

# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

## 5th – 8th Grade

### Strand I: Scientific Thinking and Practice

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

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

Grade	Performance Standards
5	<ol style="list-style-type: none"><li>1. Plan and conduct investigations, including formulating testable questions, making systematic observations, developing logical conclusions, and communicating findings.</li><li>2. Use appropriate technologies (e.g., calculators, computers, balances, spring scales, microscopes) to perform scientific tests and to collect and display data.</li><li>3. Use graphic representations (e.g., charts, graphs, tables, labeled diagrams) to present data and produce explanations for investigations.</li><li>4. Describe how credible scientific investigations use reproducible elements including single variables, controls, and appropriate sample sizes to produce valid scientific results.</li><li>5. Communicate the steps and results of a scientific investigation.</li></ol>
6	<ol style="list-style-type: none"><li>1. Construct appropriate graphs from data and develop qualitative and quantitative statements about the relationships between variables being investigated.</li><li>2. Examine the reasonableness of data supporting a proposed scientific explanation.</li><li>3. Justify predictions and conclusions based on data.</li></ol>
7	<ol style="list-style-type: none"><li>1. Use a variety of print and web resources to collect information, inform investigations, and answer a scientific question or hypothesis.</li><li>2. Use models to explain the relationships between variables being investigated.</li></ol>
8	<ol style="list-style-type: none"><li>1. Evaluate the accuracy and reproducibility of data and observations.</li><li>2. Use a variety of technologies to gather, analyze and interpret scientific data.</li><li>3. Know how to recognize and explain anomalous data.</li></ol>

# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

## **Strand I: Scientific Thinking and Practice**

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

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

<b>Grade</b>	<b>Performance Standards</b>
<b>5</b>	<ol style="list-style-type: none"><li>1. Understand that different kinds of investigations are used to answer different kinds of questions (e.g., observations, data collection, controlled experiments).</li><li>2. Understand that scientific conclusions are subject to peer and public review.</li></ol>
<b>6</b>	<ol style="list-style-type: none"><li>1. Understand that scientific knowledge is continually reviewed, critiqued, and revised as new data become available.</li><li>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.</li><li>3. Understand that not all investigations result in defensible scientific explanations.</li></ol>
<b>7</b>	<ol style="list-style-type: none"><li>1. Describe how bias can affect scientific investigation and conclusions.</li><li>2. Critique procedures used to investigate a hypothesis.</li><li>3. Analyze and evaluate scientific explanations.</li></ol>
<b>8</b>	<ol style="list-style-type: none"><li>1. Examine alternative explanations for observations.</li><li>2. Describe ways in which science differs from other ways of knowing and from other bodies of knowledge (e.g., experimentation, logical arguments, skepticism).</li><li>3. Know that scientific knowledge is built on questions posed as testable hypotheses, which are tested until the results are accepted by peers.</li></ol>

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## **Strand I: Scientific Thinking and Practice**

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

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

<b>Grade</b>	<b>Performance Standards</b>
<b>5</b>	<ol style="list-style-type: none"><li>1. Use appropriate units to make precise and varied measurements.</li><li>2. Use mathematical skills to analyze data.</li><li>3. Make predictions based on analyses of data, observations, and explanations.</li><li>4. Understand the attributes to be measured in a scientific investigation and describe the units, systems, and processes for making the measurement.</li></ol>
<b>6</b>	<ol style="list-style-type: none"><li>1. Evaluate the usefulness and relevance of data to an investigation.</li><li>2. Use probabilities, patterns, and relationships to explain data and observations.</li></ol>
<b>7</b>	<ol style="list-style-type: none"><li>1. Understand that the number of data (sample size) influences the reliability of a prediction.</li><li>2. Use mathematical expressions to represent data and observations collected in scientific investigations.</li><li>3. Select and use an appropriate model to examine a phenomenon.</li></ol>
<b>8</b>	<ol style="list-style-type: none"><li>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).</li><li>2. Create models to describe phenomena.</li></ol>

# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

## Strand II: Content of Science

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

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

Grade	Performance Standards
5	<ol style="list-style-type: none"> <li>1. Describe properties (e.g., relative volume, ability to flow) of the three states of matter.</li> <li>2. Describe how matter changes from one phase to another (e.g., condensation, evaporation).</li> <li>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.</li> <li>4. Know that the periodic table is a chart of the pure elements that make up all matter.</li> <li>5. Describe the relative location and motion of the particles (atoms and molecules) in each state of matter.</li> <li>6. Explain the relationship between temperature and the motion of particles in each state of matter.</li> </ol>
6	<ol style="list-style-type: none"> <li>1. Understand that substances have characteristic properties and identify the properties of various substances (e.g., density, boiling point, solubility, chemical reactivity).</li> <li>2. Use properties to identify substances (e.g., for minerals: the hardness, streak, color, reactivity to acid, cleavage, fracture).</li> <li>3. Know that there are about 100 known elements that combine to produce compounds in living organisms and nonliving substances.</li> <li>4. Know the differences between chemical and physical properties and how these properties can influence the interactions of matter.</li> </ol>
7	<ol style="list-style-type: none"> <li>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).</li> <li>2. Know that the total amount of matter (mass) remains constant although its form, location, and properties may change (e.g., matter in the food web).</li> <li>3. Identify characteristics of radioactivity, including: <ul style="list-style-type: none"> <li>• decay in time of some elements to others</li> <li>• release of energy</li> <li>• damage to cells.</li> </ul> </li> <li>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).</li> <li>5. Know that chemical reactions are essential to life processes.</li> </ol>

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8	<p><b>Properties of Matter</b></p> <ol style="list-style-type: none"><li>1. Know how to use density, boiling point, freezing point, conductivity, and color to identify various substances.</li><li>2. Distinguish between metals and non-metals.</li><li>3. Understand the differences among elements, compounds, and mixtures by:<ul style="list-style-type: none"><li>• classification of materials as elements, compounds, or mixtures</li><li>• interpretation of chemical formulas</li><li>• separation of mixtures into compounds by methods including evaporation, filtration, screening, magnetism.</li></ul></li></ol> <p><b>Structure of Matter</b></p> <ol style="list-style-type: none"><li>4. Identify the protons, neutrons, and electrons within an atom and describe their locations (i.e., in the nucleus or in motion outside the nucleus).</li><li>5. Explain that elements are organized in the periodic table according to their properties.</li><li>6. Know that compounds are made of two or more elements, but not all sets of elements can combine to form compounds.</li></ol> <p><b>Changes in Matter</b></p> <ol style="list-style-type: none"><li>7. Know that phase changes are physical changes that can be reversed (e.g., evaporation, condensation, melting).</li><li>8. Describe various familiar physical and chemical changes that occur naturally (e.g., snow melting, photosynthesis, rusting, burning).</li><li>9. Identify factors that influence the rate at which chemical reactions occur (e.g., temperature, concentration).</li><li>10. Know that chemical reactions can absorb energy (endothermic reactions) or release energy (exothermic reactions).</li></ol>
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# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

## Strand II: Content of Science

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

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

Grade	Performance Standards
5	<ol style="list-style-type: none"> <li>1. Know that heat is transferred from hotter to cooler materials or regions until both reach the same temperature.</li> <li>2. Know that heat is often produced as a by-product when one form of energy is converted to another form (e.g., when machines or organisms convert stored energy into motion).</li> <li>3. Know that there are different forms of energy.</li> <li>4. Describe how energy can be stored and converted to a different form of energy (e.g., springs, gravity) and know that machines and living things convert stored energy to motion and heat.</li> </ol>
6	<ol style="list-style-type: none"> <li>1. Identify various types of energy (e.g., heat, light, mechanical, electrical, chemical, nuclear).</li> <li>2. Understand that heat energy can be transferred through conduction, radiation and convection.</li> <li>3. Know that there are many forms of energy transfer but that the total amount of energy is conserved (i.e., that energy is neither created nor destroyed).</li> <li>4. Understand that some energy travels as waves (e.g., seismic, light, sound), including: <ul style="list-style-type: none"> <li>• the sun as source of energy for many processes on Earth</li> <li>• different wavelengths of sunlight (e.g., visible, ultraviolet, infrared)</li> <li>• vibrations of matter (e.g., sound, earthquakes)</li> <li>• different speeds through different materials.</li> </ul> </li> </ol>
7	<ol style="list-style-type: none"> <li>1. Know how various forms of energy are transformed through organisms and ecosystems, including: <ul style="list-style-type: none"> <li>• sunlight and photosynthesis</li> <li>• energy transformation in living systems (e.g., cellular processes changing chemical energy to heat and motion)</li> <li>• effect of mankind's use of energy and other activities on living systems (e.g., global warming, water quality).</li> </ul> </li> </ol>

