

Appendix K: Standards Correlation



This appendix lists the most recent New Mexico Content Standards, Benchmarks, and Performance Standards for science (page 648) and social studies (page 674) as well as standards and benchmarks for math (page 684), language arts (page 686), and visual arts (page 688). To view or download the complete text of those documents, go to the Public Education Department web site at <http://www.ped.state.nm.us>

Below is a list of the activities in this guide. The activity number used in this appendix is on the left; the page number for the activity is on the right. You may search for a benchmark, content standard, or performance standard and find the numbers of the activities that meet them.

| Activity Number | Activity | Page |
|--|----------------------------|------|
|  1. | Bosque Search Bingo | 75 |
| 2. | Bosque Discovery Booklet | 80 |
| 3. | Field Explorations Booklet | 87 |
| 4. | Naturalist Notebooks | 94 |
| 5. | Scavenger Hunt | 103 |
| 6. | Wildlife Detectives | 108 |
| 7. | Crawly Creatures | 110 |
| 8. | Pitfall Trapping | 113 |
| 9. | Kick-net Kritters | 122 |
| 10. | A Rose by Any Other Name | 128 |
| 11. | Reading the Bosque | 137 |
| 12. | Winter Bud Activity | 147 |
| 13. | Changing River | 162 |
| 14. | Cottonwood Creation | 190 |
| 15. | Who Lives Where? | 198 |
| 16. | Who Grows Where? | 240 |
| 17. | Working Water | 256 |

| Activity Number | Activity | Page |
|--|------------------------------------|------|
|  18. | Bosque Chaos | 265 |
| 19. | The Web | 281 |
| 20. | Bosque Leaf Hunt Relay | 284 |
| 21. | Cottonwood Quiz | 290 |
| 22. | Mapping Species Richness | 294 |
| 23. | Crane Migration | 305 |
| 24. | WebQuest: Invasive Species | 313 |
| 25. | Time Line Activity | 329 |
| 26. | What Is the Rio Grande Rift? | 331 |
| 27. | WebQuest: Geologic History | 341 |
| 28. | Porosity and Permeability | 349 |
| 29. | Rio Grande Bosque Water Cycle | 357 |
| 30. | Surface Water Demonstration | 366 |
| 31. | Watersheds in New Mexico | 371 |
| 32. | Rio Grande Stream Table | 382 |
| 33. | How Deep Is the Water Table? | 387 |
| 34. | Water Budget Activity | 401 |
| 35. | Interpreting a Hydrograph | 411 |
| 36. | Change Is All Around Us | 424 |
| 37. | Aldo Leopold | 440 |
| 38. | River Stories | 455 |
| 39. | Bosque Songs | 465 |
| 40. | If You Owned a Bosque Ecosystem | 473 |
| 41. | Fire Vocabulary Match-up | 495 |
| 42. | A Spectrum of Fires | 502 |
| 43. | Post-fire Survival of Bosque Trees | 511 |
| 44. | Naturalist Notebooks: Fire | 519 |
| 45. | Changing Fire | 524 |



Science: 2003 Content Standards, Benchmarks, and Performance Standards

A. Kindergarten Through Grade Four

Strand I: Scientific Thinking and Practice

Grade Performance Standards



Activity Number (see page 645)

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

K-4 Benchmark I: Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.

- | | |
|----------|--|
| K | <ol style="list-style-type: none"> 1. Use observation and questioning skills in science inquiry (e.g., What happens when something is pushed or pulled?).1, 2, 3, 5, 6, 7, 8, 10, 12, 13, 14, 15, 17, 19, 23, 26, 29, 30, 32, 38, 40, 42, 43, 44, 45 2. Ask and answer questions about surroundings and share findings with classmates.1, 2, 3, 5, 6, 7, 8, 10, 12, 14, 15, 19, 23, 25, 29, 30, 32, 38, 40, 42, 43, 44, 45 3. Record observations and data with pictures, numbers, and/or symbols.1, 2, 3, 5, 6, 7, 8, 10, 12, 14, 15, 25, 26, 32, 42, 43, 44, 45 |
| 1 | <ol style="list-style-type: none"> 1. Make observations, develop simple questions, and make comparisons of familiar situations (e.g., What does the seed look like when it starts to grow?).....1, 2, 3, 5, 6, 7, 8, 10, 13, 14, 15, 17, 19, 20, 23, 25, 26, 29, 30, 32, 40, 42, 43, 44, 45 2. Describe relationships between objects (e.g., above, next to, below) and predict the results of changing the relationships (e.g., When that block moves, what will happen to the one next to it?).....5, 13, 14, 17, 19, 23, 25, 26, 29, 30, 32, 40, 42, 43, 44, 45 |
| 2 | <ol style="list-style-type: none"> 1. Conduct simple investigations (e.g., measure the sizes of plants of the same kind that are grown in sunlight and in shade).5, 6, 7, 8, 10, 12, 14, 15, 17, 29, 30, 32, 43, 44 2. Use tools to provide information not directly available through only the senses (e.g., magnifiers, rulers, thermometers).....7, 8, 12, 13, 14, 25, 43, 44, 45 3. Make predictions based on observed patterns as opposed to random guessing.10, 13, 14, 15, 17, 19, 23, 29, 30, 32, 40, 42, 43, 44, 45 4. Follow simple instructions for a scientific investigation.....7, 8, 10, 12, 14, 29, 30, 32, 43, 44, 45 |
| 3 | <ol style="list-style-type: none"> 1. Make new observations when discrepancies exist between two descriptions of the same object or phenomenon to improve accuracy.....5, 6, 7, 8, 10, 13, 25, 42, 43, 44, 45 2. Recognize the difference between data and opinion.....13, 14, 17, 38, 43, 44, 45 3. Use numerical data in describing and comparing objects, events, and measurements.7, 8, 14, 15, 23, 25, 26, 29, 44, 45 4. Collect data in an investigation and analyze those data.....1, 2, 3, 5, 6, 7, 8, 10, 12, 14, 15, 17, 29, 30, 32, 40, 42, 44, 45 |



- 5. Know that the same scientific laws govern investigations in different times and places (e.g., gravity, growing plants).....10, 12, 14, 26
- 4 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.1, 2, 3, 5, 7, 8, 10, 12, 13, 14, 15, 17, 19, 23, 26, 29, 30, 42, 44, 45
- 3. Conduct multiple trials to test a prediction, draw logical conclusions, and construct and interpret graphs from measurements.14, 23, 30, 32

K-4 Benchmark II: Use scientific thinking and knowledge and communicate findings.

- K 1. Communicate observations and answer questions about surroundings1, 2, 3, 5, 6, 7, 8, 10, 12, 13, 14, 15, 17, 19, 20, 23, 25, 26, 29, 30, 32, 39, 40, 42, 43, 44, 45
- 1 1. Know that simple investigations do not always turn out as planned.44, 45
- 2 1. Understand that in doing science it is often helpful to work with a team and share findings.....1, 2, 3, 5, 6, 7, 8, 10, 12, 14, 25, 42, 43, 44, 45
- 2 2. Make accurate observations and communicate findings about investigations.....1, 2, 3, 5, 6, 7, 8, 10, 12, 13, 14, 15, 17, 19, 20, 23, 25, 26, 29, 30, 32, 40, 42, 43, 44, 45
- 3 1. Use a variety of methods to display data and present findings.....2, 3, 5, 7, 8, 10, 12, 13, 14, 15, 25, 29, 32, 39, 42, 43, 45
- 3 2. Understand that predictions are based on observations, measurements, and cause-and-effect relationships.7, 8, 10, 13, 14, 15, 17, 19, 23, 26, 29, 30, 32, 40, 42, 43, 44, 45
- 4 1. Communicate ideas and present findings about scientific investigations that are open to critique from others.....6, 13, 26, 40, 42, 43, 44, 45
- 2. Describe how scientific investigations may differ from one another (e.g., observations of nature, measurements of things changing over time).....6, 7, 8, 13, 14, 23, 26, 40, 42, 44, 45
- 3. Understand how data are used to explain how a simple system functions (e.g., a thermometer to measure heat loss as water cools).....13, 14, 15, 17, 19, 23, 29, 30, 32, 42, 45

K-4 Benchmark III: Use mathematical skills and vocabulary to analyze data, understand patterns and relationships, and communicate findings.

- K 1. Observe and describe the relative sizes and characteristics of objects (e.g., bigger, brighter, louder, smellier).1, 2, 3, 7, 8, 10, 12, 43, 44
- 1 1. Use numbers and mathematical language (e.g., “addition” instead of “add to,” “subtraction” instead of “take away”) to describe phenomena.13, 14, 23, 26, 44, 45
- 2 1. Record observations on simple charts or diagrams.1, 2, 3, 5, 6, 7, 8, 10, 12, 13, 14, 15, 25, 26, 29, 32, 42, 43, 44, 45
- 2 2. Measure length, weight, and temperature with appropriate tools and express those measurements in accurate mathematical language.....14, 25, 44, 45
- 3 1. Use numerical data in describing and comparing objects, events, and measurements.7, 8, 14, 25, 44, 45



| | | |
|----|---|--|
| 2. | Pose a question of interest and present observations and measurements with accuracy. | 5, 6, 7, 8, 12, 13, 14, 15, 17, 23, 25, 29, 30, 42, 44 |
| 3. | Use various methods to display data and present findings and communicate results in accurate mathematical language. | 7, 8, 12, 14, 15, 17, 25, 26, 44 |
| 4 | 1. Conduct multiple trials using simple mathematical techniques to make and test predictions. | 14, 17, 23, 29 |
| | 2. Use mathematical equations to formulate and justify predictions based on cause-and-effect relationships. | 13, 14, 23, 26, 29, 44, 45 |
| | 3. 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). | 14, 25, 29, 45 |

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.

K-4 Benchmark I: Recognize that matter has different forms and properties.

| | | |
|---|---|------------------|
| K | 1. Observe that objects are made of different types of materials (e.g., metal, plastic, cloth, wood). | 2, 3, 29, 42, 44 |
| | 2. Observe that different materials have different properties (e.g., color, odor). | 2, 3, 29, 42 |
| 1 | 1. Observe that the three states of matter (i.e., solids, liquids, and gases) have different properties (e.g., water can be liquid, ice, or steam). | 13, 30 |
| | 2. Describe simple properties of matter (e.g., hardness, flexibility, transparency). | 30 |
| 2 | 1. Observe that properties of substances can change when they are mixed, cooled, or heated (e.g., salt dissolves in water, ice melts).... | 26 |
| | 2. Describe the changes that occur when substances are heated or cooled and change from one state of matter to another (i.e., solid, liquid, and gas). | 26 |
| 3 | 2. Separate mixtures based on properties (e.g., by size or by substance; rocks and sand, iron filings and sand, salt and sand). | 26, 32 |
| 4 | 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). | 26 |
| | 2. Know that materials are made up of small particles (atoms and molecules) that are too small to see with the naked eye. | 26, 30 |
| | 3. Know that the mass of the same amount of material remains constant whether it is together, in parts, or in a different state. | 29, 32 |

K-4 Benchmark II: Know that energy is needed to get things done and that energy has different forms.

| | | |
|---|--|------|
| K | 1. Observe how energy does things (e.g., batteries, the sun, wind, electricity). | 2, 3 |
| 1 | 1. Observe and describe how energy produces changes (e.g., heat melts ice, gas makes car go uphill, electricity makes TV work). | 44 |



5. Recognize that moving objects carry energy (kinetic energy).....13, 26, 32

2 1. Describe how heat can be produced (e.g., burning, rubbing, mixing some substances).45

3 2. Know that light travels in a straight line until it strikes an object and then it is reflected, refracted, or absorbed.....2

3 3. Measure energy and energy changes (e.g., temperature changes).42

4 4. Construct charts or diagrams that relate variables associated with energy changes (e.g., melting of ice over time).45

4 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).45

2. Recognize that energy can be stored in many ways (e.g., potential energy in gravity or springs, chemical energy in batteries).....26

K-4 Benchmark III: Identify forces and describe the motion of objects.

