

Fourth Grade Science Standards and Benchmarks

Standard #1: Scientific Thinking and Practice

Definition I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

<p><u>Benchmark #1:</u></p> <p>Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.</p>	Performance Objective 1	<input type="checkbox"/> Use instruments to perform investigations (e.g., timers, balances) and communicate findings.
	Performance Objective 2	<input type="checkbox"/> Differentiate observation from interpretation and understand that a scientific explanation comes in part from what is observed and in part from how the observation is interpreted.
	Performance Objective 3	<input type="checkbox"/> Conduct multiple trials to test a prediction, draw logical conclusions, and construct and interpret graphs from measurements.
	Performance Objective 4	<input type="checkbox"/> Collect data in an investigation using multiple techniques, including control groups, and analyze those data to determine what other investigations could be conducted to validate findings.
<p><u>Benchmark #2:</u></p> <p>Use scientific thinking and knowledge and communicate findings.</p>	Performance Objective 1	<input type="checkbox"/> Communicate ideas and present findings about scientific investigations that are open to critique from others.
	Performance Objective 2	<input type="checkbox"/> Describe how scientific investigations may differ from one another (e.g., observations of nature, measurements of things changing over time).
	Performance Objective 3	<input type="checkbox"/> Understand how data are used to explain how a simple system functions (e.g., a thermometer to measure heat loss as water cools).
<p><u>Benchmark #3:</u></p> <p>Use mathematical skills and vocabulary to analyze data, understand patterns and relationships, and communicate findings.</p>	Performance Objective 1	<input type="checkbox"/> Conduct multiple trials using simple mathematical techniques to make and test predictions.
	Performance Objective 2	<input type="checkbox"/> Use mathematical equations to formulate and justify predictions based on cause-and-effect relationships.
	Performance Objective 3	<input type="checkbox"/> Identify simple mathematical relationships in a scientific investigation (e.g., the relationship of the density of materials that will or will not float in water to the density of water).

Standard #2: Content of Science**Definition I (Physical Science):** Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

<u>Benchmark #1:</u> Recognize that matter has different forms and properties.	Performance Objective 1	<input type="checkbox"/> Know that changes to matter may be chemical or physical and when two or more substances are combined, a new substance may be formed with properties that are different from those of the original substances (e.g., white glue and borax, cornstarch and water, vinegar and baking soda).
	Performance Objective 2	<input type="checkbox"/> Know that materials are made up of small particles (atoms and molecules) that are too small to see with the naked eye.
	Performance Objective 3	<input type="checkbox"/> Know that the mass of the same amount of material remains constant whether it is together, in parts, or in a different state.
<u>Benchmark #2:</u> Know that energy is needed to get things done and that energy has different forms.	Performance Objective 1	<input type="checkbox"/> Identify the characteristics of several different forms of energy and describe how energy can be converted from one form to another (e.g., light to heat, motion to heat, electricity to heat, light, or motion).
	Performance Objective 2	<input type="checkbox"/> Recognize that energy can be stored in many ways (e.g., potential energy in gravity or springs, chemical energy in batteries).
	Performance Objective 3	<input type="checkbox"/> Describe how some waves move through materials (e.g., water, sound) and how others can move through a vacuum (e.g., x-ray, television, radio).
	Performance Objective 4	<input type="checkbox"/> Demonstrate how electricity flows through a simple circuit (e.g., by constructing one).
<u>Benchmark #3:</u> Identify forces and describe the motion of objects.	Performance Objective 1	<input type="checkbox"/> Know that energy can be carried from one place to another by waves (e.g., water waves, sound waves), by electric currents, and by moving objects.
	Performance Objective 2	<input type="checkbox"/> Describe the motion of an object by measuring its change of position over a period of time.
	Performance Objective 3	<input type="checkbox"/> Describe that gravity exerts more force on objects with greater mass (e.g., it takes more force to hold up a heavy object than a lighter one).
	Performance Objective 4	<input type="checkbox"/> Describe how some forces act on contact and other forces act at a distance (e.g., a person pushing a rock versus gravity acting on a rock).