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<b>8</b>	<p><b>Energy Transformation</b></p> <ol style="list-style-type: none"><li>1. Know that energy exists in many forms and that when energy is transformed some energy is usually converted to heat.</li><li>2. Know that kinetic energy is a measure of the energy of an object in motion and potential energy is a measure of an object's position or composition, including:<ul style="list-style-type: none"><li>• transformation of gravitational potential energy of position into kinetic energy of motion by a falling object.</li></ul></li><li>3. Distinguish between renewable and nonrenewable sources of energy.</li><li>4. Know that electrical energy is the flow of electrons through electrical conductors that connect sources of electrical energy to points of use, including:<ul style="list-style-type: none"><li>• electrical current paths through parallel and series circuits</li><li>• production of electricity by fossil-fueled and nuclear power plants, wind generators, geothermal plants, and solar cells</li><li>• use of electricity by appliances and equipment (e.g., calculators, hair dryers, light bulbs, motors).</li></ul></li></ol> <p><b>Waves</b></p> <ol style="list-style-type: none"><li>5. Understand how light and radio waves carry energy through vacuum or matter by:<ul style="list-style-type: none"><li>• straight-line travel unless an object is encountered</li><li>• reflection by a mirror, refraction by a lens, absorption by a dark object</li><li>• separation of white light into different wavelengths by prisms</li><li>• visibility of objects due to light emission or scattering.</li></ul></li><li>6. Understand that vibrations of matter (e.g., sound, earthquakes, water waves) carry wave energy, including:<ul style="list-style-type: none"><li>• sound transmission through solids, liquids, and gases</li><li>• relationship of pitch and loudness of sound to rate and distance (amplitude) of vibration</li><li>• ripples made by objects dropped in water.</li></ul></li></ol>
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## Strand II: Content of Science

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

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

Grade	Performance Standards
5	<ol style="list-style-type: none"><li>1. Understand how the rate of change of position is the velocity of an object in motion.</li><li>2. Recognize that acceleration is the change in velocity with time.</li><li>3. Identify forces in nature (e.g., gravity, magnetism, electricity, friction).</li><li>4. Understand that when a force (e.g., gravity, friction) acts on an object, the object speeds up, slows down, or goes in a different direction.</li><li>5. Identify simple machines and describe how they give advantage to users (e.g., levers, pulleys, wheels and axles, inclined planes, screws, wedges).</li></ol>
6	<ol style="list-style-type: none"><li>1. Know that every object exerts gravitational force on every other object dependent on the masses and distance of separation (e.g., motions of celestial objects, tides).</li><li>2. Know that gravitational force is hard to detect unless one of the objects (e.g., Earth) has a lot of mass.</li></ol>
7	<ol style="list-style-type: none"><li>1. Know that forces cause motion in living systems, including:<ul style="list-style-type: none"><li>• the principle of a lever and how it gives mechanical advantage to a muscular/skeletal system to lift objects</li><li>• forces in specific systems in the human body (e.g., how the heart generates blood pressure, how muscles contract and expand to produce motion).</li></ul></li></ol>

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<b>8</b>	<p><b>Forces</b></p> <ol style="list-style-type: none"><li>1. Know that there are fundamental forces in nature (e.g., gravity, electromagnetic forces, nuclear forces).</li><li>2. Know that a force has both magnitude and direction.</li><li>3. Analyze the separate forces acting on an object at rest or in motion (e.g., gravity, elastic forces, friction), including how multiple forces reinforce or cancel one another to result in a net force that acts on an object.</li><li>4. Know that electric charge produces electrical fields and magnets produce magnetic fields.</li><li>5. Know how a moving magnetic field can produce an electric current (generator) and how an electric current can produce a magnetic field (electromagnet).</li><li>6. Know that Earth has a magnetic field.</li></ol> <p><b>Motion</b></p> <ol style="list-style-type: none"><li>7. Know that an object's motion is always described relative to some other object or point (i.e., frame of reference).</li><li>8. Understand and apply Newton's Laws of Motion:<ul style="list-style-type: none"><li>• Objects in motion will continue in motion and objects at rest will remain at rest unless acted upon by an unbalanced force (inertia).</li><li>• If a greater force is applied to an object a proportionally greater acceleration will occur.</li><li>• If an object has more mass the effect of an applied force is proportionally less.</li></ul></li></ol>
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# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