K 1. Observe that things move in many different ways (e.g., straight line, vibration, circular).7, 8, 13, 20, 26, 30, 32

2. Know that the position and motion of an object (direction or speed) are changed by pushing or pulling it26, 32

1 1. Describe ways to make things move, what causes them to stop, and what causes a change of speed, or change of direction.....32, 45

2. Observe that gravity makes things fall to the ground unless something holds them up.26, 29, 30, 32

2 1. Describe how the strength of a push or pull affects the change in an object’s motion (e.g., how a big or small push affects how high a swing rises)26

3 4. Describe motion on different time scales (e.g., the slow motion of a plant toward light, the fast motion of a tuning fork).26

4 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.....13, 45

2. Describe the motion of an object by measuring its change of position over a period of time.....26, 32

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).....26

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).....26

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

K-4 Benchmark I: Know that living things have diverse forms, structures, functions, and habits.

K 1. Identify major structures of common living organisms (e.g., stems, leaves, and roots of plants; arms, wings, and legs of animals).....1, 2, 3, 7, 8, 10, 12, 14, 20, 42, 44



| Grade | Performance Standards | |
|---|--|--|
| | 2. Observe that differences exist among individual living organisms (e.g., plants, animals) of the same kind..... | 1, 2, 3, 6, 7, 8, 10, 12, 15, 20, 42, 43, 44, 45 |
| 1 | 1. Know that living organisms (e.g., plants, animals) have needs (e.g., water, air, food, sunlight)..... | 1, 2, 3, 6, 10, 12, 14, 15, 19, 23, 40, 41, 42, 43, 44, 45 |
| | 2. Know that living organisms (e.g., plants, animals) inhabit various environments and have various external features to help them satisfy their needs (e.g., leaves, legs, claws). | 1, 2, 3, 6, 7, 8, 10, 12, 14, 14, 20, 23, 40, 42, 43, 44, 45 |
| | 3. Describe the differences and similarities among living organisms (e.g., plants, animals). | 1, 2, 3, 6, 7, 8, 10, 12, 15, 20, 42, 43, 44, 45 |
| | 4. Observe that living organisms (e.g., plants, animals) have predictable but varied life cycles..... | 3, 6, 10, 12, 14, 15, 42, 43, 44 |
| 2. | 1. Observe that diversity exists among individuals within a population..... | 1, 2, 3, 6, 7, 8, 10, 12, 15, 19, 20, 23, 40, 42, 43, 45 |
| 3 | 1. Know that an adaptation in physical structure or behavior can improve an organism’s chance for survival (e.g., horned toads, chameleons, cacti, mushrooms). | 20, 42, 43, 44, 45 |
| | 2. Observe that plants and animals have structures that serve different functions (e.g., shape of animals’ teeth). | 2, 3, 6, 7, 8, 10, 12, 14, 15, 20, 42, 44, 45 |
| | 3. Classify common animals according to their observable characteristics (e.g., body coverings, structure)..... | 2, 3, 7, 8, 15, 20, 42, 45 |
| | 4. Classify plants according to their characteristics (e.g., tree leaves, flowers, seeds). | 42, 43 |
| 4 | 1. Explain that different living organisms have distinctive structures and body systems that serve specific functions (e.g., walking, flying, swimming). | 6, 7, 8, 12, 14, 15, 19, 20, 23, 42, 44 |
| | 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. | 7, 8, 10, 12, 20, 23, 42, 44 |
| | 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). | 10, 12, 14, 17, 42, 44 |
| | 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)..... | 3, 5, 6, 7, 8, 15, 19, 20, 40, 42, 44 |
| | 5. Describe how all living things are made up of smaller units that are called cells. | 10 |
| <i>K-4 Benchmark II: Know that living things have similarities and differences and that living things change over time.</i> | | |
| K | 1. Observe and describe similarities and differences in the appearance and behavior of living organisms (e.g., plants, animals)..... | 1, 2, 3, 6, 7, 8, 10, 12, 15, 19, 23, 42, 43, 44, 45 |
| | 2. Observe that living organisms (e.g., plants, animals) closely resemble their parents. | 10, 12, 42, 43, 45 |
| 1 | 1. Identify differences between living and nonliving things..... | 1, 2, 3, 5, 6, 42, 43, 44 |
| | 2. Recognize the differences between mature and immature plants and animals (e.g., trees/seedlings, dogs/puppies, cats/kittens). | 2, 3, 6, 10, 12, 14, 15, 20, 42, 43, 44, 45 |
| 2 | 1. Explain that stages of the life cycle are different for different animals (e.g., mouse, cat, horse, butterfly, frog)..... | 7, 8, 15, 19, 20, 23 |



2. Observe that many characteristics of the offspring of living organisms (e.g., plants or animals) are inherited from their parents.10, 12, 15, 42, 45
3. Observe how the environment influences some characteristics of living things (e.g., amount of sunlight required for plant growth).3, 5, 6, 7, 8, 10, 12, 13, 14, 15, 17, 19, 20, 23, 40, 42, 43, 45
- 3 1. Identify how living things cause changes to the environments in which they live, and that some of these changes are detrimental to the organism and some are beneficial.2, 3, 6, 14, 15, 17, 19, 29, 38, 40, 42, 43, 44, 45
2. Know that some kinds of organisms that once lived on Earth have become extinct (e.g., dinosaurs) and that others resemble those that are alive today (e.g., alligators, sharks).15, 19, 25
- 4 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, 3, 6, 7, 8, 10, 12, 13, 14, 15, 17, 19, 20, 23, 40, 42, 43, 44, 45
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).....7, 8, 15, 20, 42, 45
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).6, 7, 8, 10, 12, 14, 15, 19, 20, 23, 25, 42, 43, 45

Benchmark III: Know the parts of the human body and their functions.

- K 1. Use the senses (e.g., sight, hearing, smell, taste, touch) to observe surroundings, and describe the observations.....1, 2, 3, 5, 6, 7, 8, 10, 12, 15, 32, 43, 44

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.

K-4 Benchmark I: Know the structure of the solar system and the objects in the universe.

- 3 1. Describe the objects in the solar system (e.g., sun, Earth and other planets, moon) and their features (e.g., size, temperature).25

K-4 Benchmark II: Know the structure and formation of Earth and its atmosphere and the processes that shape them.

- K 1. Observe that changes in weather occur from day to day and season to season.....12, 29, 45
2. Observe that the sun warms the land and water and they warm the air.3, 12, 29, 45
- 1 1. Know that simple tools can be used to measure weather conditions (e.g., thermometer, wind sock, hand held anemometer, rain gauge) and that measurements can be recorded from day to day and across seasons.29
2. Know that there are different climates (e.g., desert, arctic, rainforest).3, 6, 10, 12, 14, 15, 17, 25, 26, 29, 42



| Grade | Performance Standards | |
|-------|---|---------------------------|
| 2 | 1. Know that rocks have different shapes and sizes (e.g., boulders, pebbles, sand) and that smaller rocks result from the breaking and weathering of larger rocks. | 13, 26, 32 |
| | 2. Understand that rocks are made of materials with distinct properties. | 26 |
| | 3. Know that soil is made up of weathered rock and organic materials, and that soils differ in their capacity to support the growth of plants. | 3, 10, 12, 14, 17 |
| | 4. Recognize the characteristics of the seasons. | 3, 10, 12, 13, 14, 23, 29 |
| 3 | 1. Know that Earth’s features are constantly changed by a combination of slow and rapid processes that include the action of volcanoes, earthquakes, mountain building, biological changes, erosion, and weathering..... | 13, 17, 25, 26, 27, 32 |
| | 2. Know that fossils are evidence of earlier life and provide data about plants and animals that lived long ago. | 25, 26 |
| | 3. Know that air takes up space, is colorless, tasteless, and odorless, and exerts a force. | 29 |
| | 4. Identify how water exists in the air in different forms (e.g., in clouds and fog as tiny droplets; in rain, snow, and hail) and changes from one form to another through various processes (e.g., freezing/condensation, precipitation, evaporation). | 12, 13, 17, 29, 30 |
| 4 | 1. Know that the properties of rocks and minerals reflect the processes that shaped them (i.e., igneous, metamorphic, and sedimentary rocks)..... | 25, 26, 27, 32 |
| | 2. Describe how weather patterns generally move from west to east in the United States. | 13, 17, 29 |
| | 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). | 29 |

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.

| | | |
|---|--|---|
| K | 2. 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). | 26 |
| 1 | 2. Describe how science has assisted in creating tools (e.g., plows, knives, telephones, cell phones, computers) to make life easier and more efficient. | 13, 17 |
| | 3. Describe how tools and machines can be helpful, harmful, or both (e.g., bicycles, cars, scissors, stoves). | 3, 5, 17, 38, 40 |
| | 4. Know that men and women of all ethnic and social backgrounds practice science and technology..... | 13, 17, 38, 40, 42, 43, 44 |
| 2 | 4. Understand that everybody can do science, invent things, and formulate ideas. | 1, 2, 3, 13, 17, 27, 38, 42, 43, 44, 45 |



- | | |
|---|--|
| 3 | <ul style="list-style-type: none"> 5. Know that science has discovered many things about objects, events, and nature and that there are many more questions to be answered.1, 2, 3, 7, 8, 10, 12, 13, 14, 15, 17, 23, 26, 27, 40, 42, 43, 44, 45 2. Know that science produces information for the manufacture and recycling of materials (e.g., materials that can be recycled [aluminum, paper, plastic] and others that cannot [gasoline]).26 4. Know that using poisons can reduce the damage to crops caused by rodents, weeds, and insects, but their use may harm other plants, animals, or the environment.13, 15, 17, 24 |
| 4 | <ul style="list-style-type: none"> 1. Know that science has identified substances called pollutants that get into the environment and can be harmful to living things.3, 5, 10, 13, 15, 17, 24, 38, 40, 43 4. Know that both men and women of all races and social backgrounds choose science as a career.13, 17, 27, 38, 40, 42, 43, 44, 45 |

B. Grades Five Through Eight

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.

