

Sixth 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.		
<u>Benchmark #1-A:</u> Use scientific methods to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings.	Performance Objective 1	<input type="checkbox"/> Construct appropriate graphs from data and develop qualitative and quantitative statements about the relationships between variables being investigated.
	Performance Objective 2	<input type="checkbox"/> Examine the reasonableness of data supporting a proposed scientific explanation.
	Performance Objective 3	<input type="checkbox"/> Justify predictions and conclusions based on data.
<u>Benchmark #1-B:</u> Understand the processes of scientific investigation and how scientific inquiry results in scientific knowledge.	Performance Objective 1	<input type="checkbox"/> Understand that scientific knowledge is continually reviewed, critiqued, and revised as new data become available.
	Performance Objective 2	<input type="checkbox"/> Understand that scientific investigations use common processes that include the collection of relevant data and observations, accurate measurements, the identification and control of variables, and logical reasoning to formulate hypotheses and explanations.
	Performance Objective 3	<input type="checkbox"/> Understand that not all investigations result in defensible scientific explanations.
<u>Benchmark #1-C:</u> Use mathematical ideas, tools, and techniques to understand scientific knowledge.	Performance Objective 1	<input type="checkbox"/> Evaluate the usefulness and relevance of data to an investigation.
	Performance Objective 2	<input type="checkbox"/> Use probabilities, patterns, and relationships to explain data and observations.

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.

Benchmark #2-A: Know the forms and properties of matter and how matter interacts.	Performance Objective 1	<input type="checkbox"/> Understand that substances have characteristic properties and identify the properties of various substances (e.g., density, boiling point, solubility, chemical reactivity).
	Performance Objective 2	<input type="checkbox"/> Use properties to identify substances (e.g., for minerals: the hardness, streak, color, reactivity to acid, cleavage, fracture).
	Performance Objective 3	<input type="checkbox"/> Know that there are about 100 known elements that combine to produce compounds in living organisms and nonliving substances.
	Performance Objective 4	<input type="checkbox"/> Know the differences between chemical and physical properties and how these properties can influence the interactions of matter.
Benchmark #2-B: Explain the physical processes involved in the transfer, change, and conservation of energy.	Performance Objective 1	<input type="checkbox"/> Identify various types of energy (e.g., heat, light, mechanical, electrical, chemical, nuclear).
	Performance Objective 2	<input type="checkbox"/> Understand that heat energy can be transferred through conduction, radiation and convection.
	Performance Objective 3	<input type="checkbox"/> Know that there are many forms of energy transfer but that the total amount of energy is conserved (i.e., that energy is neither created nor destroyed).
	Performance Objective 4	<input type="checkbox"/> Understand that some energy travels as waves (e.g., seismic, light, sound), including: <input type="checkbox"/> the sun as source of energy for many processes on Earth <input type="checkbox"/> different wavelengths of sunlight (e.g., visible, ultraviolet, infrared) <input type="checkbox"/> vibrations of matter (e.g., sound, earthquakes) <input type="checkbox"/> different speeds through different materials.
Benchmark #2-C: Describe and explain forces that produce motion in objects.	Performance Objective 1	<input type="checkbox"/> Know that every object exerts gravitational force on every other object dependent on the masses and distance of separation (e.g., motions of celestial objects, tides).
	Performance Objective 2	<input type="checkbox"/> Know that gravitational force is hard to detect unless one of the objects (e.g., Earth) has a lot of mass.

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.

Benchmark #2-A: Explain the diverse structures and functions of living things and the complex relationships between living things and their environments.	Performance Objective 1	<input type="checkbox"/> Understand how organisms interact with their physical environments to meet their needs (i.e., food, water, air) and how the water cycle is essential to most living systems.
	Performance Objective 2	<input type="checkbox"/> Describe how weather and geologic events (e.g., volcanoes, earthquakes) affect the function of living systems.
	Performance Objective 3	<input type="checkbox"/> Describe how organisms have adapted to various environmental conditions.
Benchmark #2-B: Understand how traits are passed from one generation to the next and how species evolve.	Performance Objective 1	<input type="checkbox"/> Understand that the fossil record provides data for how living organisms have evolved.
	Performance Objective 2	<input type="checkbox"/> Describe how species have responded to changing environmental conditions over time (e.g., extinction, adaptation).

