

# **GRADES K-2**

## **Overview**

Science education in Grades K-2 sets the stage for lifelong learning in science. Young children entering school are energetic, eager to learn, and possess a natural curiosity about their world. They construct knowledge of their world through the use of the five senses. These young students process information through a variety of learning styles and demonstrate ownership through self-expression and excitement regarding their newly acquired science concepts.

An effective science classroom capitalizes on the young learner's energy and curiosity. Students model what scientists do rather than simply reading or hearing about science. The classroom becomes an inquiry-based environment that incorporates technology and extends learning beyond the printed page and classroom walls. This dynamic classroom provides experiences and interactions with animate and inanimate objects that stimulate the learner and make science real.

Instruction that includes developmentally appropriate content, integration of scientific process and application skills, and utilization of technology is necessary for the success of students in Grades K-2. Mastery of the content included in this document also requires active participation by all students. Effective instructional strategies that include the use of peer learning techniques, the application of technology to write and retell science stories, and the incorporation of investigations to enhance student vocabulary and comprehension are valuable components of the Grades K-2 science program. Appropriate science content, combined with creative instructional strategies that provide an extension of classroom learning, provides students with a solid foundation for lifelong learning of science.

# KINDERGARTEN

Kindergartners enter the school community with an eagerness and curiosity to discover their environments. Although their experiences and background knowledge are limited, science enables them to answer questions about themselves and the world around them. The everyday experiences of students in their daily environments provide them with a foundation that helps them make sense of their world.

Activities that stimulate kindergartners' interest in science investigations encourage them to develop a lifelong pursuit for scientific information and exploration. This can best be accomplished through implementation of a challenging curriculum, inquiry-based learning, and a nurturing classroom atmosphere. The classroom should be flexible, child-friendly, comfortable, stimulating, intellectually challenging, and adaptable to a variety of learning styles.

The kindergarten curriculum incorporates developmentally appropriate content, process and application skills, and technology. Content includes concepts such as relating a variety of sounds to their sources; describing seasonal changes in weather; and comparing the size, shape, structure, and basic needs of living things. Students also classify objects using the five senses and use process skills to construct knowledge of their surroundings. Student application of technology includes the use of tools such as hand lenses, computers, different types of media, and the investigation of various scientific concepts. The utilization of process skills to engage learners, explore new ideas, explain findings, extend understanding, and evaluate one's own learning during inquiry-based investigations provides kindergarten students with the necessary foundation for scientific literacy.

## Physical Science

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Students will:

1. Classify objects as solids or liquids.
2. Identify the sun as Earth's source of light and heat.
  - Predicting the effect of the sun on living and nonliving things
  - Identifying relationships between light and shadows
  - Predicting the occurrence of shadows
3. Relate a variety of sounds to their sources, including weather, animal, and transportation sounds.  
Examples: weather—thunder,  
                  animal—dog bark,  
                  transportation—truck horn
4. Identify properties of motion, including change of position and change of speed.
5. Predict whether an object will be attracted by a magnet.

## **Life Science**

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6. Compare size, shape, structure, and basic needs of living things.
  - Identifying similarities of offspring and their parents
7. Classify objects using the five senses.
  - Grouping objects according to color, shape, size, sound, taste, smell, texture, and temperature

## **Earth and Space Science**

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8. Identify features of Earth as landmasses or bodies of water.
9. Identify seasons of the year.
  - Describing seasonal changes in the weather
10. Identify objects observed in the day sky with the unaided eye, including the sun, clouds, moon, and rainbows.

# **FIRST GRADE**

First-grade students enter the classroom with a natural curiosity about their environment. Their inquisitive nature leads them to wonder about the world around them and to ask a variety of science-related questions. Students in Grade 1 are beginning to develop social skills that enable them to interact in inquiry-based and cooperative learning opportunities. A stimulating classroom environment with a meaningful curriculum allows them to begin to take ownership of their own learning experiences.

In Grade 1, content increases both in depth and in breadth. Topics include properties of various objects and effects of forces acting upon them, awareness of the structure of the body, and comparison of the day sky to the night sky. Content also includes the concepts of recognizing changes in weather, identifying components of Earth's surface, and identifying ways to conserve Earth's resources. The process skills and technology utilized in kindergarten increase in complexity due to the more rigorous content of Grade 1. The classroom environment allows students to engage in a hands-on approach to learning that facilitates acquisition of science knowledge, utilization of process skills, and application of technology.