- | | |
|---|---|
| 5 | <ul style="list-style-type: none"> 1. Plan and conduct investigations, including formulating testable questions, making systematic observations, developing logical conclusions, and communicating findings.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 18, 21, 22, 23, 24, 33, 36, 40, 41, 42, 43, 44, 45 2. Use appropriate technologies (e.g., calculators, computers, balances, spring scales, microscopes) to perform scientific tests and to collect and display data.8, 9, 22, 23, 24, 27, 32, 34, 42, 43, 44 3. Use graphic representations (e.g., charts, graphs, tables, labeled diagrams) to present data and produce explanations for investigations.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 21, 22, 23, 24, 25, 26, 33, 35, 36, 41, 42, 43, 44, 45 4. Describe how credible scientific investigations use reproducible elements including single variables, controls, and appropriate sample sizes to produce valid scientific results.6, 7, 8, 9, 21 5. Communicate the steps and results of a scientific investigation.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 24, 41, 42, 43, 44 |
| 6 | <ul style="list-style-type: none"> 1. Construct appropriate graphs from data and develop qualitative and quantitative statements about the relationships between variables being investigated.2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 22, 23, 24, 28, 32, 33, 34, 41, 42, 43, 44, 45 |



| Grade | Performance Standards | |
|---|--|---|
| | 2. Examine the reasonableness of data supporting a proposed scientific explanation..... | 4, 5, 13, 22, 23, 24, 36, 42, 44, 45 |
| | 3. Justify predictions and conclusions based on data. | 5, 6, 7, 8, 9, 10, 11, 12, 18, 22, 23, 24, 28, 29, 33, 34, 35, 40, 41, 42, 44, 45 |
| 7 | 1. Use a variety of print and web resources to collect information, inform investigations, and answer a scientific question or hypothesis. | 24, 27, 36, 37, 38, 41, 42, 43, 44, 45 |
| | 2. Use models to explain the relationships between variables being investigated. | 13, 14, 18, 19, 20, 26, 28, 30, 32, 41, 42, 43, 45 |
| | 3. Analyze and evaluate scientific explanations. | 41, 42, 44, 45 |
| 8 | 1. Evaluate the accuracy and reproducibility of data and observations. | 4, 5, 8, 9, 10, 11, 12, 24, 33, 35, 41, 44 |
| | 2. Use a variety of technologies to gather, analyze and interpret scientific data..... | 8, 9, 10, 11, 24, 27, 32, 41, 42, 44, 45 |
| | 3. Know how to recognize and explain anomalous data. | 28, 33, 41, 42, 44, 45 |
| <i>5-8 Benchmark II: Understand the processes of scientific investigation and how scientific inquiry results in scientific knowledge.</i> | | |
| 5 | 1. Understand that different kinds of investigations are used to answer different kinds of questions (e.g., observations, data collection, controlled experiments)..... | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 22, 23, 42, 44 |
| | 2. Understand that scientific conclusions are subject to peer and public review. | 1, 2, 3, 4, 24, 27, 36, 40, 42, 44 |
| 6 | 1. Understand that scientific knowledge is continually reviewed, critiqued, and revised as new data become available. | 1, 2, 3, 4, 36, 37, 42, 44 |
| | 2. 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..... | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 22, 23, 24, 28, 32, 33, 36, 42, 44 |
| | 3. Understand that not all investigations result in defensible scientific explanations..... | 1, 2, 3, 4, 5, 6, 7, 44 |
| 7 | 1. Describe how bias can affect scientific investigation and conclusions. | 2, 3, 4, 5, 8, 9, 11, 13, 21, 24, 37, 38, 42, 44 |
| | 2. Critique procedures used to investigate a hypothesis..... | 8, 9, 11, 28, 32 |
| | 3. Analyze and evaluate scientific explanations. | 4, 6, 7, 8, 9, 10, 11, 12, 15, 16, 24, 26, 27, 33, 34, 35, 42 |
| 8 | 1. Examine alternative explanations for observations. | 1, 2, 3, 4, 8, 9, 10, 11, 12, 14, 22, 23, 26, 32, 33, 36, 42, 43, 44 |
| | 2. Describe ways in which science differs from other ways of knowing and from other bodies of knowledge (e.g., experimentation, logical arguments, skepticism). | 2, 3, 4, 25, 26, 42, |
| | 3. Know that scientific knowledge is built on questions posed as testable hypotheses, which are tested until the results are accepted by peers..... | 4, 5, 6, 7, 8, 9, 22, 23, 42 |
| <i>5-8 Benchmark III: Use mathematical ideas, tools, and techniques to understand scientific knowledge.</i> | | |
| 5 | 1. Use appropriate units to make precise and varied measurements. | 28, 33, 44 |
| | 2. Use mathematical skills to analyze data..... | 22, 23, 28, 33, 34, 35, 44 |



| | | |
|---|---|--|
| | 3. Make predictions based on analyses of data, observations, and explanations. | 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 18, 22, 23, 24, 29, 30, 32, 33, 36, 41, 42, 43, 44 |
| | 4. Understand the attributes to be measured in a scientific investigation and describe the units, systems, and processes for making the measurement..... | 8, 9, 32 |
| 6 | 1. Evaluate the usefulness and relevance of data to an investigation. | 4, 5, 6, 7, 8, 9, 10, 11, 12, 24, 34, 35, 36, 40, 42, 43 |
| | 2. Use probabilities, patterns, and relationships to explain data and observations. | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 22, 23, 26, 28, 30, 32, 33, 36, 41, 42, 43, 44 |
| 7 | 1. Understand that the number of data (sample size) influences the reliability of a prediction. | 8, 9, 15, 16, 21, 45 |
| | 2. Use mathematical expressions to represent data and observations collected in scientific investigations..... | 8, 9, 22, 23, 28 |
| | 3. Select and use an appropriate model to examine a phenomenon. | 13, 14, 18, 20, 26, 28, 30, 32, 41, 42, 43 |
| 8 | 1. Use mathematical expressions and techniques to explain data and observations and to communicate findings (e.g., formulas and equations, significant figures, graphing, sampling, estimation, mean). | 8, 9, 28, 33, 34, 35, 36, 44 |
| | 2. Create models to describe phenomena. | 13, 14, 26, 41, 42, 43 |

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.

| | | |
|---|---|----------------|
| 5 | 1. Describe properties (e.g., relative volume, ability to flow) of the three states of matter..... | 13, 28, 29, 30 |
| | 2. Describe how matter changes from one phase to another (e.g., condensation, evaporation). | 29, 41, 42 |
| | 3. 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. | 30 |
| | 6. Explain the relationship between temperature and the motion of particles in each state of matter. | 29 |
| 6 | 1. Understand that substances have characteristic properties and identify the properties of various substances (e.g., density, boiling point, solubility, chemical reactivity). | 28, 42, 44 |
| | 4. Know the differences between chemical and physical properties and how these properties can influence the interactions of matter..... | 26, 41, 44 |
| 7 | 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)..... | 29, 41, 42, 43 |
| | 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). | 41 |
| | 5. Know that chemical reactions are essential to life processes..... | 10, 42, 43 |



| Grade | Performance Standards | |
|-------|--|---------------------------------------|
| 8 | Changes in Matter | |
| | 7. Know that phase changes are physical changes that can be reversed (e.g., evaporation, condensation, melting)..... | 29 |
| | 8. Describe various familiar physical and chemical changes that occur naturally (e.g., snow melting, photosynthesis, rusting, burning)..... | 10, 29, 41, 44, 45 |
| | 9. Identify factors that influence the rate at which chemical reactions occur (e.g., temperature, concentration). | 43, 45 |
| | <i>5-8 Benchmark II: Explain the physical processes involved in the transfer, change, and conservation of energy.</i> | |
| 5 | 3. Know that there are different forms of energy..... | 41, 42, 44 |
| 6 | 2. Understand that heat energy can be transferred through conduction, radiation and convection. | 41 |
| | 4. Understand that some energy travels as waves (e.g., seismic, light, sound), including: | 19, 41 |
| | • the sun as source of energy for many processes on Earth | |
| 7 | 1. Know how various forms of energy are transformed through organisms and ecosystems, including:..... | 5, 10, 11, 13, 18, 19, 40, 41, 44, 45 |
| | • 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, 11, 13, 18, 19, 43, 40 |
| 8 | Energy Transformation | |
| | 1 Know that energy exists in many forms and that when energy is transformed some energy is usually converted to heat. | 41 |
| | 3. Distinguish between renewable and nonrenewable sources of energy..... | 17, 34, 41, 45 |
| | Benchmark III: Describe and explain forces that produce motion in objects. | |
| 5 | 3. Identify forces in nature (e.g., gravity, magnetism, electricity, friction)..... | 13, 16, 41 |
| | 4. Understand that when a force (e.g., gravity, friction) acts on an objects, the object speeds up, slows down, or goes in a different direction. | 32 |
| 8. | Forces | |
| | 1. Know that there are fundamental forces in nature (e.g., gravity, electromagnetic forces, nuclear forces) | 26, 29, 41 |



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

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

- 5
1. Identify the components of habitats and ecosystems (producers, consumers, decomposers, predators).3, 6, 7, 10, 19, 24, 36, 40, 41, 42, 43, 45
 2. Understand how food webs depict relationships between different organisms.....3, 4, 6, 11, 19, 41, 42, 44
 3. Know that changes in the environment can have different effects on different organisms (e.g., some organisms move, some survive, some reproduce, some die).2, 3, 4, 6, 7, 8, 9, 10, 11, 19, 20, 21, 22, 23, 24, 40, 41, 42, 43, 44, 45
 4. Describe how human activity impacts the environment.2, 3, 4, 5, 6, 11, 13, 15, 16, 18, 31, 34, 36, 37, 38, 40, 41, 42, 43, 44, 45
- 6
1. 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.2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 19, 20, 21, 22, 34, 24, 29, 40
 2. Describe how weather and geologic events (e.g., volcanoes, earthquakes) affect the function of living systems.....11, 13, 14, 26, 29, 30, 31, 33, 36
 3. Describe how organisms have adapted to various environmental conditions.....1, 2, 3, 4, 10, 11, 14, 15, 16, 23, 24, 36, 40
7. Populations and Ecosystems
1. Identify the living and nonliving parts of an ecosystem and describe the relationships among these components.1, 2, 3, 4, 5, 11, 15, 16, 18, 19, 36, 40, 41, 42, 44, 45
 2. Explain biomes (i.e., aquatic, desert, rainforest, grasslands, tundra) and describe the New Mexico biome.2, 3, 4, 11, 15, 16, 18, 21, 24, 29, 31, 41, 42
 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).2, 3, 4, 10, 11, 15, 16, 19, 20, 22, 34, 31, 40, 41, 42, 43, 44, 45
 4. Explain the conditions and resources needed to sustain life in specific ecosystems.2, 3, 4, 10, 13, 15, 16, 19, 41, 42, 43, 44
 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.13, 15, 16, 17, 18, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 44, 45
- Biodiversity
6. Understand how diverse species fill all niches in an ecosystem.....1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 19, 20, 22, 41, 42, 43, 44, 45
 7. Know how to classify organisms: domain, kingdom, phylum, class, order, family, genus, species.....2, 3, 4, 6, 7, 8, 9, 10
- 8
1. Describe how matter moves through ecosystems (e.g., water cycle, carbon cycle).29, 31, 41, 42, 45
 2. Describe how energy flows through ecosystems (e.g., sunlight, green plants, food for animals).10, 19, 41, 42, 43



