

RRRPS District Standards: SCIENCE

Grade 4

STRAND I: SCIENTIFIC THINKING AND PRACTICE

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

NM State Benchmarks Grades K-4

RRPS Grade 4 Benchmarks

All benchmarks must be taught; Power Standards are consistently emphasized.

NM State Benchmark I-A: Grades K-4

Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.

Power Standard I

Use scientific processes, thinking, and knowledge to perform investigations, analyze data, and communicate findings.

NM Grade 4 Performance Standards

1. Use instruments to perform investigations (e.g., timers, balances) and communicate findings.
2. 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.
3. Conduct multiple trials to test a prediction, draw logical conclusions, and construct and interpret graphs from measurements.
4. 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.

Performance Indicators:

- a. Make and test predictions by conducting multiple trials using simple mathematical techniques.
- b. Use instruments to perform investigations.
- c. Communicate findings that are open to critique from others by constructing graphs from measurements, and using mathematical vocabulary.
- d. Explain the reasonableness of findings using evidence from investigations.
- e. Differentiate observation from interpretation.

NM State Benchmark I-B: Grades K-4

Use scientific thinking and knowledge and communicate findings.

NM Grade 4 Performance Standards

1. Communicate ideas and present findings about scientific investigations that are open to critique from others.
2. Describe how scientific investigations may differ from one another (e.g., observations of nature, measurements of things changing over time).
3. Understand how data are used to explain how a simple system functions (e.g., a thermometer to measure heat loss as water cools).

STRAND I: SCIENTIFIC THINKING AND PRACTICE

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

NM State Benchmark I-C: Grades K-4

Use mathematical skills and vocabulary to analyze data, understand patterns and relationships, and communicate findings.

NM Grade 4 Performance Standards

1. Conduct multiple trials using simple mathematical techniques to make and test predictions.
1. Use mathematical equations to formulate and justify predictions based on cause-and-effect relationships.
2. 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).

STRAND II: CONTENT OF SCIENCE

NM State Content Standard II (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

NM State Benchmarks Grades K-4

RRPS Grade 4 Benchmarks

All benchmarks must be taught; Power Standards are consistently emphasized.

NM State Benchmark II-A: Grades K-4

Recognize that matter has different forms and properties.

Power Standard II

Demonstrate understanding of the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

NM Grade 4 Performance Standards

1. 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).
2. Know that materials are made up of small particles (atoms and molecules) that are too small to see with the naked eye.
3. Know that the mass of the same amount of material remains constant whether it is together, in parts, or in a different state.

Performance Indicators:

- a. Explain that changes to matter may be chemical or physical.
- b. Recognize that materials are made up of atoms and molecules.
- c. Demonstrate that mass remains constant whether it is together, in parts, or in a different state.
- d. Identify the characteristics of several forms of energy.
- e. Describe how energy can be converted from one form to another.
- f. Describe how direct and indirect forces act on objects.
- g. Describe how energy can move from one place to another.

NM State Benchmark II-B: Grades K-4

Know that energy is needed to get things done and that energy has different forms.

NM Grade 4 Performance Standards

1. 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).
2. Recognize that energy can be stored in many ways (e.g., potential energy in gravity or springs, chemical energy in batteries).
3. 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).
4. Demonstrate how electricity flows through a simple circuit (e.g., by constructing one).

NM State Benchmark II-C: Grades K-4

Identify forces and describe the motion of objects.

NM Grade 4 Performance Standards

1. 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.
2. Describe the motion of an object by measuring its change of position over a period of time.
3. 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).
4. 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).

STRAND II: CONTENT OF SCIENCE

NM State Content Standard III (Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

NM State Benchmarks Grades K-4

RRPS Grade 4 Benchmarks

All benchmarks must be taught; Power Standards are consistently emphasized.

NM State Benchmark III-A: Grades K-4

Know that living things have diverse forms, structures, functions, and habitats.