Standard #2: Content of Science**Definition II (Life Science):** Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

<u>Benchmark #1:</u> Know that living things have diverse forms, structures, functions, and habitats.	Performance Objective 1	<input type="checkbox"/> Explain that different living organisms have distinctive structures and body systems that serve specific functions (e.g., walking, flying, swimming).
	Performance Objective 2	<input type="checkbox"/> Know that humans and other living things have senses to help them detect stimuli, and that sensation (e.g., hunger) and stimuli (e.g., changes in the environment) influence the behavior of organisms.
	Performance Objective 3	<input type="checkbox"/> Describe how roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight (photosynthesis).
	Performance Objective 4	<input type="checkbox"/> Describe the components of and relationships among organisms in a food chain (e.g., plants are the primary source of energy for living systems).
	Performance Objective 5	<input type="checkbox"/> Describe how all living things are made up of smaller units that are called cells.
<u>Benchmark #2:</u> Know that living things have	Performance Objective 1	<input type="checkbox"/> Know that in any particular environment some kinds of plants and animals survive well, some survive less well, and others cannot survive at all.
	Performance Objective 2	<input type="checkbox"/> Know that a change in physical structure or behavior can improve an organism's chance of survival (e.g., a chameleon changes color, a turtle pulls its head into its shell, a plant grows toward the light).

similarities and differences and that living things change over time.	Performance Objective 3	<input type="checkbox"/> Describe how some living organisms have developed characteristics from generation to generation to improve chances of survival (e.g., spines on cacti, long beaks on hummingbirds, good eyesight on hawks).
<u>Benchmark #3:</u> Know the parts of the human body and their functions.	Performance Objective 1	<input type="checkbox"/> Know that the human body has many parts that interact to function as systems (e.g., skeletal, muscular) and describe the parts and their specific functions in selected systems (e.g., the nose, lungs, and diaphragm in the respiratory system).
	Performance Objective 2	<input type="checkbox"/> Recognize that the human body is organized from cells, to tissues, to organs, to systems, to the organism.
Standard #2: Content of Science		
Definition III (Earth and Space Science): Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.		
<u>Benchmark #1:</u> Know the structure of the solar system and the objects in the universe.	Performance Objective 1	<input type="checkbox"/> Understand that the number of stars visible through a telescope is much greater than the number visible to the naked eye.
	Performance Objective 2	<input type="checkbox"/> Know that there are various types of telescopes that use different forms of light to observe distant objects in the sky.
	Performance Objective 3	<input type="checkbox"/> Know that the pattern of stars (e.g., constellations) stays the same although they appear to move across the sky nightly due to Earth's rotation.
<u>Benchmark #2:</u> Know the structure and formation of Earth and its atmosphere and the processes that shape them.	Performance Objective 1	<input type="checkbox"/> Know that the properties of rocks and minerals reflect the processes that shaped them (i.e., igneous, metamorphic, and sedimentary rocks).
	Performance Objective 2	<input type="checkbox"/> Describe how weather patterns generally move from west to east in the United States.
	Performance Objective 3	<input type="checkbox"/> Know that local weather information describes patterns of change over a period of time (e.g., temperature, precipitation symbols, cloud conditions, wind speed/direction).
Standard #3: Science and Society		
Definition I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.		
<u>Benchmark #1:</u> Describe how science influences decisions made by individuals and societies.	Performance Objective 1	<input type="checkbox"/> Know that science has identified substances called pollutants that get into the environment and can be harmful to living things.
	Performance Objective 2	<input type="checkbox"/> Know that, through science and technology, a wide variety of materials not appearing in nature have become available (e.g., steel, plastic, nylon, fiber optics).
	Performance Objective 3	<input type="checkbox"/> Know that science has created ways to store and retrieve information (e.g., paper and ink, printing press, computers, CD ROMs) but that these are not perfect (e.g., faulty programming, defective hardware).
	Performance Objective 4	<input type="checkbox"/> Know that both men and women of all races and social backgrounds choose science as a career.