

NEW MEXICO Grade 7 SCIENCE STANDARDS

Strand I: Scientific Thinking and Practice

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

5-8 Benchmark I: Use scientific methods to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings.

1. Use a variety of print and web resources to collect information, inform investigations, and answer a scientific question or hypothesis.
2. Use models to explain the relationships between variables being investigated.

5-8 Benchmark II: Understand the processes of scientific investigation and how scientific inquiry results in scientific knowledge.

1. Describe how bias can affect scientific investigation and conclusions.
2. Critique procedures used to investigate a hypothesis.
3. Analyze and evaluate scientific explanations.

5-8 Benchmark III: Use mathematical ideas, tools, and techniques to understand scientific knowledge.

1. Understand that the number of data (sample size) influences the reliability of a prediction.
2. Use mathematical expressions to represent data and observations collected in scientific investigations.
3. Select and use an appropriate model to examine a phenomenon.

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Strand II: Content of Science

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

5-8 Benchmark I: Know the forms and properties of matter and how matter interacts.

1. Explain how matter is transferred from one organism to another and between organisms and their environment (e.g., consumption, the water cycle, the carbon cycle, the nitrogen cycle).
2. Know that the total amount of matter (mass) remains constant although its form, location, and properties may change (e.g., matter in the food web).
3. Identify characteristics of radioactivity, including:
 - decay in time of some elements to others
 - release of energy
 - damage to cells.
4. Describe how substances react chemically in characteristic ways to form new substances (compounds) with different properties (e.g., carbon and oxygen combine to form carbon dioxide in respiration).
5. Know that chemical reactions are essential to life processes.

5-8 Benchmark II: Explain the physical processes involved in the transfer, change, and conservation of energy.

1. Know how various forms of energy are transformed through organisms and ecosystems, including:
 - sunlight and photosynthesis
 - energy transformation in living systems (e.g., cellular processes changing chemical energy to heat and motion)
 - effect of mankind's use of energy and other activities on living systems (e.g., global warming, water quality).

5-8 Benchmark III: Describe and explain forces that produce motion in objects.

1. Know that forces cause motion in living systems, including:
 - the principle of a lever and how it gives mechanical advantage to a muscular/skeletal system to lift objects
 - forces in specific systems in the human body (e.g., how the heart generates blood pressure, how muscles contract and expand to produce motion).

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Strand II: Content of Science

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

5-8 Benchmark I: Explain the diverse structures and functions of living things and the complex relationships between living things and their environments.

Populations and Ecosystems

1. Identify the living and nonliving parts of an ecosystem and describe the relationships among these components.
2. Explain biomes (i.e., aquatic, desert, rainforest, grasslands, tundra) and describe the New Mexico biome.
3. Explain how individuals of species that exist together interact with their environment to create an ecosystem (e.g., populations, communities, niches, habitats, food webs).
4. Explain the conditions and resources needed to sustain life in specific ecosystems.
5. Describe how the availability of resources and physical factors limit growth (e.g., quantity of light and water, range of temperature, composition of soil) and how the water, carbon, and nitrogen cycles contribute to the availability of those resources to support living systems.

Biodiversity

6. Understand how diverse species fill all niches in an ecosystem.
7. Know how to classify organisms: domain, kingdom, phylum, class, order, family, genus, species.

5-8 Benchmark II: Understand how traits are passed from one generation to the next and how species evolve.

Reproduction

1. Know that reproduction is a characteristic of all living things and is essential to the continuation of a species.
2. Identify the differences between sexual and asexual reproduction.
3. Know that, in sexual reproduction, an egg and sperm unite to begin the development of a new individual.
4. Know that organisms that sexually reproduce fertile offspring are members of the same species.

Heredity

5. Understand that some characteristics are passed from parent to offspring as inherited traits and others are acquired from interactions with the environment.
6. Know that hereditary information is contained in genes that are located in chromosomes, including:
 - determination of traits by genes
 - traits determined by one or many genes
 - more than one trait sometimes influenced by a single gene.

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Biological Evolution

7. Describe how typical traits may change from generation to generation due to environmental influences (e.g., color of skin, shape of eyes, camouflage, shape of beak).
8. Explain that diversity within a species is developed by gradual changes over many generations
9. Know that organisms can acquire unique characteristics through naturally occurring genetic variations.
10. Identify adaptations that favor the survival of organisms in their environments (e.g., camouflage, shape of beak).
11. Understand the process of natural selection.
12. Explain how species adapt to changes in the environment or become extinct and that extinction of species is common in the history of living things.
13. Know that the fossil record documents the appearance, diversification, and extinction of many life forms.

5-8 Benchmark III: Understand the structure of organisms and the function of cells in living systems.

Structure of Organisms

1. Understand that organisms are composed of cells and identify unicellular and multicellular organisms.
2. Explain how organs are composed of tissues of different types of cells (e.g., skin, bone, muscle, heart, intestines).

Function of Cells

3. Understand that many basic functions of organisms are carried out in cells, including:
 - growth and division to produce more cells (mitosis)
 - specialized functions of cells (e.g., reproduction, nerve-signal transmission, digestion, excretion, movement, transport of oxygen).
4. Compare the structure and processes of plant cells and animal cells.
5. Describe how some cells respond to stimuli (e.g., light, heat, pressure, gravity).
6. Describe how factors (radiation, UV light, drugs) can damage cellular structure or function.

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Strand II: Content of Science

Standard 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.

5-8 Benchmark I: 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.

1. Explain why Earth is unique in our solar system in its ability to support life.
2. Explain how energy from the sun supports life on Earth.

5-8 Benchmark II: Describe the structure of Earth and its atmosphere and explain how energy, matter, and forces shape Earth's systems.

1. Understand how the remains of living things give us information about the history of Earth, including:
 - layers of sedimentary rock, the fossil record, and radioactive dating showing that life has been present on Earth for more than 3.5 billion years.
2. Understand how living organisms have played many roles in changes of Earth's systems through time (e.g., atmospheric composition, creation of soil, impact on Earth's surface).
3. Know that changes to ecosystems sometimes decrease the capacity of the environment to support some life forms and are difficult and/or costly to remediate.

Strand III: Science and Society

Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

5-8 Benchmark I: Explain how scientific discoveries and inventions have changed individuals and societies.

1. Analyze the contributions of science to health as they relate to personal decisions about smoking, drugs, alcohol, and sexual activity.
2. Analyze how technologies have been responsible for advances in medicine (e.g., vaccines, antibiotics, microscopes, DNA technologies).
3. Describe how scientific information can help individuals and communities respond to health emergencies (e.g., CPR, epidemics, HIV, bio-terrorism).