



Radiation ~ Museum Explorations
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New Mexico Science Content Standards, Benchmarks, and Performance Standards
Strands and Benchmarks

Kindergarten – 4th Grade

Strand III: Science and Society

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

K-4 Benchmark I: Describe how science influences decisions made by individuals and societies.

Grade	Performance Standards
K	Describe how science helps provide products we use every day (e.g., gasoline for cars; electricity for lights, refrigerators, TVs; gas or electricity for heating, cooking).
1	Describe how science has assisted in creating tools (e.g., plows, knives, telephones, cell phones, computers) to make life easier and more efficient. Describe how tools and machines can be helpful, harmful, or both (e.g., bicycles, cars, scissors, stoves).
2	Understand that everybody can do science, invent things, and formulate ideas.
3	Describe how food packaging (e.g., airtight containers, date) and preparation (heating, cooling, salting, smoking, drying) extend food life and the safety of foods (e.g., elimination of bacteria).
4	Know that science has identified substances called pollutants that get into the environment and can be harmful to living things. 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).



New Mexico Science Content Standards, Benchmarks, and Performance Standards
Strands and Benchmarks

5th – 8th Grade

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 III: Use mathematical ideas, tools, and techniques to understand scientific knowledge.

Grade	Performance Standards
5	Make predictions based on analyses of data, observations, and explanations.
6	Use probabilities, patterns, and relationships to explain data and observations.
7	Understand that the number of data (sample size) influences the reliability of a prediction. Select and use an appropriate model to examine a phenomenon.
8	Create models to describe phenomena.

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.

Grade	Performance Standards
5	Know that the periodic table is a chart of the pure elements that make up all matter.
6	Use properties to identify substances (e.g., for minerals: the hardness, streak, color, reactivity to acid, cleavage, fracture).
7	Identify characteristics of radioactivity, including: <ul style="list-style-type: none">• decay in time of some elements to others• release of energy• damage to cells.
8	Properties of Matter Understand the differences among elements, compounds, and mixtures by: <ul style="list-style-type: none">• separation of mixtures into compounds by methods including evaporation, filtration, screening, magnetism. Structure of Matter Identify the protons, neutrons, and electrons within an atom and describe their locations (i.e., in the nucleus or in motion outside the nucleus).



New Mexico Science Content Standards, Benchmarks, and Performance Standards
Strands and Benchmarks

5th – 8th Grade

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

Grade	Performance Standards
5	Know that there are different forms of energy.
6	Identify various types of energy (e.g., heat, light, mechanical, electrical, chemical, nuclear).
7	Effect of mankind's use of energy and other activities on living systems (e.g., global warming, water quality).
8	Energy Transformation Know that electrical energy is the flow of electrons through electrical conductors that connect sources of electrical energy to points of use, including: <ul style="list-style-type: none">• production of electricity by fossil-fueled and nuclear power plants, wind generators, geothermal plants, and solar cells Waves Understand how light and radio waves carry energy through vacuum or matter by straight-line travel unless an object is encountered

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.

Grade	Performance Standards
5	Describe the contributions of science to understanding local or current issues (e.g., watershed and community decisions regarding water use). Describe how various technologies have affected the lives of individuals (e.g., transportation, entertainment, health).
6	Examine the role of scientific knowledge in decisions.
7	Analyze how technologies have been responsible for advances in medicine Describe how scientific information can help individuals and communities respond to health emergencies (e.g., CPR, epidemics, HIV, bio-terrorism).
8	Analyze the interrelationship between science and technology (e.g., germ theory, vaccines). Describe how scientific information can help to explain environmental phenomena. Describe how technological revolutions have significantly influenced societies (e.g., energy production, warfare, space exploration). Critically analyze risks and benefits associated with technologies related to energy production.

Bradbury Science Museum is part of Los Alamos National Laboratory's Community Programs Office. The Community Programs Office supports education, economic development, and community giving.



New Mexico Science Content Standards, Benchmarks, and Performance Standards
Strands and Benchmarks

9th – 12th Grade

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.

9-12 Benchmark II: Understand that scientific processes produce scientific knowledge that is continually evaluated, validated, revised, or rejected.

