

Second Grade Standards: SCIENCE

*Note: This information has been adapted from the 2020 Colorado State Standards as presented on the Colorado Department of Education (CDE) website. It is *not* an exhaustive or detailed list. All standards mentioned represent skills grade-level students should have mastered by the end of the grade-level year. If you desire further information, please visit the Standards page on the CDE website: <https://www.cde.state.co.us/standardsandinstruction/standards>

This document provides support in addressing the academic standards in four categories: a general **Overview** of expectations and scientific behaviors, **Basic Questions** (a “fly by” glance of concepts a student masters throughout the school year), **Scientific Principles** (principles that students can begin to understand), and **Scientific Practices** (general ideas for how to introduce and teach the principles). As you consider the learning objectives for each grade level, use the “Basic Questions” checklist to help you plan out your year. Start with the end in mind: If my child needs to know how to _____ by the end of the school year, what learning activities can be implemented to introduce and then reinforce the concepts? Think next about smaller steps in learning that your child needs to master in order to reach that end goal. While science units tend to be taught thematically, certain basic skills can (and should) be practiced in every unit (i.e. observing, predicting, experimenting, reading graphs, etc.). We understand that science is often a subject area where parents choose a curriculum that aligns with a family’s personal values and worldview. Know that any of the standards can be addressed according to a family’s personal beliefs. If you are using a reputable and research-based curriculum, then your child will most likely be working his/her way through these learning objectives in a well-paced and consistent manner. (A brief sampling of solid curriculum options can be found on the CSP website under “Homeschool Resources.”)

Overview

Expectations for Second Grade Students:

- **Physical Science:** Matter exists as different substances that have observable properties.
- **Life Science:** Plants depend on water and light to grow and on animals for pollination or to move their seeds around; living things live in a variety of places.
- **Earth Science:** Some events on Earth occur quickly, others can occur slowly; wind and water can change the shape of the land, and models can show the shape and these changes.

Throughout Second Grade You May Find Students:

- Conducting investigations to describe and classify different kinds of materials by their observable properties.
- Constructing an argument with evidence that some changes caused by heating or cooling can be reversed, and some cannot.
- Planning and conducting an investigation to see if plants need sunlight and water to grow.
- Making observations of plants and animals to compare the diversity of life in different habitats.
- Comparing multiple solutions designed to slow or prevent wind or water from changing the shape of the land.
- Using evidence from several sources to provide evidence that Earth events can occur quickly (ex. volcanic explosions) or slowly (ex. erosion of rocks).

Basic Questions

Physical Science

1. How do particles combine to form the variety of matter one observes?

Life Science

2. How do organisms interact with the living and nonliving environments to obtain matter and energy?
3. What evidence shows that different species are related?

Earth and Space Science

4. How do people reconstruct and date events in the Earth's planetary history?
5. How and why is Earth constantly changing?

Specific Principles and Skills

Physical Science

1. **Basic Question: How do particles combine to form the variety of matter one observes?**

*Scientific Principles

- a. Structure and Properties of Matter: Different kinds of matter exist (e.g., wood, metal, water), and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties (e.g., visual, aural, textural), by its uses and by whether it occurs naturally or is manufactured. Different properties are suited to different purposes. A great variety of objects can be built up from a small set of pieces (e.g., blocks, construction sets). Objects or samples of a substance can be weighed, and their size can be described and measured.
- b. Chemical Reactions: Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible (e.g., melting and freezing), and sometimes they are not (e.g., baking a cake, burning fuel).
- c. Energy and Matter: Objects may break into smaller pieces and be put together into larger pieces or may change shapes.
- d. Students can understand that matter exists as different substances that have observable different properties.

*Scientific Practices

- a. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. (*Observations could include color, texture, hardness and flexibility. Patterns could include the similar properties that different materials share.*)
- b. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. (*Examples of properties could include, strength, flexibility, hardness, texture and absorbency. (Quantitative measurement is limited to length.)*)
- c. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. (*Examples of pieces could include blocks, building bricks or other assorted small objects.*)
- d. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. (*Examples of reversible changes could include materials such*

as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.)

Life Science

2. Basic Question: How do organisms interact with the living and nonliving environments to obtain matter and energy?

***Scientific Principles**

- a. Interdependent Relationships in Ecosystems: Animals depend on their surroundings to get what they need, including food, water, shelter, and a favorable temperature. Animals depend on plants or other animals for food. They use their senses to find food and water, and they use their body parts to gather, catch, eat, and chew the food. Plants depend on air, water, minerals (in the soil) and light to grow. Animals can move around, but plants cannot, and they often depend on animals for pollination or to move their seeds around. Different plants survive better in different settings because they have varied needs for water, minerals, and sunlight.
- b. Students understand that plants depend on water and light to grow and on animals for pollination or to move their seeds around.

***Scientific Practices**

- a. Plan and conduct an investigation to determine if plants need sunlight and water to grow. *(Limit to using one variable at a time.)*
- b. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

3. Basic Question: What evidence shows that different species are related?

***Scientific Principles**

- a. Biodiversity and Humans: There are many different kinds of living things in any area, and they exist in different places on land and in water.
- b. Students understand that a range of different organisms lives in different places.

***Scientific Practices**

- a. Make observations of plants and animals to compare the diversity of life in different habitats. *(Emphasis is on the diversity of living things in each of a variety of different habitats.)*

Earth and Space Science

4. How do people reconstruct and date events in the Earth's planetary history?

***Scientific Principles**

- a. The History of Planet Earth: Some events on Earth occur in cycles, like day and night, and others have a beginning and an end, like a volcanic eruption. Some events, like an earthquake, happen very quickly; others, such as the formation of the Grand Canyon, occur very slowly over a time period much longer than one can observe.
- b. Students understand that some events on Earth occur quickly; others can occur very slowly.

***Scientific Practices**

- a. Use information from several sources to provide evidence that Earth events can occur quickly or slowly. *(Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly, and erosion of rocks, which occurs slowly.)*

5. How and why is Earth constantly changing?

***Scientific Principles**

- a. Earth Materials and Systems: Wind and water can change the shape of the land. The resulting landforms, together with the materials on the land, provide homes for living things.
- b. Plate Tectonics and Large-Scale System Interactions: Rocks, soils, and sand are present in most areas where plants and animals live. There may also be rivers, streams, lakes, and ponds. Maps show where things are located. One can map the shapes and kinds of land and water in any area.
- c. The Roles of Water in Earth's Surface Processes: Water is found in the ocean, rivers, lakes and ponds. Water exists as solid ice and in liquid form. It carries soil and rocks from one place to another and determines the variety of life forms that can live in a particular location.
- d. Students understand that wind and water can change the shape of the land; models can show the shape and these changes to the land.

***Scientific Practices**

- a. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. *(Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.)*
- b. Develop a model to represent the shapes and kinds of land and bodies of water in an area.
- c. Obtain information to identify where water is found on Earth and that it can be solid or liquid.