Benchmark #2-C: Understand the structure of organisms and the function of cells in living systems.	Performance Objective 1	<input type="checkbox"/> Explain how fossil fuels were formed from animal and plant cells.
	Performance Objective 2	<input type="checkbox"/> Describe the differences between substances that were produced by living organisms (e.g., fossil fuels) and substances that result from nonliving processes (e.g., igneous rocks).

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.

Benchmark #2-A: 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	Universe <input type="checkbox"/> Describe the objects in the universe, including: <input type="checkbox"/> billions of galaxies, each containing billions of stars <input type="checkbox"/> different sizes, temperatures, and colors of stars in the Milky Way galaxy.
	Performance Objective 2	Solar System <input type="checkbox"/> Locate the solar system in the Milky Way galaxy.
	Performance Objective 3	<input type="checkbox"/> Identify the components of the solar system, and describe their defining characteristics and motions in space, including: <input type="checkbox"/> sun as a medium sized star <input type="checkbox"/> sun's composition (i.e., hydrogen, helium) and energy production <input type="checkbox"/> nine planets, their moons, asteroids.
	Performance Objective 4	<input type="checkbox"/> Know that the regular and predictable motions of the Earth-moon-sun system explain phenomena on Earth, including: <input type="checkbox"/> Earth's motion in relation to a year, a day, the seasons, the phases of the moon, eclipses, tides, and shadows <input type="checkbox"/> moon's orbit around Earth once in 28 days in relation to the phases of the moon.
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	Structure of Earth <input type="checkbox"/> Know that Earth is composed of layers that include a crust, mantle, and core.
	Performance Objective 2	<input type="checkbox"/> Know that Earth's crust is divided into plates that move very slowly, in response to movements in the mantle.
	Performance Objective 3	<input type="checkbox"/> Know that sedimentary, igneous, and metamorphic rocks contain evidence of the materials, temperatures, and forces that created them.
	Performance Objective 4	Weather and Climate <input type="checkbox"/> Describe the composition (i.e., nitrogen, oxygen, water vapor) and strata of Earth's atmosphere, and differences between the atmosphere of Earth and those of other planets.
	Performance Objective 5	<input type="checkbox"/> Understand factors that create and influence weather and climate, including: <input type="checkbox"/> heat, air movement, pressure, humidity, oceans <input type="checkbox"/> how clouds form by condensation of water vapor <input type="checkbox"/> how weather patterns are related to atmospheric pressure <input type="checkbox"/> global patterns of atmospheric movement (e.g., El Niño) <input type="checkbox"/> factors that can impact Earth's climate (e.g., volcanic eruptions, impacts of asteroids, glaciers).
	Performance Objective 6	<input type="checkbox"/> Understand how to use weather maps and data (e.g., barometric pressure, wind speeds, humidity) to predict weather.
	Performance Objective 7	Changes to Earth <input type="checkbox"/> Know that landforms are created and change through a combination of constructive and destructive forces, including: <input type="checkbox"/> weathering of rock and soil, transportation, deposition of sediment, and tectonic activity <input type="checkbox"/> similarities and differences between current and past processes on Earth's surface (e.g., erosion, plate tectonics, changes in atmospheric composition) <input type="checkbox"/> impact of volcanoes and faults on New Mexico geology.

	Performance Objective 8	<input type="checkbox"/> Understand the history of Earth and how information about it comes from layers of sedimentary rock, including: <input type="checkbox"/> sediments and fossils as a record of a very slowly changing world <input type="checkbox"/> evidence of asteroid impact, volcanic and glacial activity.
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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 #3-A:</u> Explain how scientific discoveries and inventions have changed individuals and societies.	Performance Objective 1	<input type="checkbox"/> Examine the role of scientific knowledge in decisions (e.g., space exploration, what to eat, preventive medicine and medical treatment).
	Performance Objective 2	<input type="checkbox"/> Describe the technologies responsible for revolutionizing information processing and communications (e.g., computers, cellular phones, Internet).