

Fairfield Public Schools Science Curriculum

Grade 1



FAIRFIELD
PUBLIC SCHOOLS

Grade 1: Description

Patterns in the natural world can be observed and used as evidence to describe phenomena.

The elementary science standards are driven by questions to spark curiosity, guide instruction, deepen investigation into phenomena, acquire rigorous content knowledge and enable students to transfer the knowledge of ideas in real-world situations and to design and find solutions to problems. In the performance expectations, 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 understanding of the disciplinary core ideas in earth science, life science and physical science. The standards define what students should know about the most essential ideas in the major science disciplines. Cross-cutting concepts provide students with connections and intellectual tools that are related across the differing areas of disciplinary content and can enrich their application of practices and their understanding of core ideas. These standards also tie together the influence of engineering, technology, and science on society and the natural world.

There is one physical science disciplinary core ideas in grade one: 1) Waves and their Application in technologies for Information Transfer. There are two life science disciplinary core ideas: 1) From Molecules to Organisms: Structures and Processes, 2) Heredity: Inheritance and Variation of Traits. And, there is one earth science disciplinary core idea: 1) Earth's Place in the Universe.

The first grade science performance expectations require that students examine patterns, cause and effect relationships, and the structure and function of living things. Students will observe, ask questions, investigate, describe, and use evidence to predict some patterns of the movement of objects in the sky. They will investigate phenomena related to waves by asking questions and deepening their understanding of the relationship between sound and vibrating materials as well as the relationship 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 are also expected to develop understanding 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.

NGSS Standards

SCIENCE AND ENGINEERING PRACTICES (SEP):

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

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

CROSS-CUTTING CONCEPTS (CCC):

Patterns

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

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)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)

Corresponding Connecticut Core Standards:

ELA/Literacy –

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-ESS1-1),(1-ESS1-2)

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (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)

1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)

1.MD.C.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)

Grade 1: Overview

Essential Understandings

- The movement of objects in the sky follows observable patterns.
- There is a relationship between sound and vibrating materials as well as between the availability of light and ability to see objects.
- Plants and animals use their external parts to help them survive, grow, and meet their needs. Behaviors of parents and offspring help the offspring survive. Young plants and animals are like, but not exactly the same as, their parents.

Course Essential Questions

- What natural objects are observable in the sky and how do they seem to move?
- How does the vibration of objects relate to the sound they make?
- How does light or the lack of light affect how we see objects?
- How does the shape of animals and plants help them survive and how does their behavior help their off-spring?

Grade 1: Year-at-a Glance

| Unit | Title | Unit Essential Questions |
|------|---|--|
| 1 | Space Systems: Patterns and Cycles | <ul style="list-style-type: none">• What objects are in the sky and how do they appear to move?• What is the relationship between the amount of daylight and the time of year? |
| 2 | Waves, Light and Sound | <ul style="list-style-type: none">• How do vibrating objects make sound, and how does sound make objects vibrate?• How does light or the lack of light affect how we see objects? |
| 3 | Structure, Function, and Information Processing | <ul style="list-style-type: none">• How do plant and animal parts help them survive and grow?• How are plants and animals and their offspring similar and different? |

Space Systems: Patterns and Cycles

Overview

Space Systems, and observations of the sun, moon, and stars will be used to generate questions. Evidence will be gathered to describe patterns that can be used to make predictions. Some examples of patterns could include how the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day. Throughout the year students will also observe, describe, and predict the seasonal patterns of sunrise and sunset. The emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.

Unit Performance Expectations

At the conclusion of this unit, students will be able to:

1-ESS 1-1. Use observations of the movement of the sun, moon, and stars to describe patterns that can be predicted.

1-ESS 1-2. Make observations at different times of year to relate the amount of daylight to the time of year.

Unit Essential Questions

- What objects are in the sky and how do they appear to move?
- What is the relationship between the amount of daylight and the time of year?

