



## Grade Four

### Physical Sciences

---

1. Electricity and magnetism are related effects that have many useful applications in everyday life. As a basis for understanding this concept:
  - a. *Students know* how to design and build simple series and parallel circuits by using components such as wires, batteries, and bulbs.
  - b. *Students know* how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field.
  - c. *Students know* electric currents produce magnetic fields and know how to build a simple electromagnet.
  - d. *Students know* the role of electromagnets in the construction of electric motors, electric generators, and simple devices, such as doorbells and earphones.
  - e. *Students know* electrically charged objects attract or repel each other.
  - f. *Students know* that magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other.
  - g. *Students know* electrical energy can be converted to heat, light, and motion.

### Life Sciences

---

2. All organisms need energy and matter to live and grow. As a basis for understanding this concept:
  - a. *Students know* plants are the primary source of matter and energy entering most food chains.
  - b. *Students know* producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.
  - c. *Students know* decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:
  - a. *Students know* ecosystems can be characterized by their living and nonliving components.
  - b. *Students know* that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
  - c. *Students know* many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.
  - d. *Students know* that most microorganisms do not cause disease and that many are beneficial.

## Earth Sciences

---

4. The properties of rocks and minerals reflect the processes that formed them. As a basis for understanding this concept:
  - a. *Students know* how to differentiate among igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation (the rock cycle).
  - b. *Students know* how to identify common rock-forming minerals (including quartz, calcite, feldspar, mica, and hornblende) and ore minerals by using a table of diagnostic properties.
5. Waves, wind, water, and ice shape and reshape Earth's land surface. As a basis for understanding this concept:
  - a. *Students know* some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.
  - b. *Students know* natural processes, including freezing and thawing and the growth of roots, cause rocks to break down into smaller pieces.
  - c. *Students know* moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).

## Investigation and Experimentation

---

6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:
  - a. Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.
  - b. Measure and estimate the weight, length, or volume of objects.
  - c. Formulate and justify predictions based on cause-and-effect relationships.
  - d. Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.
  - e. Construct and interpret graphs from measurements.
  - f. Follow a set of written instructions for a scientific investigation.