

- 3-ESS3-1*

(An asterisk indicates that the PE incorporates Engineering Practices.)

Fourth Grade Science

Students in fourth grade formulate answers to questions such as: *“What are waves and what are some things they can do? How can water, ice, wind and vegetation change the land? What patterns of Earth’s features can be determined with the use of maps? How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals? What is energy and how is it related to motion? How is energy transferred? How can energy be used to solve a problem?”*

Students use a model of waves to describe patterns of waves in terms of amplitude and wavelength, and that waves can cause objects to move.

Students develop understanding of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. They apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of such processes on humans.

Fourth graders develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Students use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object.

Students develop an understanding that energy can be transferred from place to place by sound, light, heat, and electric currents or from object to object through collisions.

They apply their understanding of energy to design, test, and refine a device that converts energy from one form to another.

In order to describe patterns of Earth’s features, students analyze and interpret data from maps.

By developing a model, they describe that an object can be seen when light reflected from its surface enters the eye.

The crosscutting concepts of patterns; cause and effect; energy and matter; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas.

Students are expected to demonstrate grade-appropriate proficiency in asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understandings.

There are 14 Performance Expectations in fourth grade.

4-PS3 Energy

4-PS3-1

4-PS3-2

4-PS3-3

4-PS3-4*

4-PS4 Waves and their Applications in Technologies for Information Transfer

4-PS4-1

4-PS4-2

4-PS4-3*

(An asterisk indicates that the PE incorporates Engineering Practices.)

4-LS1 From Molecules to Organisms: Structures and Processes

4-LS1-1

4-LS1-2

4-ESS1 Earth’s Place in the Universe

4-ESS1-1

4-ESS2 Earth’s Systems

4-ESS2-1

4-ESS2-2

4-ESS3 Earth and Human Activity

4-ESS3-1

4-ESS3-2*

Fifth Grade Science

Fifth grade students formulate answers to questions such as: *“When matter changes, does its weight change? How much water can be found in different places on Earth? Can new substances be created by combining other substances? How does matter cycle through ecosystems? Where does the energy in food come from and what is it used for? How do lengths and directions of shadows or relative lengths of day and night change from day to day, and how does the appearance of some stars change in different seasons?”*

Students describe that matter is made of particles too small to be seen through the development of a model. Students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances.

Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth.

Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals’ food was once energy from the sun.

Students develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas.

In the fifth grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understandings.

There are 13 Performance Expectations in fifth grade.

5-PS1 Matter and Its Interactions

- 5-PS1-1
- 5-PS1-2
- 5-PS1-3
- 5-PS1-4

5-PS2 Motion and Stability: Forces and Interactions

- 5-PS2-1

5-PS3 Energy

- 5-PS3-1

5-LS1 From Molecules to Organisms: Structures and Processes

- 5-LS1-1

5-LS2 Ecosystems: Interactions, Energy, and Dynamics

- 5-LS2-1

5-ESS1 Earth’s Place in the Universe

- 5-ESS1-1
- 5-ESS1-2

5-ESS2 Earth’s Systems

- 5-ESS2-1
- 5-ESS2-2

5-ESS3 Earth and Human Activity

- 5-ESS3-1

(None of the fifth grade PE’s incorporate Engineering Practices.)

The Engineering Design standards are arranged in grade bands. The engineering design performance expectations are always combined with disciplinary core ideas. Below are the performance expectations for grades K-2 and the performance expectations where they are integrated.

3-5-ETS1 Engineering Design

- 3-5-ETS1-1, 3-5-ETS1-2, and 3-5-ETS1-3

3-5 Performance Expectations that incorporate Engineering Practices

- 3-PS2-4, 3-LS4-4, and 3-ESS3-1
- 4-PS3-4, PS4-3, and 4-ESS3-2