NGSS Unit Standards

DISCIPLINARY CORE IDEAS (DCI):

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)

SCIENCE AND ENGINEERING PRACTICES (SEP):

- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data

CROSS-CUTTING CONCEPTS (CCC):

- Patterns

Corresponding Connecticut Core Standards:

ELA/Literacy –

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1- ESS1-1),(1-ESS1-2)

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (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)

1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)

1.MD.C.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)

Waves: Light and Sound

Overview

In this unit, first grade students ask questions, investigate, and deepen their understanding about sound and light. They make observations and generate questions about how sound can make matter vibrate and how vibrating matter can make sound. They deepen their understanding through questioning and investigating the causal relationships. Students also make observations, gather evidence and communicate the effect of complete darkness or absence of light on the ability to see objects. Students will investigate the effect of placing objects made with different transparent, translucent, opaque and reflective materials in the path of a beam of light. Students transfer their understanding of sound and light to design a means for communicating.

Unit Performance Expectations

At the conclusion of this unit, students will be able to:

1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sounds can make materials vibrate.

1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated.

1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.

1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

Unit Essential Questions

- How do vibrating objects make sound, and how does sound make objects vibrate?
- How does light or the lack of light affect how we see objects?

NGSS Unit Standards

DISCIPLINARY CORE IDEAS (DCI):

PS4.A: Wave Properties

- Sound can make matter 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. (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)

SCIENCE AND ENGINEERING PRACTICES (SEP):

- Planning and Carrying Out Investigations
- Constructing Explanations and Designing Solutions

CROSS-CUTTING CONCEPTS (CCC):

- Cause and Effect

Corresponding Connecticut Core Standards:

ELA/Literacy –

W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-PS4- 1),(1-PS4-2),(1-PS4-3),(1-PS4-4)

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1),(1-PS4-2),(1- PS4-3)

SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1),(1-PS4-2),(1- PS4-3)

Mathematics –

MP.5 Use appropriate tools strategically. (1-PS4-4)

1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4)

1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4)

Structure, Function, and Information Processing

Overview

In this unit, first grade students deepen their understanding of how the external parts of plants and animals help them survive, grow, and meet their needs. Students investigate how all organisms have external parts and that 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. They will learn that plants have different parts - roots, stems, leaves, flowers, fruits. Animals also 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. Students will understand that the behavior of parents and offspring help the offspring survive and that young plants and animals are alike, but not exactly the same as their parents. Students will transfer what they have learned about how external parts of plants and animals are used to design a solution to a problem.

Unit Performance Expectations

At the conclusion of this unit, students will be able to:

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Unit Essential Questions

- How do plant and animal parts help them survive and grow?
- How are plants and animals and their offspring similar and different?

NGSS Unit Standards

DISCIPLINARY CORE IDEAS (DCI):

LS1.A: Structure and Function

- 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)

LS1.B: Growth and Development of Organisms

- 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)

LS1.D: Information Processing

- 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)

LS3.A: Inheritance Traits

- Young animals are very much, but not exactly, like their parents. (1-LS3-1)

LS3.B: Variation of Traits

- Individuals of the same kind of plant or animal are recognizable as similar, but can also vary in many ways. (1-LS3-1)

SCIENCE AND ENGINEERING PRACTICES (SEP):

- Constructing Explanations and Designing Solutions
- Obtaining, Evaluating, and Communicating Information

CROSS-CUTTING CONCEPTS (CCC):

- Patterns
- Structure and Function

Corresponding Connecticut Core Standards:

ELA/Literacy –

RI.1.1 Ask and answer questions about key details in a text. (1-LS1-2),(1-LS3-1)

RI.1.2 Identify the main topic and retell key details of a text. (1-LS1-2)

RI.1.10 With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2)

W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-LS1-1),(1-LS3-1)

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)

Mathematics –

MP.2 Reason abstractly and quantitatively. (1-LS3-1)

MP.5 Use appropriate tools strategically. (1-LS3-1)

1.NBT.B.3 Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols $>$, $<$, and $=$ (1-LS1-2)

1.NBT.C.4 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, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)

1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)

1.NBT.C.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)

1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)