Kindergarten 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 Kindergarten Students:

- **Physical Science:** Compare the effect of different strengths and directions of push and pull on the speed and motion of an object. Examine how sunlight affects the Earth's surface.
- **Life Science:** Develop an understanding of what plants and animals need to survive and examine the relationship between their needs and where they live (ex. Deer eat buds and leaves, so they typically live in areas like forests.)
- **Earth Science:** Patterns are observed when measuring the local weather, and these observations can help communities prepare for and respond to severe weather conditions.

Throughout Kindergarten You May Find Students:

- Planning investigations to compare the affect strength and direction have on the motion of an object.
- Using tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.
- Making observations about what animals and plants need to help them live and grow, and also making observations about how animals might change their environments to meet their needs.
- Keeping track of how the weather changes from day to day and describing the patterns they observe over time.

Basic Questions

Physical Science

1. **How can one predict an object's continued motion, changes in motion or stability? (In Kindergarten, this question is specifically related to how scientists study the world.)**
2. **What is meant by conservation of energy? How is energy transferred between objects or systems? (In Kindergarten, this question is specifically related to how sunlight affects the Earth's surface.)**

Life Science

3. **How do the structures of organisms enable life's functions?**

Earth and Space Science

4. **What regulates weather and climate?**
5. **How do Earth's surface processes and human activities affect each other?**

Specific Principles and Skills

Physical Science

1. **Basic Question: How can one predict an object's continued motion, changes in motion or stability?**

*Scientific Principles

a. Forces and Motion: Pushes and pulls can have different strengths and directions. Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
b. Types of Interactions: When objects touch or collide, they push on one another and can change motion.
c. Relationship Between Energy and Forces: A bigger push or pull makes things speed up or slow down more quickly.
d. Students understand that pushes and pulls can have different strengths and directions and that speed or direction of an object's motion can be changed, started, or stopped.

*Scientific Practices

a. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. *(Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball and two objects colliding and pushing on each other. Does not include non-contact pushes or pulls such as those produced by magnets.)*
b. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. *(Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.)*

2. **Basic Question: What is meant by conservation of energy? How is energy transferred between objects or systems? (In Kindergarten, this question is specifically related to how sunlight affects the Earth's surface.)**

*****Scientific Principles

a. Students make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

*Scientific Practices

a. Make observations to determine the effect of sunlight on Earth's surface. *(Examples of Earth's surface could include sand, soil, rocks, and water. Temperature is limited to relative measures such as warmer/cooler.)*
b. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. *(Examples of structures could include umbrellas, canopies and tents that minimize the warming effect of the sun.)*

Life Science

3. **Basic Question: How do the structures of organisms enable life's functions?**

*Scientific Principles

a. Students understand that animals need food in order to live and grow, obtaining food from plants or other animals. Plants need water and light to live and grow.

*Scientific Practices:

a. Students use observations to describe patterns of what plants and animals (including humans) need to survive. *(Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and that all living things need water.)*

Earth and Space Science

4. **Basic Question: What regulates weather and climate?**

*Scientific Principles

a. Weather and Climate: Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.
b. Biogeology: Plants and animals can change their environment.
c. Human Impacts on Earth Systems: Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air and other living things
d. Students make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.
e. Patterns are observed when measuring the local weather, including how humans and other organisms impact their environment.

*Scientific Practices

a. Use and share observations of local weather conditions to describe patterns over time. *(Examples of qualitative observations could include descriptions of the weather [such as*

sunny, cloudy, rainy, and warm]; examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.)

b. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. *(Examples of plants and animals changing their environment could include a squirrel digging in the ground to hide its food and tree roots can break concrete.)*

5. Basic Question: How do Earth's surface processes and human activities affect each other?

*Scientific Principles

a. Natural Resources: Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.
b. Natural Hazards: Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.
c. Human Impacts on Earth Systems: Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.
d. Students understand that plants and animals meet their needs in their habitats and impact one another; people can prepare for severe weather.

*Scientific Practices

a. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. *(Examples of relationships could include that deer eat buds and leaves; therefore, they usually live in forested areas. Grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.)*
b. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. *(Emphasis is on local forms of severe weather.)*
c. Communicate solutions that will reduce the impact of humans on the land, water, air and/or other living things in the local environment. *(Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.)*