

# Fifth 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 develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings.</p>	Performance Objective 1	<input type="checkbox"/> Plan and conduct investigations, including formulating testable questions, making systematic observations, developing logical conclusions, and communicating findings.
	Performance Objective 2	<input type="checkbox"/> Use appropriate technologies (e.g., calculators, computers, balances, spring scales, microscopes) to perform scientific tests and to collect and display data.
	Performance Objective 3	<input type="checkbox"/> Use graphic representations (e.g., charts, graphs, tables, labeled diagrams) to present data and produce explanations for investigations.
	Performance Objective 4	<input type="checkbox"/> Describe how credible scientific investigations use reproducible elements including single variables, controls, and appropriate sample sizes to produce valid scientific results.
	Performance Objective 5	<input type="checkbox"/> Communicate the steps and results of a scientific investigation.
<p><u>Benchmark #2:</u></p> <p>Understand the processes of scientific investigation and how scientific inquiry results in scientific knowledge.</p>	Performance Objective 1	<input type="checkbox"/> Understand that different kinds of investigations are used to answer different kinds of questions (e.g., observations, data collection, controlled experiments).
	Performance Objective 2	<input type="checkbox"/> Understand that scientific conclusions are subject to peer and public review.
<p><u>Benchmark #3:</u></p> <p>Use mathematical ideas, tools, and techniques to understand scientific knowledge.</p>	Performance Objective 1	<input type="checkbox"/> Use appropriate units to make precise and varied measurements.
	Performance Objective 2	<input type="checkbox"/> Use mathematical skills to analyze data.
	Performance Objective 3	<input type="checkbox"/> Make predictions based on analyses of data, observations, and explanations.
	Performance Objective 4	<input type="checkbox"/> Understand the attributes to be measured in a scientific investigation and describe the units, systems, and processes for making the measurement.

**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.

<b>Benchmark #1:</b>  Know the forms and properties of matter and how matter interacts.	Performance Objective 1	<input type="checkbox"/> Describe properties (e.g., relative volume, ability to flow) of the three states of matter.
	Performance Objective 2	<input type="checkbox"/> Describe how matter changes from one phase to another (e.g., condensation, evaporation).
	Performance Objective 3	<input type="checkbox"/> Know that matter is made up of particles (atoms) that can combine to form molecules and that these particles are too small to see with the naked eye.
	Performance Objective 4	<input type="checkbox"/> Know that the periodic table is a chart of the pure elements that make up all matter.
	Performance Objective 5	<input type="checkbox"/> Describe the relative location and motion of the particles (atoms and molecules) in each state of matter.
	Performance Objective 6	<input type="checkbox"/> Explain the relationship between temperature and the motion of particles in each state of matter.

<b>Benchmark #2:</b>  Explain the physical processes involved in the transfer, change, and conservation of energy.	Performance Objective 1	<input type="checkbox"/> Know that heat is transferred from hotter to cooler materials or regions until both reach the same temperature.
	Performance Objective 2	<input type="checkbox"/> Know that heat is often produced as a by-product when one form of energy is converted to another form (e.g., when machines or organisms convert stored energy into motion).
	Performance Objective 3	<input type="checkbox"/> Know that there are different forms of energy.
	Performance Objective 4	<input type="checkbox"/> Describe how energy can be stored and converted to a different form of energy (e.g., springs, gravity) and know that machines and living things convert stored energy to motion and heat.

<b>Benchmark #3:</b>  Describe and explain forces that produce motion in objects.	Performance Objective 1	<input type="checkbox"/> Understand how the rate of change of position is the velocity of an object in motion.
	Performance Objective 2	<input type="checkbox"/> Recognize that acceleration is the change in velocity with time.
	Performance Objective 3	<input type="checkbox"/> Identify forces in nature (e.g., gravity, magnetism, electricity, friction).
	Performance Objective 4	<input type="checkbox"/> Understand that when a force (e.g., gravity, friction) acts on an object, the object speeds up, slows down, or goes in a different direction.
	Performance Objective 5	<input type="checkbox"/> Identify simple machines and describe how they give advantage to users (e.g., levers, pulleys, wheels and axles, inclined planes, screws, wedges).