## **Physical Science**

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Students will:

1. Select appropriate tools and technological resources needed to gather, analyze, and interpret data.  
Examples: platform balances, hand lenses, computers, maps, graphs, journals
2. Identify basic properties of objects.  
Examples: size, shape, color, texture
3. Describe effects of forces on objects, including change of speed, direction, and position.

## **Life Science**

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4. Describe survival traits of living things, including color, shape, size, texture, and covering.
  - Classifying plants and animals according to physical traits  
Examples: animals—six legs on insects,  
plants—green leaves on evergreen trees
  - Identifying developmental stages of plants and animals  
Examples: plants—seed developing into seedling, seedling developing into tree;  
animals—piglet developing into pig, kid developing into goat
  - Describing a variety of habitats and natural homes of animals

5. Identify parts of the human body, including the head, neck, shoulders, arms, spine, and legs.
  - Recognizing the importance of a balanced diet for healthy bones
  - Discussing the relationship of muscles and bones to locomotion
  - Discussing the relationship of bones to protection of vital organs  
Example: protection of brain by skull
  - Identifying technology used by scientists to study the human body  
Examples: X-ray images, magnetic resonance imaging (MRI)
6. Recognize evidence of animals that no longer exist.

## **Earth and Space Science**

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7. Identify components of Earth's surface, including soil, rocks, and water.
8. Recognize daily changes in weather, including clouds, precipitation, and temperature.
  - Recognizing instruments used to observe weather  
Examples: thermometer, rain gauge, wind sock, weather vane
  - Recording weather data using weather journals, charts, and maps
9. Identify ways to conserve Earth's resources.  
Example: turning off lights and water when not in use
10. Describe uses of recycled materials.  
Examples: manufacture of paper products from old newspapers, production of mulch from trees
11. Compare the day sky to the night sky as observed with the unaided eye.

## SECOND GRADE

Second-grade students begin the school year equipped with prior knowledge and skills that enhance their awareness of scientific concepts and serve as a foundation for continued exploration of the world around them. These young scientists engage in science-related challenges that encourage various levels of inquiry. They are actively involved in hands-on science investigations that are teacher-selected but often self-guided.

The classroom environment stimulates the natural curiosity of students. Investigating materials and situations, asking questions, communicating findings, and seeking meaning from everyday activities and experiences are vital instructional components for all students in Grade 2.

The second-grade curriculum provides opportunities for students to develop awareness of simple machines and changes in the states of matter. Students identify characteristics of plants and animals and become aware of the impact of weather on society. The curriculum integrates scientific processes with technology as a basis for inquiry. It pairs a dynamic classroom environment with a challenging curriculum designed to extend the natural curiosity of students and encourage the development of scientific knowledge and skills.

### Physical Science

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Students will:

1. Identify states of matter as solids, liquids, and gases.
  - Describing objects according to physical properties, including hardness, color, and flexibility
  - Describing changes between states of matter  
Examples: solid to liquid—melting,  
gas to liquid—condensing,  
liquid to gas—evaporating,  
liquid to solid—freezing
  - Measuring quantities of solids and liquids
2. Identify vibration as the source of sound.
  - Identifying pitch and volume as properties of sound
  - Distinguishing between pitch and volume of sound
3. Recognize that light travels in a straight line until it strikes an object.
  - Recognizing that light can be reflected
4. Describe observable effects of forces, including buoyancy, gravity, and magnetism.  
Examples: buoyancy—boat floating on water,  
gravity—apple falling from tree,  
magnetism—magnets adhering to metal
  - Identifying simple machines, including the inclined plane, lever, pulley, wedge, screw, and wheel and axle

## Life Science

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5. Identify the relationship of structure to function in plants, including roots, stems, leaves, and flowers.
6. Identify characteristics of animals, including behavior, size, and body covering.
  - Comparing existing animals to extinct animals  
Examples: iguana to stegosaurus, elephant to woolly mammoth
  - Identifying migration and hibernation as survival strategies

## Earth and Space Science

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7. Identify geological features as mountains, valleys, plains, deserts, lakes, rivers, and oceans.
  - Identifying local landforms and bodies of water
  - Identifying components of soil, including sand, clay, and silt
8. Identify evidence of erosion and weathering of rocks.
9. Describe evaporation, condensation, and precipitation in the water cycle.
10. Identify the impact of weather on agriculture, recreation, the economy, and society.
  - Recognizing the importance of science and technology to weather predictions
11. Identify basic components of our solar system, including the sun, planets, and Earth's moon.