| Grade | Performance Standards | |
|---|---|---|
| | 3. Explain how a change in the flow of energy can impact an ecosystem (e.g., the amount of sunlight available for plant growth, global climate change)..... | 11, 13, 17, 18, 24, 33, 34, 36, 40, 41, 42, 43, 45 |
| | <i>5–8 Benchmark II: Understand how traits are passed from one generation to the next and how species evolve.</i> | |
| 5 | 1. 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. | 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 19, 20, 21, 41, 42, 43 |
| | 2. 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..... | 6, 7, 8, 9, 10, 23, 41, 42 |
| 6 | 2. Describe how species have responded to changing environmental conditions over time (e.g., extinction, adaptation). | 22, 23, 24, 25, 41, 42, 43 |
| 7 | Reproduction | |
| | 1. Know that reproduction is a characteristic of all living things and is essential to the continuation of a species..... | 10, 11, 42 |
| | 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)..... | 2, 3, 4, 6, 7, 8, 9, 10, 24, 41 |
| | 10. Identify adaptations that favor the survival of organisms in their environments (e.g., camouflage, shape of beak). | 2, 3, 4, 6, 7, 8, 9, 10, 24, 41, 42, 43 |
| | 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. | 2, 3, 4, 6, 7, 8, 9, 10, 25, 41, 42, 43 |
| 8 | 3. Describe the widespread role of carbon in the chemistry of living systems. | 19, 41 |
| | <i>5–8 Benchmark III: Understand the structure of organisms and the function of cells in living systems.</i> | |
| 5. | 2. 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) | 2, 3, 4 |
| | 3. Describe the relationships among cells, tissues, organs, organ systems, whole organisms, and ecosystems. | 2, 3, 4, 41, 42, 43, 44 |
| 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. | | |
| | <i>5–8 Benchmark II: Describe the structure of Earth and its atmosphere and explain how energy, matter, and forces shape earth’s systems.</i> | |
| 5 | 1. Understand that water and air relate to Earth’s processes, including: | |
| | • how the water cycle relates to weather; and | 29 |
| | • how clouds are made of tiny droplets of water, like fog or steam. | 29, 30, 31 |



| | | |
|---|---|--|
| | 2. Know that air is a substance that surrounds Earth (atmosphere), takes up space, and moves, and that temperature fluctuations and other factors produce wind currents. | 29, 42 |
| 6 | Structure of Earth | |
| | 1. Know that Earth is composed of layers that include a crust, mantle, and core..... | 25, 27 |
| | 2. Know that Earth’s crust is divided into plates that move very slowly, in response to movements in the mantle..... | 26, 27 |
| | Weather and Climate | |
| | 5. Understand factors that create and influence weather and climate, including: | |
| | • how clouds form by condensation of water vapor. | 29 |
| 7 | 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. | 14, 17, 18, 35, 26, 40, 42, 42, 43, 44 |
| 8 | 2. Understand the unique role water plays on Earth, including:: | |
| | • ability to remain liquid at most Earth temperatures | 29 |
| | • properties of water related to processes in the water cycle: evaporation, condensation, precipitation, surface run-off, percolation..... | 29, 20, 31 |
| | • dissolving of minerals and gases and transport to the oceans..... | 29 |
| | • fresh and salt water in oceans, rivers, lakes, and glaciers..... | 29, 30, 31, 32, 33 |

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.

| | | |
|---|--|--|
| 5 | 1. Describe the contributions of science to understanding local or current issues (e.g., watershed and community decisions regarding water use). | 17, 18, 31, 33, 34, 35, 36, 37, 40, 41, 42, 43, 44, 45 |
| | 2. Describe how various technologies have affected the lives of individuals (e.g., transportation, entertainment, health). | 17, 33, 40, 41 |
| 6 | 1. Examine the role of scientific knowledge in decisions (e.g., space exploration, what to eat, preventive medicine and medical treatment). | 34, 36, 37, 40, 41, 45 |
| 7 | 2. Analyze how technologies have been responsible for advances in medicine (e.g., vaccines, antibiotics, microscopes, DNA technologies). | 43 |
| | 3. Describe how scientific information can help individuals and communities respond to health emergencies (e.g., CPR, epidemics, HIV, bio-terrorism). | 41 |
| 8 | 1. Analyze the interrelationship between science and technology (e.g., germ theory, vaccines). | 34, 35 |



| | | |
|----|--|------------------------------------|
| 2. | Describe how scientific information can help to explain environmental phenomena (e.g., floods, earthquakes, volcanoes, fire, extreme weather)..... | 18, 33, 34, 35, 41, 42, 43, 44, 45 |
| 3. | Describe how technological revolutions have significantly influenced societies: (e.g., energy production, warfare, space exploration)..... | 41 |

C. Grades Nine Through Twelve

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 I: Use accepted scientific methods to collect, analyze, and interpret data and observations and to design and conduct scientific investigations and communicate results.

| | | |
|------|---|---|
| 9–12 | 1. Describe the essential components of an investigation, including appropriate methodologies, proper equipment, and safety precautions..... | 28, 32, 44 |
| | 2. Design and conduct scientific investigations that include:..... | 28, 44 |
| | <ul style="list-style-type: none"> • testable hypotheses • controls and variables • methods to collect, analyze, and interpret data • results that address hypotheses being investigated • predictions based on results • reevaluation of hypotheses and additional experimentation as necessary • error analysis. | |
| | 3. Use appropriate technologies to collect, analyze, and communicate scientific data (e.g., computers, calculators, balances, microscopes)..... | 8, 9, 24, 27, 28, 44 |
| | 4. Convey results of investigations using scientific concepts, methodologies, and expressions, including:..... | 4, 8, 9, 12, 13, 15, 18, 22, 24, 26, 27, 28, 32, 33, 34, 35, 41, 42, 43, 44 |
| | <ul style="list-style-type: none"> • scientific language and symbols • diagrams, charts, and other data displays • mathematical expressions and processes (e.g., mean, median, slope, proportionality) • clear, logical, and concise communication | |



- reasoned arguments.

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

1. Understand how scientific processes produce valid, reliable results, including:.....28, 32, 33, 42, 43, 44
 - consistency of explanations with data and observations
 - openness to peer review
 - full disclosure and examination of assumptions
 - testability of hypotheses
 - repeatability of experiments and reproducibility of results.
2. Use scientific reasoning and valid logic to recognize:11, 13, 34, 36, 37, 42, 43, 44, 45
 - faulty logic
 - cause and effect
 - the difference between observation and unsubstantiated inferences and conclusions
 - potential bias.
3. Understand how new data and observations can result in new scientific knowledge.4, 13, 41, 44, 45
4. Critically analyze an accepted explanation by reviewing current scientific knowledge.26, 44
5. Examine investigations of current interest in science (e.g., superconductivity, molecular machines, age of the universe.).....3
6. Examine the scientific processes and logic used in investigations of past events (e.g., using data from crime scenes, fossils), investigations that can be planned in advance but are only done once (e.g., expensive or time-consuming experiments such as medical clinical trials), and investigations of phenomena that can be repeated easily and frequently.....33

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

- 9–12 1. Create multiple displays of data to analyze and explain the relationships in scientific investigations.....43, 44
2. Use mathematical models to describe, explain, and predict natural phenomena.....44
3. Use technologies to quantify relationships in scientific hypotheses (e.g., calculators, computer spreadsheets and databases, graphing software, simulations, modeling).....44
4. Identify and apply measurement techniques and consider possible effects of measurement errors.....44
5. Use mathematics to express and establish scientific relationships (e.g., scientific notation, vectors, dimensional analysis).....44



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.

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

| | |
|-------------|--|
| 9–12 | <p>Properties of Matter</p> <p>1. Classify matter in a variety of ways (e.g., element, compound, mixture; solid, liquid, gas; acidic, basic, neutral).....41</p> <p>Chemical Reactions</p> <p>13. Understand types of chemical reactions (e.g., synthesis, decomposition, combustion, redox, neutralization) and identify them as exothermic or endothermic.44</p> <p>14. Know how to express chemical reactions with balanced equations that show:.....44</p> <ul style="list-style-type: none"> • conservation of mass • products of common reactions. <p>15. Describe how the rate of chemical reactions depends on many factors that include temperature, concentration, and the presence of catalysts.....41, 44, 45</p> <p style="text-align: center;"><i>9–12 Benchmark II: Understand the transformation and transmission of energy and how energy and matter interact.</i></p> |
| 9–12 | <p>Energy Transformation and Transfer</p> <p>1. Identify different forms of energy, including kinetic, gravitational (potential), chemical, thermal, nuclear, and electromagnetic.41</p> <p>2. Explain how thermal energy (heat) consists of the random motion and vibrations of atoms and molecules and is measured by temperature.41</p> <p>3. Understand that energy can change from one form to another (e.g., changes in kinetic and potential energy in a gravitational field, heats of reaction, hydroelectric dams) and know that energy is conserved in these changes.....41</p> <p>4. Understand how heat can be transferred by conduction, convection, and radiation, and how heat conduction differs in conductors and insulators.....41</p> <p>5. Explain how heat flows in terms of the transfer of vibrational motion of atoms and molecules from hotter to colder regions.41</p> <p>6. Understand that the ability of energy to do something useful (work) tends to decrease (and never increases) as energy is converted from one form to another.41</p> <p>Interactions of Energy and Matter</p> <p>11. Understand the concept of equilibrium (i.e., thermal, mechanical, and chemical).....41</p> |

*Benchmark III: Understand the motion of objects and waves, and the forces that cause them.*

9–12 Motion

8. Apply Newton’s Laws to describe and analyze the behavior of moving objects, including:.....32
- displacement, velocity, and acceleration of a moving object

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

9-12 Benchmark I: Understand how the survival of species depends on biodiversity and on complex interactions, including the cycling of matter and the flow of energy.

Ecosystems

- 9–12
1. Know that an ecosystem is complex and may exhibit fluctuations around a steady state or may evolve over time.....4, 11, 15, 16, 22, 24, 41, 42, 43, 44
 2. Describe how organisms cooperate and compete in ecosystems (e.g., producers, decomposers, herbivores, carnivores, omnivores, predator-prey, symbiosis, mutualism).4, 8, 9, 11, 12, 15, 16, 18, 22, 24, 42, 44, 45
 3. Understand and describe how available resources limit the amount of life an ecosystem can support (e.g., energy, water, oxygen, nutrients).....11, 13, 18, 22, 24, 33, 36, 41, 42, 44, 45
 4. Critically analyze how humans modify and change ecosystems (e.g., harvesting, pollution, population growth, technology).....4, 11, 13, 15, 16, 17, 18, 24, 33, 34, 35, 36, 37, 38, 41, 42, 43, 44, 45

Energy Flow in the Environment

5. Explain how matter and energy flow through biological systems (e.g., organisms, communities, ecosystems), and how the total amount of matter and energy is conserved but some energy is always released as heat to the environment.11, 41, 42, 44
6. Describe how energy flows from the sun through plants to herbivores to carnivores and decomposers.12, 15, 16
7. Understand and explain the principles of photosynthesis (i.e., chloroplasts in plants convert light energy, carbon dioxide, and water into chemical energy).12

