

Greenwich Public Schools Science Curriculum Objectives

Grade 4

THE NATURE OF SCIENTIFIC INQUIRY, LITERACY AND NUMERACY

Connecticut State Standards for Grades 3, 4, 5

Scientific Inquiry:	Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena.
Scientific Literacy:	Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science
Scientific Numeracy:	Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas.

Enduring Understanding:

Scientific inquiry is the process that scientists follow to find answers to questions about the natural world. Scientific inquiry includes asking questions, recording observations, making predictions and communicating ideas and theories that help explain the world around us.

Essential Question:

How is scientific knowledge created and communicated?

Important to Know and Do:

Students will...

1. Make observations and ask questions about objects, organisms and the environment.
2. Seek relevant information in books, magazines and electronic sources of information.
3. Design and conduct simple investigations.
4. Employ simple equipment and measuring tools to gather data and extend the senses.
5. Use data to construct reasonable explanations.
6. Analyze, critique and communicate investigations using words, graphs and drawings.
7. Read and write a variety of fiction and non-fiction science-related texts.
8. Search the web and locate relevant science information.
9. Use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.
10. Use mathematics to analyze, interpret and present data.

Fourth Grade Science Objectives Physics - Electricity and Magnetism

Connecticut State Standard 4.4: Electrical and magnetic energy can be transferred and transformed.

Enduring Understanding:

Energy can be transformed into light, heat, sound and magnetic effects.

Essential Question:

How are electrical, magnetic, sound and light energies transferred and transformed?

Important to Know and Do:

Student will...

1. Describe how batteries, wires and bulbs can transfer energy to light a light bulb (Connecticut Expected Performance B14).
2. Explain how simple electrical circuits can be used to determine what materials conduct electricity (Connecticut Expected Performance B 15).
3. Differentiate between open, closed, series and parallel circuits.
4. Recognize and identify conductors and nonconductor/insulators and explains how nonconductors/insulators reduce heat loss.
5. Explain how electricity in circuits can be transformed into light, heat, sound and magnetic effects.
6. Explain how magnets can make objects move without direct contact between the object and the magnet.
7. Describe the properties of magnets and how they can be used to identify and separate mixtures of solid materials (Connecticut Expected Performance B16).

Worth Being Familiar With:

1. Design and build a simple electric machine or a model that uses electricity.
2. Describe how to make safe electrical connections with various plugs, sockets and terminals.
3. Explain the need for fuse and circuit breakers.
4. Recognize that electrical power is measured in amps, volts and kilowatts.

5. Describe the contributions of Thomas A. Edison (e.g. his patents on over 1,000 inventions, many dealing with electricity), Michael Faraday (e.g. his work with currents), and Granville T. Woods (E.g. his railway telegraph system).

Fourth Grade Science Objectives

Physics - Sound and Light

Connecticut State Standard 5.1: Sound and light are forms of energy

Enduring Understanding:

Electricity in circuits can be transformed into light, heat, sound and magnetic effects.

Essential Question:

How is electrical, magnetic, sound and light energies transferred and transformed?

Important to Know and Do:

Students will...

1. Describe the factors that affect the pitch and loudness of sound produced by vibrating objects (Connecticut Expected Performance B17).
2. Describe how sound is transmitted, reflected and/absorbed by different materials (Connecticut Expected Performance B18).
3. Describe how light is absorbed and/or reflected by different surfaces (Connecticut Expected Performance B19).
4. Describe how light absorption and reflection allows us to see the shapes and colors of objects (Connecticut Expected Performance B20).
5. Recognizes that sound is a form of energy.
6. Demonstrate that light is a form of energy.

Worth Being Familiar With:

1. Recognize that primary colors of light can be mixed to create other colors.
2. Recognize that black is the absence of all color and white is all colors combined.

Fourth Grade Science Objectives

Zoology/Ecology

Connecticut State Standard 3.2: Organisms can survive and reproduce only in environments that meet their basic needs.

Connecticut State Standard 4.2: All organisms depend on the living and non-living features of the environment for survival.

Enduring Understanding:

All organisms depend on the living and non-living features of the environment for survival.

Essential Question:

How are living things designed to interact with their habitats to ensure survival?

Important to Know and Do:

Students will...

1. Recognize and describe how different animals have adapted to obtain air, water, food and protection in their habitat (Connecticut Expected Performance B3 and B4).
2. Name the characteristics of an animal (a case study of birds would include having backbones, are warm-blooded, have feathers, two wings and claws or webbed feet, breathe with lungs, lay eggs).
3. Relate the animal adaptations to its environment (e.g. a bird's feet are webbed for a water environment)
4. Recognize that animals have special adaptations that help them survive in their habitat (e.g. bird feet, beak and wings).
5. Explain how protective coloration, camouflage and/or warning coloration help an animal survive in its environment.
6. Explain what happens when an animal cannot adapt to its environment (e.g. threatened, endangered and extinct species).
7. Describe how animals depend directly or indirectly on plants to provide food and energy they need in order to survive (Connecticut Expected Performance B10).

8. Describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants (Connecticut Expected Performance B11).
9. Describe simple food chains (e.g. sun-grass-cow-person) in land and water environments including decomposers, plants and animals.
10. Recognize that animals get their energy from plants and that plants get their energy from the sun.
11. Define, classify and give examples of herbivores (organisms that eat only plants), carnivores (organisms that eat only animals), omnivores (organisms that eat both plants and animals), and predators and their prey.

Worth Being Familiar With:

1. Describe the contributions of different naturalists in studying the different environments (e.g. John James Audubon, John Muir, Rachel Carson and Jacques Cousteau).
2. Describe the way major disasters have impacted natural habitats and its inhabitants (e.g. oil spills, hurricanes).

Fourth Grade Science Objectives Geology and Earth Dynamics

Connecticut State Standard 3.1: Materials have properties that can be identified and described through the use of simple tests.

Connecticut State Standard 4.3: Water has a major role in shaping the Earth's surface.

Enduring Understanding:

Water has a major role in shaping the Earth's surface.

Essential Question:

How do natural sources of energy (wind, solar and water) affect the earth's systems/cycles?

Important to Know and Do:

Students will...

1. Describe the effect of heating and cooling on the melting, evaporation, condensation and freezing of water (Connecticut Expected Performance B2).
2. Describe how the sun's energy drives the water cycle, including evaporation, condensation and precipitation, how it affects the shape of the land (Connecticut Expected Performance B12).
3. Describe the role of water in erosion and river formation (Connecticut Expected Performance B13).
4. Define and explain the factors that cause weathering (e.g. climate, time, mineral composition, wind, waves, freezing and thawing of water)
5. Define and explain erosion and what factors affect erosion.
6. Define and explain deposition and what factors affect deposition.
7. Identify landforms that result from weathering and erosion.

Worth Being Familiar With:

1. Recognize that the results of weathering are smaller pieces of the parent material.
2. Explain how the energy in fossil fuels (such as oil, gas and coal) comes indirectly from the sun.
3. Describe ways to control and prevent erosion.
4. Describe the layers that form during deposition.