Power Standard III

Demonstrate understanding of the properties, structures, and processes of living things and the interdependence of living things and their environments.

NM Grade 4 Performance Standards

1. Explain that different living organisms have distinctive structures and body systems that serve specific functions (e.g., walking, flying, swimming).
2. Know that humans and other living things have senses to help them detect stimuli, and that sensations (e.g., hunger) and stimuli (e.g., changes in the environment) influence the behavior of organisms.
3. Describe how roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight (photosynthesis).
4. Describe the components of and relationships among organisms in a food chain (e.g., plants are the primary source of energy for living systems).
5. Describe how all living things are made up of smaller units that are called cells.

Performance Indicators:

- a. Explain that different organisms have distinctive structures and systems that serve specific functions.
- b. Describe how a particular environment affects living things.
- c. Describe how a living organism's chances of survival are affected by changes over time.
- d. Recognize that the human body is organized from cells, to tissues, to organs, to systems, to the organism.

NM State Benchmark III-B: Grades K-4

Know that living things have similarities and differences and that living things change over time.

NM Grade 4 Performance Standards

1. Know that in any particular environment some kinds of plants and animals survive well, some survive less well, and others cannot survive at all.
2. 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).
3. 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).

NM State Benchmark III-C: Grades K-4

Know the parts of the human body and their functions.

NM Grade 4 Performance Standards

1. 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).
2. Recognize that the human body is organized from cells, to tissues, to organs, to systems, to the organism.

STRAND II: CONTENT OF SCIENCE

NM State Content Standard IV (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.

NM State Benchmarks Grades K-4

RRPS Grade 4 Benchmarks

All benchmarks must be taught; Power Standards are consistently emphasized.

NM State Benchmark IV-A: Grades K-4

Know the structure of the solar system and the objects in the universe.

Power Standard IV

Recognize that the patterns of stars stay the same and explain the function of telescopes.

NM Grade 4 Performance Standards

1. Understand that the number of stars visible through a telescope is much greater than the number visible to the naked eye.
2. Know that there are various types of telescopes that use different forms of light to observe distant objects in the sky.
3. 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.

Performance Indicators:

- a. Compare the number of stars visible to the naked eye to the number visible through a telescope.
- b. Recognize the function and purpose of various types of telescopes.
- c. Explain that the pattern of stars stays the same although they appear to move across the sky due to the Earth's rotation.

NM State Benchmark IV-B: Grades K-4

Know the structure and formation of Earth and its atmosphere and the processes that shape them.

Power Standard V

Demonstrate knowledge of the structure of Earth and its atmosphere and the processes that shape them.

NM Grade 4 Performance Standards

1. Know that the properties of rocks and minerals reflect the processes that shaped them (i.e., igneous, metamorphic, and sedimentary rocks).
2. Describe how weather patterns generally move from west to east in the United States.
3. Know that local weather information describes patterns of change over a period of time (e.g., temperature, precipitation symbols, cloud conditions, wind speed/direction).

Performance Indicators:

- a. Describe the properties and formation of igneous, metamorphic, and sedimentary rocks.
- b. Describe weather patterns and their changes over a period of time.

STRAND III: SCIENCE AND SOCIETY

NM State Content Standard V: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

NM State Benchmarks Grades K-4

RRPS Grade 4 Benchmarks

All benchmarks must be taught; Power Standards are consistently emphasized.

NM State Benchmark V-A: Grades K-4

Describe how science influences decisions made by individuals and societies.

Power Standard VI

Describe ways that science and technology influence individuals, society, and the environment.

NM Grade 4 Performance Standards

1. Know that science has identified substances called pollutants that get into the environment and can be harmful to living things.
2. 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).
3. 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).
4. Know that both men and women of all races and social backgrounds choose science as a career.

Performance Indicators:

- a. Identify pollutants and explain how they affect the environment.
- b. Identify materials invented through the use of science.
- c. Explain that science has created ways to store and retrieve information but that these are not perfect.