Biodiversity

8. Understand and explain the hierarchical classification scheme (i.e., domain, kingdom, phylum, class, order, family, genus, species), including:4, 8, 9, 11, 12, 13, 15, 16, 18, 22, 24, 33, 42, 43, 44, 45
 - classification of an organism into a category
 - similarity inferred from molecular structure (DNA) closely matching classification based on anatomical similarities
 - similarities of organisms reflecting evolutionary relationships.
9. Understand variation within and among species, including:4, 8, 9, 11, 13, 15, 16, 18, 22, 24, 33
 - mutations and genetic drift



| Grade | Performance Standards | |
|-------|--|-----------------------------|
| | <ul style="list-style-type: none"> • factors affecting the survival of an organism • natural selection | |
| | <i>9–12 Benchmark II: Understand the genetic basis for inheritance and the basic concepts of biological evolution.</i> | |
| 9–12 | Genetics | |
| | 5. Know how genetic variability results from the recombination and mutation of genes, including: | 4, 11 |
| | • radiation or chemical substances can cause mutations in cells, resulting in permanent change in DNA. | |
| | 6. Understand the principles of sexual and asexual reproduction, including meiosis and mitosis. | 8, 9, 12 |
| | Biological Evolution | |
| | 8. Describe the evidence for the first appearance of life on Earth as one-celled organisms, over 3.5 billion years ago, and for the later appearance of a diversity of multicellular organisms over millions of years. | 4, 11 |
| | 9. Critically analyze the data and observations supporting the conclusion that the species living on Earth today are related by descent from the ancestral one-celled organisms. | 4, 8, 9, 11 |
| | 10. Understand the data, observations, and logic supporting the conclusion that species today evolved from earlier, distinctly different species, originating from the ancestral one-celled organisms. | |
| | 11. Understand that evolution is a consequence of many factors, including the ability of organisms to reproduce, genetic variability, the effect of limited resources, and natural selection. | 4, 8, 9, 11, 12, 15, 16, 42 |
| | 12. Explain how natural selection favors individuals who are better able to survive, reproduce, and leave offspring. | 8, 9, 41, 42 |
| | 13. Analyze how evolution by natural selection and other mechanisms explains many phenomena including the fossil record of ancient life forms and similarities (both physical and molecular) among different species. | 8, 9 |
| | <i>9-12 Benchmark III: Understand the characteristics, structures, and functions of cells.</i> | |
| 9-12 | Structure and Function | |
| | 2. Know that specialized structures inside cells in most organisms carry out different functions, including: | 8, 9, 12 |
| | • similarities and differences between plant and animal cells | |
| | 3. Describe the mechanisms for cellular processes (e.g., energy production and storage, transport of molecules, waste disposal, synthesis of new molecules). | 12 |
| | 4. Know how the cell membrane controls which ions and molecules enter and leave the cell based on membrane permeability and transport (i.e., osmosis, diffusion, active transport, passive transport). | 12 |
| | Biochemical Mechanisms | |



7. Describe how most cell functions involve chemical reactions, including:12
- processes of respiration (e.g., energy production, ATP)

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.

9-12 Benchmark I: Examine the scientific theories of the origin, structure, contents, and evolution of the solar system and the universe, and their interconnections.

- 9-12 2. Predict changes in the positions and appearances of objects in the sky (e.g., moon, sun) based on knowledge of current positions and patterns of movements (e.g., lunar cycles, seasons).....4

9-12 Benchmark II: Examine the scientific theories of the origin, structure, energy, and evolution of Earth and its atmosphere, and their interconnections.

9-12 Characteristics and Evolution of Earth

1. Describe the characteristics and the evolution of Earth in terms of the geosphere, the hydrosphere, the atmosphere, and the biosphere.26, 27, 32
2. Recognize that radiometric data indicate that Earth is at least 4 billion years old and that Earth has changed during that period.26, 27
3. Describe the internal structure of Earth (e.g., core, mantle, crust) and the structure of Earth's plates.....26, 27
4. Understand the changes in Earth's past and the investigative methods used to determine geologic time, including:26, 27
 - rock sequences, relative dating, fossil correlation, and radiometric dating
 - geologic time scales, historic changes in life forms, and the evidence for absolute ages (e.g., radiometric methods, tree rings, paleomagnetism).....26
5. Explain plate tectonic theory and understand the evidence that supports it.26, 27

Energy in Earth's System

7. Describe convection as the mechanism for moving heat energy from deep within Earth to the surface and discuss how this process results in plate tectonics, including:26, 27
 - geological manifestations (e.g., earthquakes, volcanoes, mountain building) that occur at plate boundaries
 - impact of plate motions on societies and the environment (e.g., earthquakes, volcanoes).
8. Describe the patterns and relationships in the circulation of air and water driven by the sun's radiant energy, including:32, 33, 34, 35, 37, 38
 - patterns in weather systems related to the transfer of energy
 - differences between climate and weather
 - global climate, global warming, and the greenhouse effect



- El Niño, La Niña, and other climatic trends

Geochemical Cycles

9. Know that Earth’s system contains a fixed amount of natural resources that cycle among land, water, the atmosphere, and living things (e.g., carbon and nitrogen cycles, rock cycle, water cycle, ground water, aquifers).....15, 16, 28, 32, 33, 34, 35, 36, 37, 38
10. Describe the composition and structure of Earth’s materials, including:.....26, 27, 28
 - the major rock types (i.e., sedimentary, igneous, metamorphic) and their formation.
 - natural resources (e.g., minerals, petroleum) and their formation.
12. Explain how the availability of ground water through aquifers can fluctuate based on multiple factors (i.e., rate of use, rate of replenishment, surface changes, and changes in temperature).28, 32, 33, 34, 35

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.

9–12 Science and Technology

2. Understand how advances in technology enable further advances in science (e.g., microscopes and cellular structure; telescopes and understanding of the universe).....17, 33, 41
3. 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 (e.g., the wheel, the plow, the printing press, the lightning rod).....17, 41, 42
4. Understand the scientific foundations of common technologies (e.g., kitchen appliances, radio, television, aircraft, rockets, computers, medical X-rays, selective breeding, fertilizers and pesticides, agricultural equipment).17, 41
5. Understand that applications of genetics can meet human needs and can create new problems (e.g., agriculture, medicine, cloning).....41

Science and Society

9. 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).....17, 33, 41, 42, 44, 45
10. Describe major historical changes in scientific perspectives (e.g., atomic theory, germs, cosmology, relativity, plate tectonics, evolution) and the experimental observations that triggered them.36, 37, 38



11. Know that societal factors can promote or constrain scientific discovery
 (e.g., government funding, laws and regulations about human cloning and
 genetically modified organisms, gender and ethnic bias, AIDS research, alternative-energy research).....36, 37, 38, 41

12. Explain how societies can change ecosystems
 and how these changes can be reversible or irreversible.....13, 18, 24, 33, 34, 42, 43, 44, 45

13. Describe how environmental, economic, and political interests impact
 resource management and use in New Mexico.....13, 17, 18, 24, 33, 34, 36, 37, 38, 41, 42, 43, 44, 45

Science and Individuals

15 5. Understand that applications of genetics can meet human needs and can create new problems
 (e.g., agriculture, medicine, cloning).....41, 44
18.

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).36, 37, 38, 41

19. 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).....36, 37, 38, 41, 45



Social Studies: 2001 Content Standards, Benchmarks, and Performance Standards

Strand: History

Standard I: Students are able to identify important people and events in order to analyze significant patterns, relationships, themes, ideas, beliefs, and turning points in New Mexico, United States, and world history in order to understand the complexity of the human experience.

K-4 Benchmark I-A: New Mexico: Describe how contemporary and historical people and events have influenced New Mexico communities and regions.

- | | |
|----------|--|
| K | 1. Identify the customs, celebrations, and holidays of various cultures in New Mexico.38, 39 |
| 2 | 1. Describe how historical people, groups, and events have influenced the local community.....5, 13, 17, 38, 39, 40 |
| 3 | 1. Describe how the lives and contributions of people of New Mexico influenced local communities and regions.....5, 13, 17, 38, 39, 40 |
| 4 | 1. Identify important issues, events, and individuals from New Mexico pre-history to the present.....13, 38, 39 |

5-8 Benchmark I-A: New Mexico: Explore and explain how people and events have influenced the development of New Mexico up to the present day.

- | | |
|----------|--|
| 7 | <p>1. Compare and contrast the contributions of the civilizations of the Western Hemisphere (e.g., Aztecs, Mayas, Toltecs, Mound Builders) with the early civilizations of the Eastern Hemisphere (e.g., Sumerians, Babylonians, Hebrews, Egyptians) and their impact upon societies, to include:5, 17</p> <ul style="list-style-type: none"> • cultural and scientific contributions (e.g., advances in astronomy, mathematics, agriculture, architecture, artistic and oral traditions, development of writing systems and calendars). <p>2. Describe the characteristics of other indigenous peoples that had an affect upon New Mexico’s development (e.g., pueblo farmers, great plains horse culture, nomadic bands, noting their development of tools, trading routes, adaptation to environments, social structure, domestication of plants, and animals).....5, 17</p> <p>5. Explain how New Mexicans have adapted to their physical environments to meet their needs over time (e.g., living in the desert, control over water resources, pueblo structure, highway system, use of natural resources).13, 17, 29, 31, 32, 33, 34, 36, 42, 45</p> <p>6. Explain the impact of New Mexico on the development of the American West up to the present, to include:.....13, 17, 31, 34, 36, 45</p> <ul style="list-style-type: none"> • identification and use of natural and human resources • population growth and economic patterns |
|----------|--|



9-12 Benchmark I-A: New Mexico: Analyze how people and events of New Mexico have influenced United States and world history since statehood.

- 9-12 2. Analyze the geographic, economic, social, and political factors of New Mexico that impacted United States and world history, to include:.....13, 17, 18, 31, 34, 35, 36, 37, 38, 40, 42, 45
- role of water issues as they relate to development of industry, population growth, historical issues, and current acequia systems/water organizations

K-4 Benchmark I-D: Skills: Understand time passage and chronology.

- K 1. Understand the concept of past and present.13, 38, 39
- 1 1. Demonstrate the use of timelines in order to show events in relation to one another.25
- 2 1. Correctly sequence historical events.13, 25, 26, 38, 39
- 3 1. Interpret information from multiple resources and contexts to determine chronological relationships.13, 25, 26
- 4 1. Describe and explain how historians and archaeologists provide information about people in different time periods.38, 39

5-8 Benchmark I-D: Skills: Research historical events and people from a variety of perspectives.

- 5 1. Differentiate between, locate, and use primary and secondary sources (e.g., computer software, interviews, biographies, oral histories, print, visual material, artifacts) to acquire information.....38, 39
2. Use resources for historical information (e.g., libraries, museums, historical societies, courthouse, world wide web, family records, elders).24, 27
3. Gather, organize, and interpret information using a variety of media and technology.22, 24, 27, 38
5. Use effective communication skills and strategies to share research findings.27, 38, 39
- 6 2. Identify different points of view about an issue or topic.38, 42
3. Use a decision-making process to identify a situation that requires a solution; gather information, identify options, predict consequences, and take action to implement that solution.33, 34
- 7 1. Analyze and evaluate information by developing and applying criteria for selecting appropriate information and use it to answer critical questions.33, 34, 35, 42
2. Demonstrate the ability to examine history from the perspectives of the participants.....38
- 8 1. Understand and apply the problem-solving skills for historical research, to include:.....13, 17, 18, 22, 24, 25, 27, 33, 34, 35, 36, 37, 38, 40, 42, 45
- use of primary and secondary sources
 - sequencing
 - posing questions to be answered by historical inquiry
 - collecting, interpreting, and applying information



Grade Benchmark/Standard

- gathering and validating materials that present a variety of perspectives.