Grade Performance Standards

- 9-12** Use scientific reasoning and valid logic to recognize:
- faulty logic
 - cause and effect
 - the difference between observation and unsubstantiated inferences and conclusions
 - potential bias.
- Critically analyze an accepted explanation by reviewing current scientific knowledge.

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.

9-12 Benchmark III: Use mathematical concepts, principles, and expressions to analyze data, develop models, understand patterns and relationships, evaluate findings, and draw conclusions.

Grade Performance Standards

- 9-12** Create multiple displays of data to analyze and explain the relationships in scientific investigations.
- Use mathematical models to describe, explain, and predict natural phenomena.

Strand II: The 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.

9-12 Benchmark I: Understand the properties, underlying structure, and reactions of matter.

Grade Performance Standards

9-12 Properties of Matter

- Know how to use properties to separate mixtures into pure substances (e.g., distillation, chromatography, solubility).
- Describe trends in properties (e.g., ionization energy or reactivity as a function of location on the periodic table, boiling point of organic liquids as a function of molecular weight).



**New Mexico Science Content Standards, Benchmarks, and Performance Standards
Strands and Benchmarks**

Structure of Matter

Understand that matter is made of atoms and that atoms are made of subatomic particles.

Understand atomic structure, including:

- most space occupied by electrons
- nucleus made of protons and neutrons
- isotopes of an element

Know that some atomic nuclei can change, including:

- spontaneous decay
- half-life of isotopes
- fission
- fusion (e.g., the sun)
- alpha, beta, and gamma radiation.

Strand II: The 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.

9-12 Benchmark II: Understand the transformation and transmission of energy and how energy and matter interact.

Grade Performance Standards

9-12 Energy Transformation and Transfer

Identify different forms of energy, including kinetic, gravitational (potential), chemical, thermal, nuclear, and electromagnetic.

Interactions of Energy and Matter

Understand that electromagnetic waves carry energy that can be transferred when they interact with matter.

Describe the characteristics of electromagnetic waves (e.g., visible light, radio, microwave, X-ray, ultraviolet, gamma) and other waves (e.g., sound, seismic waves, water waves), including:

- origin and potential hazards of various forms of electromagnetic radiation
- energy of electromagnetic waves carried in discrete energy packets (photons) whose energy is inversely proportional to wavelength.



New Mexico Science Content Standards, Benchmarks, and Performance Standards
Strands and Benchmarks

9th – 12th Grade

Strand III: Science and Society

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

9-12 Benchmark I: Examine and analyze how scientific discoveries and their applications affect the world, and explain how societies influence scientific investigations and applications.

Grade Performance Standards

9-12

Science and Technology

Evaluate the influences of technology on society (e.g., communications, petroleum, transportation, nuclear energy, computers, medicine, genetic engineering) including both desired and undesired effects, and including some historical examples.

Understand the scientific foundations of common technologies.

Describe how human activities have affected ozone in the upper atmosphere and how it affects health and the environment.

Describe uses of radioactivity (e.g., nuclear power, nuclear medicine, radiometric dating).

Science and Society

Describe how scientific knowledge helps decision makers with local, national, and global challenges (e.g., Waste Isolation Pilot Project [WIPP], mining, drought, population growth, alternative energy, climate change).

Describe major historical changes in scientific perspectives (e.g., atomic theory, germs, cosmology, relativity, plate tectonics, evolution) and the experimental observations that triggered them.

Know that societal factors can promote or constrain scientific discovery.

Explain how societies can change ecosystems and how these changes can be reversible or irreversible.

Describe how environmental, economic, and political interests impact resource management and use in New Mexico.

Describe New Mexico's role in nuclear science (e.g., Manhattan Project, WIPP, national laboratories).

Science and Individuals

Identify how science has produced knowledge that is relevant to individual health and material prosperity.

Understand that scientists have characteristics in common with other individuals (e.g., employment and career needs, curiosity, desire to perform public service, greed, preconceptions and biases, temptation to be unethical, core values including honesty and openness).

Know that science plays a role in many different kinds of careers and activities (e.g., public service, volunteers, public office holders, researchers, teachers, doctors, nurses, technicians, farmers, ranchers).

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