

Grade 4

Overview

Science in grade four focuses on providing students with the opportunity to learn age-appropriate concepts and skills in the life, earth, and physical sciences and to acquire scientific attitudes and habits of mind. The students' study of science includes observing, measuring, recording, questioning, analyzing, identifying, and drawing conclusions. Through their explorations, students develop an understanding of and an ability to apply the Indicators of the scientific method. Specifically, fourth graders explore the sciences within the framework of the following topics: "Organisms and Their Environments" (patterns of behavior and changes in the environment); "Astronomy" (Earth, Sun, Moon and planets); "Weather" (water cycle, clouds, and severe weather); and "Properties of Light and Electricity" (reflection, refraction, and series and parallel circuits).

The science standards for grade four provide richness and a wide variety of learning experiences, materials, and instructional strategies to accommodate a broad range of student's individual differences. Students are actively engaged in their learning by observing, interacting with materials and with people, and asking questions as they explore new concepts and expand their understanding.

Scientific Inquiry

The skills of scientific inquiry, including knowledge and use of tools, are not taught as separate skills in science, but are embedded throughout because these process skills are fundamental to all science instruction and content. A table of the PK–12 of scientific inquiry standards and Indicators: is provided in appendix A.

Standard:	4Sa:	The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.
Indicators:	4Sa.1:	Classify observations as either quantitative or qualitative.
	4Sa.2:	Use appropriate instruments and tools (including a compass, an anemometer, mirrors, and a prism) safely and accurately when conducting simple investigations.
	4Sa.3:	Summarize the characteristics of a simple scientific investigation that represent a fair test (including a question that identifies the problem, a prediction that indicates a possible outcome, a process that tests one manipulated variable at a time, and results that are communicated and explained).
	4Sa.4:	Distinguish among observations, predictions, and inferences.
	4Sa.5:	Recognize the correct placement of variables on a line graph.
	4Sa.6:	Construct and interpret diagrams, tables, and graphs made from recorded measurements and observations.
	4Sa.7:	Use appropriate safety procedures when conducting investigations.

Organisms and Their Environments

Standard:	4Sb:	The student will demonstrate an understanding of the characteristics and patterns of behavior that allow organisms to survive in their own distinct environments. (Life Science)
Indicators:	4Sb.1:	Classify organisms into major groups (including plants or animals, flowering or non-flowering plants, and vertebrates [fish, amphibians, reptiles, birds, and mammals] or invertebrates) according to their physical characteristics.
	4Sb.2:	Explain how the characteristics of distinct environments (including swamps, rivers and streams, tropical rain forests, deserts, and the polar regions) influence the variety of organisms in each.
	4Sb.3:	Explain how humans and other animals use their senses and sensory organs to detect signals from the environment and how their behaviors are influenced by these signals.
	4Sb.4:	Distinguish between the characteristics of an organism that are inherited and those that are acquired over time.
	4Sb.5:	Explain how an organism's patterns of behavior are related to its environment

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(including the kinds and the number of other organisms present, the availability of food and other resources, and the physical characteristics of the environment).

4Sb.6: Explain how organisms cause changes in their environment.

Astronomy

Standard: **4Sc:** **The student will demonstrate an understanding of the properties, movements, and locations of objects in the solar system. (Earth Science)**

Indicators: **4Sc.1:** Recall that Earth is one of many planets in the solar system that orbit the Sun.

4Sc.2: Compare the properties (including the type of surface and atmosphere) and the location of Earth to the Sun, which is a star, and the Moon.

4Sc.3: Explain how the Sun affects Earth.

4Sc.4: Explain how the tilt of Earth's axis and the revolution around the Sun results in the seasons of the year.

4Sc.5: Explain how the rotation of Earth results in day and night.

4Sc.6: Illustrate the phases of the Moon and the Moon's effect on ocean tides.

4Sc.7: Interpret the change in the length of shadows during the day in relation to the position of the Sun in the sky.

4Sc.8: Recognize the purpose of telescopes.

Weather

Standard: **4Sd:** **The student will demonstrate an understanding of weather patterns and phenomena. (Earth Science)**

Indicators: **4Sd.1:** Summarize the processes of the water cycle (including evaporation, condensation, precipitation, and runoff).

4Sd.2: Classify clouds according to their three basic types (cumulus, cirrus, and stratus) and summarize how clouds form.

4Sd.3: Compare daily and seasonal changes in weather conditions (including wind speed and direction, precipitation, and temperature) and patterns.

4Sd.4: Summarize the conditions and effects of severe weather phenomena (including thunderstorms, hurricanes, and tornadoes) and related safety concerns.

4Sd.5: Carry out the procedures for data collecting and measuring weather conditions (including wind speed and direction, precipitation, and temperature) by using appropriate tools and instruments.

4Sd.6: Predict weather from data collected through observation and measurements.

Properties of Light and Electricity

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Standard:	4Se:	The student will demonstrate an understanding of the properties of light and electricity. (Physical Science)
Indicators:	4Se.1:	Summarize the basic properties of light (including brightness and colors).
	4Se.2:	Illustrate the fact that light, as a form of energy, is made up of many different colors.
	4Se.3:	Summarize how light travels and explain what happens when it strikes an object (including reflection, refraction, and absorption).
	4Se.4:	Compare how light behaves when it strikes transparent, translucent, and opaque materials.
	4Se.5:	Explain how electricity, as a form of energy, can be transformed into other forms of energy (including light, heat, and sound).
	4Se.6:	Summarize the functions of the Indicators of complete circuits (including wire, switch, battery, and light bulb).
	4Se.7:	Illustrate the path of electric current in series and parallel circuits.
	4Se.8:	Classify materials as either conductors or insulators of electricity.
	4Se.9:	Summarize the properties of magnets and electromagnets (including polarity, attraction/repulsion, and strength).
	4Se.10:	Summarize the factors that affect the strength of an electromagnet.