

Grade 5

Overview

Science in grade five focuses on scientific and technological problem-solving and decision making as well as the skills of scientific inquiry: formulating usable questions and hypotheses, planning experiments and product design, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating the findings to others. Fifth-grade students actively investigate science concepts by predicting, observing, and recording the results of experiments, and they will generate ideas to solve problems. Specifically, students in the fifth grade learn about the life, earth, and physical sciences by exploring them within the framework of the following topics: “Ecosystems: Terrestrial and Aquatic” (characteristics and interactions); “Landforms and Oceans” (natural processes and the ocean floor); “Properties of Matter” (mixtures and solutions); and “Forces and Motion” (position, direction, and speed).

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

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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:	5Sa:	The student will demonstrate an understanding of scientific inquiry, including the foundations of technological design and the processes, skills, and mathematical thinking necessary to conduct a controlled scientific investigation.
Indicators:	5Sa.1:	Identify questions suitable for generating a hypothesis.
	5Sa.2:	Identify independent (manipulated), dependent (responding), and controlled variables in an experiment.
	5Sa.3:	Plan and conduct controlled scientific investigations, manipulating one variable at a time.
	5Sa.4:	Use appropriate tools and instruments (including a timing device and a 10x magnifier) safely and accurately when conducting a controlled scientific investigation.
	5Sa.5:	Construct a line graph from recorded data with correct placement of independent (manipulated) and dependent (responding) variables.
	5Sa.6:	Evaluate results of an investigation to formulate a valid conclusion based on evidence and communicate the findings of the evaluation in oral or written form.
	5Sa.7:	Use a simple technological design process to develop a solution or a product, communicating the design by using descriptions, models, and drawings.
	5Sa.8:	Use appropriate safety procedures when conducting investigations.

Ecosystems: Terrestrial and Aquatic

Standard:	5Sb:	The student will demonstrate an understanding of relationships among biotic and abiotic factors within terrestrial and aquatic ecosystems. (Life Science)
Indicators:	5Sb.1:	Recall the cell as the smallest unit of life and identify its major structures (including cell membrane, cytoplasm, nucleus, and vacuole).
	5Sb.2:	Summarize the composition of an ecosystem, considering both biotic factors (including populations to the level of microorganisms and communities) and abiotic factors.
	5Sb.3:	Compare the characteristics of different ecosystems (including estuaries/salt marshes, oceans, lakes and ponds, forests, and grasslands).
	5Sb.4:	Identify the roles of organisms as they interact and depend on one another through food chains and food webs in an ecosystem, considering producers and consumers (herbivores, carnivores, and omnivores), decomposers (microorganisms, termites,

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worms, and fungi), predators and prey, and parasites and hosts.

5Sb.5: Explain how limiting factors (including food, water, space, and shelter) affect populations in ecosystems.

Landforms and Oceans

Standard: **5Sc:** **The student will demonstrate an understanding of features, processes, and changes in Earth’s land and oceans. (Earth Science)**

Indicators: **5Sc.1:** Explain how natural processes (including weathering, erosion, deposition, landslides, volcanic eruptions, earthquakes, and floods) affect Earth’s oceans and land in constructive and destructive ways.

5Sc.2: Illustrate the geologic landforms of the ocean floor (including the continental shelf and slope, the mid-ocean ridge, rift zone, trench, and the ocean basin).

5Sc.3: Compare continental and oceanic landforms.

5Sc.4: Explain how waves, currents, tides, and storms affect the geologic features of the ocean shore zone (including beaches, barrier islands, estuaries, and inlets).

5Sc.5: Compare the movement of water by waves, currents, and tides.

5Sc.6: Explain how human activity (including conservation efforts and pollution) has affected the land and the oceans of Earth.

Properties of Matter

Standard: **5Sd:** **The student will demonstrate an understanding of properties of matter. (Physical Science)**

Indicators: **5Sd.1:** Recall that matter is made up of particles too small to be seen.

5Sd.2: Compare the physical properties of the states of matter (including volume, shape, and the movement and spacing of particles).

5Sd.3: Summarize the characteristics of a mixture, recognizing a solution as a kind of mixture.

5Sd.4: Use the processes of filtration, sifting, magnetic attraction, evaporation, chromatography, and floatation to separate mixtures.

5Sd.5: Explain how the solute and the solvent in a solution determine the concentration.

5Sd.6: Explain how temperature change, particle size, and stirring affect the rate of dissolving.

5Sd.7: Illustrate the fact that when some substances are mixed together, they chemically combine to form a new substance that cannot easily be separated.

5Sd.8: Explain how the mixing and dissolving of foreign substances is related to the pollution of the water, air, and soil.

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Forces and Motion

Standard:	5Se:	The student will demonstrate an understanding of the nature of force and motion. (Physical Science)
Indicators:	5Se.1:	Illustrate the affects of force (including magnetism, gravity, and friction) on motion.
	5Se.2:	Summarize the motion of an object in terms of position, direction, and speed.
	5Se.3:	Explain how unbalanced forces affect the rate and direction of motion in objects.
	5Se.4:	Explain ways to change the effect that friction has on the motion of objects (including changing the texture of the surfaces, changing the amount of surface area involved, and adding lubrication).
	5Se.5:	Use a graph to illustrate the motion of an object.
	5Se.6:	Explain how a change of force or a change in mass affects the motion of an object.