**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.

<b>Benchmark #1:</b>  Explain the diverse structures and functions of living things and the complex relationships	Performance Objective 1	<input type="checkbox"/> Identify the components of habitats and ecosystems (producers, consumers, decomposers, predators).
	Performance Objective 2	<input type="checkbox"/> Understand how food webs depict relationships between different organisms.
	Performance Objective 3	<input type="checkbox"/> Know that changes in the environment can have different effects on different organisms (e.g., some organisms move, some survive, some reproduce, some die).

between living things and their environments.	Performance Objective 4	<input type="checkbox"/> Describe how human activity impacts the environment.
<b>Benchmark #2:</b> Understand how traits are passed from one generation to the next and how species evolve.	Performance Objective 1	<input type="checkbox"/> Know that plants and animals have life cycles that include birth, growth and development, reproduction, and death and that these cycles differ for different organisms.
	Performance Objective 2	<input type="checkbox"/> Identify characteristics of an organism that are inherited from its parents (e.g., eye color in humans, flower color in plants) and other characteristics that are learned or result from interactions with the environment.
	Performance Objective 3	<input type="checkbox"/> Understand that heredity is the process by which traits are passed from one generation to another.
<b>Benchmark #3:</b> Understand the structure of organisms and the function of cells in living systems.	Performance Objective 1	<input type="checkbox"/> Understand that all living organisms are composed of cells from one to many trillions, and that cells are usually only visible through a microscope.
	Performance Objective 2	<input type="checkbox"/> Know that some organisms are made of a collection of similar cells that cooperate (e.g., algae) while other organisms are made of cells that are different in appearance and function (e.g., corn, birds).
	Performance Objective 3	<input type="checkbox"/> Describe the relationships among cells, tissues, organs, organ systems, whole organisms, and ecosystems.
<b>Standard #2: Content of Science</b> <b>Definition III (Earth and Space Science):</b> Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.		
<b>Benchmark #1:</b> Describe how the concepts of energy, matter, and force can be used to explain the observed behavior of the solar system, the universe, and their structures.	Performance Objective 1	<input type="checkbox"/> Know that many objects in the universe are huge and are separated from one another by vast distances (e.g., many stars are larger than the sun but so distant that they look like points of light).
	Performance Objective 2	<input type="checkbox"/> Understand that Earth is part of a larger solar system, which is part of an even larger galaxy (Milky Way), which is one of many galaxies.
	Performance Objective 3	<input type="checkbox"/> Know that there have been manned and unmanned journeys to space and to the moon.
<b>Benchmark #2:</b> Describe the structure of Earth and its atmosphere and explain how energy, matter, and forces shape Earth's systems.	Performance Objective 1	<input type="checkbox"/> Understand that water and air relate to Earth's processes, including: <input type="checkbox"/> how the water cycle relates to weather <input type="checkbox"/> how clouds are made of tiny droplets of water, like fog or steam.
	Performance Objective 2	<input type="checkbox"/> Know that air is a substance that surrounds Earth (atmosphere), takes up space, and moves, and that temperature fluctuation and other factors produce wind currents.
	Performance Objective 3	<input type="checkbox"/> Know that most of Earth's surface is covered by water, that most of that water is salt water in oceans, and that fresh water is found in rivers, lakes, underground sources, and glaciers.
	Performance Objective 4	<input type="checkbox"/> Recognize that the seasons are caused by Earth's motion around the sun and the tilt of Earth's axis of rotation.
<b>Standard #3: Science and Society</b> <b>Definition I:</b> Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.		
<b>Benchmark #1:</b> Explain how scientific discoveries and inventions have changed individuals and societies.	Performance Objective 1	<input type="checkbox"/> Describe the contributions of science to understanding local or current issues (e.g., watershed and community decisions regarding water use).
	Performance Objective 2	<input type="checkbox"/> Describe how various technologies have affected the lives of individuals (e.g., transportation, entertainment, health).