9-12 Benchmark I-D: Skills: Use critical thinking skills to understand and communicate perspectives of individuals, groups, and societies from multiple contexts.

| | |
|-------------|---|
| 9-12 | <ol style="list-style-type: none"> 1. Understand how to use the skills of historical analysis to apply to current social, political, geographic, and economic issues.....17, 34, 35, 36, 37, 38, 42 2. Apply chronological and spatial thinking to understand the importance of events.....13, 25, 26, 36, 37, 38, 45 3. Describe primary and secondary sources and their uses in research.24, 27, 37, 38 5. Distinguish “facts” from authors’ opinions and evaluate an author’s implicit and explicit philosophical assumptions, beliefs, or biases about the subject.37, 38 6. Interpret events and issues based upon the historical, economic, political, social, and geographic context of the participants.....37, 38, 42 |
|-------------|---|

Strand: Geography

Standard II: Students understand how physical, natural, and cultural processes influence where people live, the ways in which people live, and how societies interact with one another and their environments.

K-4 Benchmark II-A: Understand the concept of location by using and constructing maps, globes, and other geographic tools to identify and derive information about people, places, and environments.

| | |
|----------|--|
| 1 | <ol style="list-style-type: none"> 1. Understand maps and globes as representations of places and phenomena.31 3. Create, use, and describe simple maps to identify locations within familiar places (e.g., classroom, school, community, state).....13, 17, 31 |
| 2 | <ol style="list-style-type: none"> 1. Use a variety of maps to locate specific places and regions.26, 31 2. Identify major landforms, bodies of water, and other places of significance in selected countries, continents, and oceans.31 |
| 4 | <ol style="list-style-type: none"> 1. Apply geographic tools of title, grid system, legends, symbols, scale, and compass rose to construct and interpret maps.....31 3. Draw conclusions and make generalizations from geographic information and inquiry.31 |

5-8 Benchmark II-A: Analyze and evaluate the characteristics and purposes of geographic tools, knowledge, skills and perspectives and apply them to explain the past, present, and future in terms of patterns, events, and issues.

| | |
|----------|---|
| 5 | <ol style="list-style-type: none"> 1. Make and use different kinds of maps, globes, charts, and databases.13, 22, 31, 32, 33, 45 8. Identify and locate natural and man-made features of local, regional, state, national, and international locales.13, 22, 30, 31, 32, 44, 45 |
|----------|---|



| Grade | Benchmark/Standard | |
|-------|--|------------------------------------|
| 6 | 2. Draw complex and accurate maps from memory and interpret them to answer questions about the location of physical features | 13, 36 |
| 7 | 2. Describe factors affecting location of human activities, including land use patterns in urban, suburban, and rural areas | 13, 18, 31, 36, 40 |
| 8 | 1. Describe patterns and processes of migration and diffusion. | 22, 23 |
| | 2. Provide a historic overview of patterns of population expansion into the West by the many diverse groups of people (e.g., Native Americans, European Americans, and others) to include movement into the Southwest along established settlement, trade, and rail routes. | 13, 17, 45 |
| | <i>9-12 Benchmark II-A: Analyze and evaluate the characteristics and purposes of geographic tools, knowledge, skills, and perspectives, and apply them to explain the past, present, and future in terms of patterns, events, and issues.</i> | |
| 9-12 | 1. Evaluate and select appropriate geographic representations to analyze and explain natural and man-made issues and problems. | 13, 22, 31, 34, 35, 42, 45 |
| | 2. Understand the vocabulary and concepts of spatial interaction, including an analysis of population distributions and settlements patterns. | 13, 22, 23, 24, 36, 37, 38, 40, 45 |
| | <i>K-4 Benchmark II-B: Distinguish between natural and human characteristics of places and use this knowledge to define regions, their relationships with other regions, and patterns of change.</i> | |
| K | 1. Identify natural characteristics of places (e.g., climate, topography)..... | 5 |
| 1 | 1. Identify and classify characteristics of places as human or natural | 5 |
| 2 | 1. Describe how climate, natural resources, and natural hazards affect activities and settlement patterns. | 5, 13, 17, 23 |
| | 2. Explain how people depend on the environment and its resources to satisfy their basic needs..... | 13, 30 |
| 3 | 1. Describe how human and natural processes can sometimes work together to shape the appearance of places (e.g., post-fire reforestation). | 5, 13, 17, 40 |
| | 2. Explore examples of environmental and social changes in various regions..... | 13, 40 |
| 4 | 1. Identify a region as an area with unifying characteristics (e.g., human, weather, agriculture, industry, natural characteristics)..... | 31, 41 |
| | 2. Describe the regions of New Mexico, the United States, and the Western Hemisphere..... | 13, 31 |
| | 3. Identify ways in which different individuals and groups of people view and relate to places and regions..... | 13, 40 |



Grade Benchmark/Standard

5-8 Benchmark II-B: Explain the physical and human characteristics of places and use this knowledge to define regions, their relationships with other regions, and their patterns of change.

| | | |
|---|---|--|
| 5 | 1. Describe human and natural characteristics of places. | 2, 3, 4, 5, 11, 13, 18, 19, 22, 24, 34, 35, 36, 40, 44, 45 |
| 6 | 1. Explain how places change due to human activity..... | 5, 13, 17, 18, 34, 36, 37, 38, 40, 42, 44, 45 |
| | 3. Identify a region by its formal, functional, or perceived characteristics..... | 13, 18, 36, 37, 38, 40, 42, 45 |
| 7 | 1. Select and explore a region by its distinguishing characteristics..... | 13, 18, 36, 37, 38, 40, 42, 45 |
| | 2. Describe the role of technology in shaping the characteristics of places..... | 13, 17, 36, 40, 42, 45 |
| | 4. Describe geographically based pathways of inter-regional interaction (e.g., Camino Real’s role in establishing a major trade and communication route in the New World, the significance of waterways)..... | 13, 17, 18, 36, 40, 42, 45 |
| 8 | 2. Describe political, population, and economic regions that result from patterns of human activity, using New Mexico as an example. | 13, 17, 18, 36, 38, 40 |

9-12 Benchmark II-B: Analyze natural and man-made characteristics of worldwide locales; describe regions, their interrelationships, and patterns of change.

| | | |
|------|--|--|
| 9-12 | 1. Analyze the interrelationships among natural and human processes that shape the geographic connections and characteristics of regions, including connections among economic development, urbanization, population growth, and environmental change..... | 13, 17, 18, 19, 22, 24, 30, 31, 36, 37, 38, 40, 42, 44, 45 |
| | 2. Analyze how the character and meaning of a place is related to its economic, social, and cultural characteristics, and why diverse groups in society view places and regions differently. | 13, 18, 36, 37, 38, 40 |

K-4 Benchmark II-C: Be familiar with aspects of human behavior and man-made and natural environments in order to recognize their impact on the past and present.

| | | |
|---|---|-----------------------|
| K | 1. Identify family customs and traditions and explain their importance. | 38 |
| | 2. Describe the natural characteristics of places (e.g., landforms, bodies of water, natural resources, and weather). | 2, 11, 13, 29, 31 |
| 1 | 1. Identify examples of and uses for natural resources in the community, state, and nation. | 13, 17, 23, 34 |
| 2 | 1. Identify ways in which people depend on natural and man-made environments including natural resources to meet basic needs..... | 13, 17, 31, 40 |
| 3 | 1. Identify personal behaviors that can affect community planning..... | 5 |
| | 2. Identify ways in which people have modified their environments (e.g., building roads, clearing land for development, mining, and constructing towns and cities)..... | 5, 13, 17, 31, 38, 40 |
| | 3. Describe the consequences of human modification of the natural environment (e.g., use of irrigation to improve crop yields, highways)..... | 5, 13, 17, 31, 38, 40 |
| 4 | 1. Explain how geographic factors have influenced people, including settlement patterns and population distribution in New Mexico, past and present..... | 13, 17, 31, 40 |



- 2. Describe how environments, both natural and man-made, have influenced people and events over time, and describe how places change.....13, 17, 40, 42
- 3. Understand how visual data (e.g., maps, graphs, diagrams, tables, charts) organizes and presents geographic information.....13, 31, 40

5-8 Benchmark II-C: Understand how human behavior impacts man-made and natural environments, recognizes past and present results, and predicts potential changes.

- 5 1. Describe how man-made and natural environments have influenced conditions in the past.....5, 13, 17, 18, 24, 31, 34, 36, 40, 41, 42, 44, 45
- 2. Identify and define geographic issues and problems from accounts of current events.....5, 13, 17, 18, 21, 24, 31, 34, 35, 36, 42, 45
- 7 1. Explain how differing perceptions of places, people, and resources have affected events and conditions in the past.5, 13, 17, 18, 21, 24, 31, 34, 35, 36, 42, 45
- 2. Interpret and analyze geographic information obtained from a variety of sources (e.g., maps, directly witnessed and surveillanced photographic and digital data, symbolic representations [e.g., graphs, charts, diagrams, tables], personal documents, and interviews).5, 13, 17, 18, 21, 24, 31, 34, 35, 36, 45
- 3. Recognize geographic questions and understand how to plan and execute an inquiry to answer them.13, 31, 36, 40
- 4. Explain a contemporary issue using geographic knowledge, tools, and perspectives.31, 34, 35, 42, 45
- 8 1. Explain and evaluate how changing perceptions of place and the natural environment have affected human behavior.....13, 24, 33, 34, 36, 38, 40, 42, 45

9-12 Benchmark II-C: Analyze the impact of people, places, and natural environments upon the past and present in terms of our ability to plan for the future.

- 9-12 2. Compare and contrast how different viewpoints influence policy regarding the use and management of natural resources.....13, 18, 36, 37, 38, 40, 41, 42, 43, 45

K-4 Benchmark II-D: Understand how physical processes shape the Earth’s surface patterns and biosystems.

