Fairfield Public Schools
Science Curriculum

Grade Kindergarten

Course: Description

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.

Kindergarten students are expected to develop understanding in the core disciplines of patterns and variations in local weather and the purpose of weather forecasting to prepare for, and respond to, severe weather. Students are expected 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 and design a solution to a problem. Students are also expected to develop understanding of what plants and animals (including humans) need to survive and the relationship between their needs, why they live where they live, and the impact they have on their environment.

Course: Overview

Essential Understandings

- Weather has observable and measureable patterns that can be recorded and used to make predictions.
- Pushes and pulls can have different strengths and directions and will have an effect on how an object moves.
- Living things (plants, animals and humans) need light, water, air, and resources from the land, and they live and grow in places that have the things they need.
- Things that plants and animals (including people) do to live can affect the world around them. People can make choices that reduce their impact on the land, water, air, and other living things.

Course Essential Questions

- How do we have an impact on the environment around us and how does the environment have an impact on us?
- How do patterns and variations in local weather affect us?
- How do different strengths or different directions of pushes or pulls affect still objects or objects in motion?
- How does the environment affect how plants and animals survive and how do they affect their environment?

Course: Year-at-a Glance

Unit	Title	Unit Essential Questions
1	Weather and Climate	• What patterns do you notice in the weather and how do those patterns help us know what the weather will be? • How does the sun affect different parts of the Earth? • How can we change the warming effect of the sun?
2	Push, Pull, Go	• What happens if you push or pull an object? • How can the speed and direction of an object change with a push or a pull? • What happens if an object hits another object and how does speed and direction affect both objects?
3	Animals, Plants and Their Environment	• How are things influenced by where they live? • Why do plants and animals live where they do? • How do plants and animals (including humans) change the environment to meet their needs, and how can they make less of an impact?

NGSS Standards

SCIENCE AND ENGINEERING PRACTICES (SEP):

Asking Questions and Defining Problems

Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.

- Ask questions based on observations to find more information about the designed world. (K-ESS3-2)

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. (K-PS3-1)

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. (K-ESS2-1)

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.

- Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)

CROSS-CUTTING CONCEPTS (CCC):

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)

Systems and System Models

- Systems in the natural and designed world have parts that work together. (K-ESS2-2),(K-ESS3-1)

Unit 1
Earth & Space Science - Weather and Climate

Overview

Kindergarten students will focus on the study of weather and climate in this unit. Students will observe local weather conditions to describe patterns over time. They will make observations, ask questions, gather data, identify and predict patterns, and use evidence to communicate their reasoning about local weather conditions including severe weather. They will investigate and understand how sunlight can affect the Earth's surface including relative measures of temperature of sand, soil, rocks, and water. They will also investigate structures that could minimize the warming effects of the sun and the impact humans have on the environment.

Unit Content Objectives

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

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.

K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.

K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

Unit Essential Questions

- What patterns do you notice in the weather and how do those patterns help us know what the weather will be?
- How does the sun affect different parts of the Earth?
- How can we change the warming effect of the sun?

NGSS Unit Standards

DISCIPLINARY CORE IDEAS (DCI):

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 problem (secondary to K-ESS3-2)

SCIENCE AND ENGINEERING PRACTICES (SEP):

- **Asking Questions and Defining Problems**
- **Planning and Carrying Out Investigations**
- **Analyzing and Interpreting Data**
- **Constructing Explanations and Designing Solutions**
- **Obtaining, Evaluating, and Communicating Information**

CROSS-CUTTING CONCEPTS (CCC):

- **Patterns**
- **Cause and Effect**

Unit 2
Physical Science – Pushes & Pulls

Overview

In this unit, Kindergarten students ask questions and deepen their understanding about why objects move or stand still when forces and interactions between physical objects are applied. Students will be able to investigate and measure how an object's movement is impacted by the relative strength or direction of pushing and pulling. They will interpret information gained during investigations, identify a problem, and design and test a solution for how a proposed push or pull will affect the speed and direction of an object.

Unit Content Objectives

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

K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Unit Essential Questions

- What happens if you push or pull an object?
- How can the speed and direction of an object change with a push or a pull?
- What happens if an object hits another object and how does speed and direction affect both objects?

NGSS Unit Standards

DISCIPLINARY CORE IDEAS (DCI):

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)

SCIENCE AND ENGINEERING PRACTICES (SEP):

- **Planning and Carrying Out Investigations**
- **Analyzing and Interpreting Data**

CROSS-CUTTING CONCEPTS (CCC):

- **Cause and Effect**

Corresponding CT Core Standards:

Common Core State Standards Connections:

ELA/Literacy –

RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-PS2-2)

W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1)

SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2)

Mathematics –

MP.2 Reason abstractly and quantitatively. (K-PS2-1)

K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-1)

K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has “more of”/p“less of” the attribute, and describe the difference. (K-PS2-1)

Unit 3
Life Science - Animals, Plants and Their Environment

Overview

In this unit, Kindergarten students investigate the relationship between different plants, animals (including humans) and their environment. Students will ask questions, make observations and communicate the patterns they notice about what animals and plants need for survival. They will describe and present evidence for how animals and plants alter the environment when necessary, and show how plants and animals depend on their environment. They will also share ideas on how to reduce the impact people have on resources such as air, water and land resources.

Unit Content Objectives

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

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive

K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

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.

K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

Unit Essential Questions

- How are things influenced by where they live?
- Why do plants and animals live where they do?
- How do plants and animals (including humans) change the environment to meet their needs, and how can they make less of an impact?

NGSS Unit Standards

DISCIPLINARY CORE IDEAS (DCI):

LS1.C: Organization for Matter and Energy Flow in Organisms
All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1)
ESS2.E: Biogeology
Plants and animals can change their environment. (K-ESS2-2)
ESS3.A: Natural Resources
Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1)
ESS3.C: Human Impacts on Earth Systems
Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (secondary to K-ESS2-2),(K-ESS3-3)
ETS1.B: Developing Possible Solutions Developing and Using Models
Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (secondary to K-ESS3-3)
SCIENCE AND ENGINEERING PRACTICES (SEP):

- **Developing and Using Models**
- **Analyzing and Interpreting Data**
- **Engaging in Argument from Evidence**
- **Obtaining, Evaluating, and Communicating Information**

CROSS-CUTTING CONCEPTS (CCC):

- **Patterns**
- **Cause and Effect**
- **Systems and System Models**

Corresponding CT Core Standards:

Common Core State Standards Connections:

ELA/Literacy –
RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)
W.K.1 Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)
W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS2-2),(K-ESS3-3)
W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)
SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1)

Mathematics –
MP.2 Reason abstractly and quantitatively. (K-ESS3-1)
MP.4 Model with mathematics. (K-ESS3-1)
K.CC Counting and Cardinality (K-ESS3-1)
K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-LS1-1)