- K 1. Describe the Earth’s physical characteristics.13, 26, 30, 31, 32
- 1 1. Describe the Earth-Sun relationship and how it affects living conditions on Earth.10, 12, 16, 19
- 2 1. Describe the physical processes that affect the Earth’s features (e.g., weather, erosion).13, 26, 29, 30, 31
- 2. Identify characteristics of physical systems (e.g., water cycle).13, 29, 31, 40
- 3 1. Identify the components of the Earth’s biosystems and their makeup (e.g., air, land, water, plants, and animals).1, 2, 3, 5, 6, 7, 10, 12, 14, 15, 16, 19, 20, 23, 29, 31, 40
- 2. Describe how physical processes shape features on the Earth’s surface.13, 26, 30, 31, 32



| Grade | Benchmark/Standard | Activity Number (see page 645) |
|--|--|--|
| 4 | 2. Describe the four provinces (plains, mountains, plateau, and basin and range) that make up New Mexico's land surface (geographic conditions)..... | 26, 315-8 |
| <i>Benchmark II-D: Explain how physical processes shape the Earth's surface patterns and biosystems.</i> | | |
| 5 | 1. Explain how the four provinces of New Mexico's land surface (plains, mountains, plateau, and basin and range) support life. | 4, 13, 15, 16, 18, 19, 26, 27, 29, 41, 45 |
| 6 | 1. Describe how physical processes shape the environmental patterns of air, land, water, plants and animals..... | 13, 18, 19, 29, 30, 31, 32, 36, 40, 41, 42, 45 |
| 7 | 1. Explain how physical processes influence the formation and location of resources..... | 13, 26, 27, 29, 30, 31, 32, 42, 45 |
| | 2. Use data to interpret changing patterns of air, land, water, plants, and animals. | 33, 34, 35, 42 |
| | 3. Explain how ecosystems influence settlements and societies. | 13, 17, 18, 36, 37, 38, 40, 41, 45 |
| 8 | 1. Explain how human activities and physical processes influence change in ecosystems. | 13, 17, 18, 36, 37, 38, 40, 41, 42, 45 |
| <i>9-12 Benchmark II-D: Analyze how physical processes shape the Earth's surface patterns and biosystems.</i> | | |
| 9-12 | 1. Analyze how the Earth's physical processes are dynamic and interactive..... | 13, 24, 26, 27, 29, 31, 32, 33, 45 |
| | 2. Analyze the importance of ecosystems in understanding environments. | 13, 15, 16, 18, 19, 22, 36, 38, 40, 41, 42, 43, 45 |
| | 3. Explain and analyze how water is a scarce resource in New Mexico, both in quantity and quality..... | 13, 14, 17, 18, 29, 30, 31, 33, 34, 35, 36, 40, 45 |
| | 4. Explain the dynamics of the four basic components of the Earth's physical systems (atmosphere, biosphere, lithosphere, and hydrosphere). | 26, 27, 29, 30, 31, 32, 33, 35 |
| <i>K-4 Benchmark II-E Describe how economic, political, cultural, and social processes interact to shape patterns of human populations, and their interdependence, cooperation, and conflict.</i> | | |
| 2 | 1. Describe how characteristics of culture affect behaviors and lifestyles. | 5 |
| 3 | 1. Describe how patterns of culture vary geographically. | 38, 39 |
| | 3. Describe how cooperation and conflict affect neighborhoods and communities. | 13, 40 |
| 4 | 2. Describe how geographic factors influence the location and distribution of economic activities. | 13, 17, 31, 40 |
| | 5. Describe how and why people create boundaries and describe types of boundaries..... | 31 |
| <i>5-8 Benchmark II-E: Understand how economic, political, cultural, and social processes interact to shape patterns of human populations, and their interdependence, cooperation, and conflict.</i> | | |
| 6 | 1. Explain how human migration impacted places, societies, and civilizations..... | 13, 45 |



| Grade | Benchmark/Standard | Activity Number (see page 645) |
|---|---|--|
| | 3. Explain how cultures create a cultural landscape, locally and throughout the world, and how these landscapes change over time..... | 13, 17, 18, 36, 40, 45 |
| 7 | 1. Analyze New Mexico settlement patterns and their impact on current issues. | 13, 17, 18, 36, 40 |
| | 2. Describe and analyze how the study of geography is used to improve our quality of life, including urban and environmental planning. | 31, 34, 35, 41, 45 |
| 8 | 1. Explain and describe how movement of people impacted and shaped western settlement of the United States (e.g., growth of towns and cities, affect upon native populations, railroads, livestock). | 13, 17, 18, 36, 40 |
| <i>9-12 Benchmark II-E: Analyze and evaluate how economic, political, cultural, and social processes interact to shape patterns of human populations, and their interdependence, cooperation, and conflict.</i> | | |
| 9-12 | 1. Analyze the factors influencing economic activities (e.g., mining, ranching, agriculture, tribal gaming, tourism, high tech) that have resulted in New Mexico’s population growth. | 13, 17, 34, 36, 40 |
| | 3. Analyze the interrelationships among settlement, migration, population-distribution patterns, landforms, and climates in developing and developed countries..... | 13, 17, 22, 23, 34, 35, 36, 37, 38, 40 |
| | 5. Analyze how cultures shape characteristics of a region. | 13, 17, 36, 37, 38, 40 |
| | 6. Analyze how differing points of view and self-interest play a role in conflict over territory and resources (e.g., impact of culture, politics, strategic locations, resources). | 13, 36, 37, 40, 45 |
| | 7. Evaluate the effects of technology on the developments, changes to, and interactions of cultures. | 17 |
| <i>K-4 Benchmark II-F: Describe how natural and man-made changes affect the meaning, use, distribution, and value of resources.</i> | | |
| K | 1. Identify natural resources. | 1, 2, 13, 29, 31, 38, 40 |
| 1 | 1. Describe the role of resources in daily life. | 1, 2, 13, 29, 31, 40 |
| | 2. Describe ways that humans depend upon, adapt to, and affect the physical environment..... | 5, 13, 17, 31, 38, 40 |
| 2 | 1. Describe ways that people and groups can conserve and replenish natural resources. | 13, 40, 41 |
| 3 | 1. Identify the characteristics of renewable and nonrenewable resources. | 29 |
| 4 | 1. Identify the distributions of natural and man-made resources in New Mexico, the Southwest, and the United States. | 13, 17, 40 |
| <i>5-8 Benchmark II-F: Understand the effects of interactions between human and natural systems in terms of changes in meaning, use, distribution, and relative importance of resources.</i> | | |
| 5 | 1. Understand how resources impact daily life. | 13, 18, 36, 40, 45 |
| 6 | 1. Describe how human modifications to physical environments and use of resources in one place often lead to changes in other places. | 13, 17, 18, 31, 33, 36, 37, 38, 40, 56 |
| 8 | 1. Describe the differing viewpoints that individuals and groups have with respect to the use of resources. | 13, 18, 36, 37, 38, 40 |



Grade Benchmark/Standard

| | | |
|------|----|--|
| | | <i>9-12 Benchmark II-F: Analyze and evaluate the effects of human and natural interactions in terms of changes in the meaning, use, distribution, and importance of resources in order to predict our global capacity to support human activity.</i> |
| 9-12 | 1. | Compare the ways man-made and natural processes modify the environment and how these modifications impact resource allocations.3, 4, 5, 13, 15, 16, 17, 34, 35, 36, 37, 38, 40, 42, 43, 44, 45 |
| | 2. | Analyze how environmental changes bring about and impact resources.3, 4, 5, 13, 15, 16, 17, 34, 35, 36, 37, 38, 40, 42, 43, 44, 45 |

Strand: Civics and Government

Standard III: Students understand the ideals, rights, and responsibilities of citizenship and understand the content and history of the founding documents of the United States with particular emphasis on the United States and New Mexico constitutions and how governments function at local, state, tribal, and national levels.

K-4 Benchmark III-D: Understand rights and responsibilities of “good citizenship” as members of a family, school and community.

| | | |
|---|----|--|
| K | 1. | Describe what is meant by citizenship.....5, 13, 38, 40, 41 |
| 1 | 2. | Explain and apply “good citizenship” traits within the school and community using the elements of fair play, good sportsmanship, the idea of treating others the way you want to be treated, and being trustworthy.....5, 13, 38, 40, 41 |
| 2 | 1. | Understand characteristics of “good citizenship” as exemplified by historic and ordinary people.....5, 13, 38, 40, 41 |
| | 2. | Explain the responsibilities of being a member of various groups (e.g. family, school, community).5, 13, 38, 40, 41 |
| 3 | 1. | Explain the significance of participation and cooperation in a classroom and community.....5, 13, 38, 40, 41 |

Strand: Economics

Standard IV: Students understand basic economic principles and use economic reasoning skills to analyze the impact of economic systems (including the market economy) on individuals, families, businesses, communities, and governments.

K-4 Benchmark IV-A: Understand that individuals, households, businesses, governments, and societies make decisions that affect the distribution of resources and that these decisions are influenced by incentives (both economic and intrinsic).

| | | |
|---|----|---|
| 1 | 1. | Understand how resources are limited and varied in meeting human needs.....13, 17, 29, 40 |
| 3 | 2. | Define and categorize resources (e.g., human, financial, natural).....13, 17, 29, 40 |
| 4 | 3. | Illustrate how resources can be used in alternative ways and, sometimes, allocated to different users.....13, 17, 29, 40 |
| | 5. | Understand and explain how conflict may arise between private and public incentives (e.g., new parks, parking structures).40 |



| Grade | Benchmark/Standard | |
|---|--|--|
| <i>5-8 Benchmark IV-A: Explain and describe how individuals, households, businesses, governments, and societies make decisions, are influenced by incentives (economic as well as intrinsic) and the availability and use of scarce resources, and that their choices involve costs and varying ways of allocating.</i> | | |
| 5 | 2. Understand the patterns of work and economic activities in New Mexico and the United States (e.g., farming, ranching, oil and gas production, high tech, manufacturing, medicine)..... | 13, 17, 29, 34, 35, 36, 37, 38, 40 |
| 7 | 1. Explain how economic and intrinsic incentives influence how individuals, households, businesses, governments, and societies allocate and use their scarce resources..... | 29, 34, 36 |
| 8 | 2. Analyze the full costs and benefits of alternative uses of resources that will lead to productive use of resources today and in the future..... | 29, 34, 35, 36, 40, 41 |
| <i>9-12 Benchmark IV-A: Analyze the ways individuals, households, businesses, governments, and societies make decisions, are influenced by incentives (economic and intrinsic) and the availability and use of scarce resources and that their choices involve costs and varying ways of allocating.</i> | | |
| 9-12 | 4. Analyze and evaluate the impact of economic choices on the allocation of scarce resources..... | 13, 17, 29, 34, 35, 36, 40, 45 |
| <i>K-4 Benchmark IV-C: Understand the patterns and results of trade and exchange among individuals, households, businesses, governments, and societies, and their interdependent qualities.</i> | | |
| 4 | 1. Identify patterns of work and economic activity in New Mexico and their sustainability over time (e.g., farming, ranching, mining, retail, transportation, manufacturing, tourism, high tech)..... | 13, 17, 36, 37, 38, 40 |
| <i>5-8 Benchmark IV-C: Describe the patterns of trade and exchange in early societies and civilizations and explore the extent of their continuation in today's world.</i> | | |
| 5 | 1. Understand basic economic patterns of early societies (e.g., hunter-gathers, early farming, business)..... | 13, 17, 45 |
| 7 | 3. Understand the factors that currently limit New Mexico from becoming an urban state, including the availability and allocation of water, and the extent to which New Mexico relies upon traditional economic forms (e.g., the acequia systems, localized agricultural markets)..... | 13, 17, 29, 31, 34, 35, 36, 37, 38, 40, 45 |



Mathematics: 2002 Content Standards and Benchmarks

Strand: Numbers and Operations

| | | |
|------------------|--|---|
| Standard: | Students will understand numerical concepts and mathematical operations. | |
| K-4 Benchmark: | Understand numbers, ways of representing numbers, relationships among numbers, and number systems..... | 6, 8, 13, 14, 20 |
| 5-8 Benchmark: | Understand numbers, ways of representing numbers, relationships among numbers, and number systems..... | 6, 8, 9, 13, 14, 20, 25, 26, 28 |
| K-4 Benchmark: | Understand the meaning of operations and how they relate to one another. | 6, 8, 13, 14, 20 |
| 5-8 Benchmark: | Understand the meaning of operations and how they relate to one another. | 6, 8, 9, 13, 14, 18, 22, 25, 26, 28, 34, 35 |
| K-4 Benchmark: | Compute fluently and make reasonable estimates | 6, 8, 13, 14, 20 |
| 5-8 Benchmark: | Compute fluently and make reasonable estimates | 6, 8, 9, 18, 22, 34 |

Strand: Algebra

| | | |
|------------------|--|--|
| Standard: | Students will understand algebraic concepts and applications. | |
| K-4 Benchmark: | Understand patterns, relations, and functions. | 23 |
| 5-8 Benchmark: | Understand patterns, relations, and functions. | 8, 13, 18, 22, 23, 33, 34, 35, 36 |
| K-4 Benchmark: | Use mathematical models to represent and understand quantitative relationships. | 8, 9, 14, 20, 23, 25 |
| 5-8 Benchmark: | Use mathematical models to represent and understand quantitative relationships. | 8, 9, 21, 22, 26, 28, 31, 33, 34, 35, 36 |
| K-4 Benchmark: | Analyze changes in various contexts. | 8, 13, 20, 23, 26 |
| 5-8 Benchmark: | Analyze changes in various contexts. | 13, 18, 22, 33, 34, 35, 36 |

Strand: Algebra, Functions, and Graphs

| | | |
|------------------|--|----------------|
| Standard: | Students will understand algebraic concepts and applications. | |
| 9-12 Benchmark: | Use mathematical models to represent and understand quantitative relationships. | 28, 33, 34, 36 |



Strand: Geometry

| | |
|---|------------|
| K-4 Benchmark: Specify locations and describe spatial relationships using coordinate geometry and other representational systems..... | 13, 23, 32 |
|---|------------|

Strand: Measurement

| | |
|--|----------------|
| Standard: Students will understand measurement systems and applications. | |
| K-4 Benchmark: Understand measurable attributes of objects and the units, systems, and processes of measurement..... | 8, 14, 25, 26 |
| 5-8 Benchmark: Understand measurable attributes of objects and the units, systems, and processes of measurement..... | 14, 25, 28, 33 |
| K-4 Benchmark: Apply appropriate techniques, tools, and formulas to determine measurements..... | 8, 14, 25 |
| 5-8 Benchmark: Apply appropriate techniques, tools, and formulas to determine measurements..... | 14, 25, 28, 34 |

Strand: Data Analysis and Probability

| | |
|--|--|
| Standard: Students will understand how to formulate questions, analyze data, and determine probabilities. | |
| K-4 Benchmark: Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them..... | 6, 8, 14, 20, 26 |
| 5-8 Benchmark: Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them..... | 8, 9, 14, 18, 21, 22, 26, 28, 31, 33, 34, 35, 36 |
| 9-12 Benchmark: Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them..... | 9, 21, 22, 28, 33, 34, 35, 36, 43 |
| K-4 Benchmark: Select and use appropriate statistical methods to analyze data..... | 8, 14, 20, 26 |
| 5-8 Benchmark: Select and use appropriate statistical methods to analyze data..... | 21, 22, 28, 33, 34, 35, 36 |
| 9-12 Benchmark: Select and use appropriate statistical methods to analyze data..... | 36 |
| K-4 Benchmark: Develop and evaluate inferences and predictions that are based on data..... | 8, 13, 14, 23 |
| 5-8 Benchmark: Develop and evaluate inferences and predictions that are based on data..... | 21, 22, 28, 33, 34, 35, 36, 45 |
| 9-12 Benchmark: Develop and evaluate inferences and predictions that are based on data..... | 22, 34, 35, 36 |
| K-4 Benchmark: Understand and apply basic concepts of probability..... | 13, 14, 19 |
| 5-8 Benchmark: Understand and apply basic concepts of probability..... | 13, 14, 18, 22, 33, 34, 36, 45 |
| 9-12 Benchmark: Understand and apply basic concepts of probability..... | 18, 22, 36 |



Language Arts: 2000 Content Standards and Benchmarks

Strand: Reading and Listening for Comprehension

| | |
|----------------------|---|
| Standard I: | Students will apply strategies and skills to comprehend information that is read, heard, and viewed. |
| K-4 Benchmark I-A: | Listen to, read, react to, and retell information. 2, 3, 13, 15, 38, 40, 41 |
| 5-8 Benchmark I-A: | Listen to, read, react to, and interpret information. 2, 3, 4, 12, 15, 16, 18, 19, 21, 24, 27, 38, 39, 40, 41, 42 |
| 9-12 Benchmark I-A: | Listen to, read, react to, and analyze information. 15, 16, 18, 21, 24, 27, 37, 38, 39, 40, 41, 42, 43 |
| K-4 Benchmark I-B: | Locate and use a variety of resources to acquire information across the curriculum. 2, 3, 38, 39, 40 |
| 5-8 Benchmark I-B: | Gather and use information for research and other purposes. 2, 3, 24, 27, 37, 38, 40, 42 |
| 9-12 Benchmark I-B: | Synthesize and evaluate information to solve problems across the curriculum. 24, 27, 37, 38, 40 |
| K-4 Benchmark I-C: | Demonstrate critical thinking skills to comprehend written, spoken, and visual information. 2, 3, 13, 15, 19, 21, 38, 40 |
| 5-8 Benchmark I-C: | Apply critical thinking skills to analyze information. 3, 4, 13, 15, 16, 18, 19, 24, 27, 37, 38, 40, 41, 42, 45 |
| 9-12 Benchmark I-C: | Demonstrate critical thinking skills to evaluate information and solve problems. 4, 13, 15, 16, 18, 19, 24, 27, 37, 38, 40, 41, 42, 43, 44, 45 |
| K-4 Benchmark I-D: | Acquire reading strategies. 2, 13, 15, 40, 41 |
| 5-8 Benchmark I-D: | Demonstrate competence in the skills and strategies of the reading process. 2, 3, 15, 16, 18, 24, 27, 37, 38, 40 |
| 9-12 Benchmark I-D: | Apply knowledge of reading process to evaluate print, non-print, and technology-based information. 24, 27, 37, 40, 43 |
| Standard II: | Students will communicate effectively through speaking and writing. |
| K-4 Benchmark II-A: | Demonstrate competence in speaking to convey information. 3, 12, 13, 15, 16, 18, 19, 38, 39, 40 |
| 5-8 Benchmark II-A: | Use speaking as an interpersonal communication tool. 3, 13, 15, 16, 18, 19, 24, 27, 37, 38, 39, 40, 41, 42, 43, 45 |
| 9-12 Benchmark II-A: | Communicate information in a coherent and persuasive manner using verbal and non-verbal language. 13, 18, 24, 27, 37, 38, 40, 41, 42, 42, 45 |
| K-4 Benchmark II-B: | Apply grammatical and language conventions to communicate. 3, 12, 19, 38, 39, 40 |
| 5-8 Benchmark II-B: | Apply grammatical and language conventions to communicate. 2, 3, 19, 24, 27, 37, 38, 39, 40, 42 |



9-12 Benchmark II-B: Apply grammatical and language conventions to communicate..... 18, 19, 24, 37, 38, 40, 42

K-4 Benchmark II-C: Demonstrate competence in the skills and strategies of the writing process..... 3, 12, 19, 38, 39

5-8 Benchmark II-C: Demonstrate competence in the skills and strategies of the writing process..... 3, 4, 12, 24, 27, 38, 42, 43

9-12 Benchmark II-C: Demonstrate competence in the skills and strategies of the writing process
to inform and persuade..... 12, 18, 24, 37, 38, 42, 43

Standard III: Students will use literature and media to develop an understanding of people, societies, and the self.

K-4 Benchmark II-A: Use language, literature, and media to gain and demonstrate awareness of cultures around the world..... 38, 39, 42

5-8 Benchmark III-A: Use language, literature, and media to understand various social and cultural perspectives..... 37, 38, 39, 42

9-12 Benchmark III-A: Use language, literature, and media to understand the role of the individual
as a member of many cultures..... 37, 38, 39, 42

K-4 Benchmark III-B: Identify and use the types of literature according to their purpose and function..... 38

9-12 Benchmark III-B: Understand literary elements, concepts, and genres..... 37, 38



Visual Arts: 1998 Content Standards and Benchmarks

Standard 1: Learn and develop the essential skills and technical demands unique to dance, music, theatre/drama, and visual arts.

K-4 Benchmarks: Visual arts: students will:

- identify the elements of design (line, color, shape, texture, pattern, space, value) as found in the environment and in art. 2, 3, 12
- demonstrate and explain steps used to create art (idea gathering, sketches, diagrams, and additions to diagrams). 2, 3, 12

5-8 Benchmarks: Visual arts: students will:

- engage in problem-solving activities that apply the principles of art to the elements of art. 2, 3, 4, 12, 13, 32, 42
- research and discuss the relationship between art and artifact and their historical, geographical, cultural, and political contexts. 4, 12, 39, 42

9-12 Benchmarks: Visual arts: students will:

- demonstrate an increasing level of competence in using the elements and principles of art to create art works for public exhibition..... 4, 12, 13, 24, 27, 42
- use objects, symbols, and ideas in their artwork and use the skills gained to solve problems in daily life. 4, 12, 13, 32, 42, 44

Standard 2: Use dance, music, theatre/drama, and visual arts to express ideas.

K-4 Benchmarks: Visual arts: students will:

- participate in a variety of reflective processes (individual tasks, group discussions, journaling, portfolio and display)..... 2, 3, 12, 16, 19
- complete, discuss and display one's own original works of art. 2, 3, 12, 19

5-8 Benchmarks: Visual arts: students will identify and describe the emotional connotations of the use and placement of design principles and elements in one's own work and the work of others. 2, 3, 4, 12, 24, 27, 32

9-12 Benchmarks: Visual arts: students will review and assess the use of design principles and elements in art..... 12, 24, 27



Standard 3: Integrate understanding of visual and performing arts by seeking connections and parallels among arts disciplines as well as all other content areas.

K-4 Benchmarks: Visual arts: students will identify and apply connections between the visual arts and other disciplines in the local curriculum. 2, 3, 12, 16, 19

5-8 Benchmarks: Visual arts: students will identify and explain the similarities and differences of concepts common to the visual arts and to other content areas..... 3, 4, 12, 19, 32, 42

9-12 Benchmarks: Visual arts: students will include in portfolio form examples that demonstrate an understanding of art based on cross-discipline learning..... 4, 12, 19, 24, 27, 32, 44

Standard 4: Demonstrate an understanding of the dynamics of the creative process.

K-4 Benchmarks: Visual arts: students will:

- understand that works of art come from diverse personal and cultural experiences and inspirations. 2, 3
- develop appropriate methods of reflection and evaluation of art work..... 2, 3

5-8 Benchmarks: Visual arts: students will create art in which design elements and principles in conjunction with subject, themes, and content are based on personal experiences to create meanings. 2, 3, 4, 12, 24, 27

9-12 Benchmarks: Visual arts: students will use oral and written methods to express the introspective process used in creating personal artwork..... 4

Standard 5: Observe, discuss, analyze, and make critical judgments about artistic works.

K-4 Benchmarks: Visual arts: students will:

- describe their own art and the work of others..... 2, 3, 12
- respond to constructive comments from others about one’s own art..... 2, 3, 12, 19

5-8 Benchmarks: Visual arts: students will demonstrate the use of the elements of art to express moods and feelings in one’s own art and the art of others..... 2, 3, 4, 12

Standard 6: Show increased awareness of diverse people and cultures through visual and performing arts.

K-4 Benchmarks: Visual arts: students will create art that reflects NM cultural and historical influences..... 2, 3, 12