## Strand II: Content of Science

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

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

Grade	Performance Standards
5	<ol style="list-style-type: none"> <li>1. Identify the components of habitats and ecosystems (producers, consumers, decomposers, predators).</li> <li>2. Understand how food webs depict relationships between different organisms.</li> <li>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).</li> <li>4. Describe how human activity impacts the environment.</li> </ol>
6	<ol style="list-style-type: none"> <li>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.</li> <li>2. Describe how weather and geologic events (e.g., volcanoes, earthquakes) affect the function of living systems.</li> <li>3. Describe how organisms have adapted to various environmental conditions.</li> </ol>
7	<p><b>Populations and Ecosystems</b></p> <ol style="list-style-type: none"> <li>1. Identify the living and nonliving parts of an ecosystem and describe the relationships among these components.</li> <li>2. Explain biomes (i.e., aquatic, desert, rainforest, grasslands, tundra) and describe the New Mexico biome.</li> <li>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).</li> <li>4. Explain the conditions and resources needed to sustain life in specific ecosystems.</li> <li>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.</li> </ol> <p><b>Biodiversity</b></p> <ol style="list-style-type: none"> <li>6. Understand how diverse species fill all niches in an ecosystem.</li> <li>7. Know how to classify organisms: domain, kingdom, phylum, class, order, family, genus, species.</li> </ol>
8	<ol style="list-style-type: none"> <li>1. Describe how matter moves through ecosystems (e.g., water cycle, carbon cycle).</li> <li>2. Describe how energy flows through ecosystems (e.g., sunlight, green plants, food for animals).</li> <li>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).</li> </ol>

# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

## Strand II: Content of Science

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

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

Grade	Performance Standards
5	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>3. Understand that heredity is the process by which traits are passed from one generation to another.</li> </ol>
6	<ol style="list-style-type: none"> <li>1. Understand that the fossil record provides data for how living organisms have evolved.</li> <li>2. Describe how species have responded to changing environmental conditions over time (e.g., extinction, adaptation).</li> </ol>
7	<p><b>Reproduction</b></p> <ol style="list-style-type: none"> <li>1. Know that reproduction is a characteristic of all living things and is essential to the continuation of a species.</li> <li>2. Identify the differences between sexual and asexual reproduction.</li> <li>3. Know that, in sexual reproduction, an egg and sperm unite to begin the development of a new individual.</li> <li>4. Know that organisms that sexually reproduce fertile offspring are members of the same species.</li> </ol> <p><b>Heredity</b></p> <ol style="list-style-type: none"> <li>5. Understand that some characteristics are passed from parent to offspring as inherited traits and others are acquired from interactions with the environment.</li> <li>6. Know that hereditary information is contained in genes that are located in chromosomes, including: <ul style="list-style-type: none"> <li>• determination of traits by genes</li> <li>• traits determined by one or many genes</li> <li>• more than one trait sometimes influenced by a single gene.</li> </ul> </li> </ol>

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	<p><b>Biological Evolution</b></p> <ol style="list-style-type: none"><li>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).</li><li>8. Explain that diversity within a species is developed by gradual changes over many generations</li><li>9. Know that organisms can acquire unique characteristics through naturally occurring genetic variations.</li><li>10. Identify adaptations that favor the survival of organisms in their environments (e.g., camouflage, shape of beak).</li><li>11. Understand the process of natural selection.</li><li>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.</li><li>13. Know that the fossil record documents the appearance, diversification, and extinction of many life forms.</li></ol>
<b>8</b>	<ol style="list-style-type: none"><li>1. Understand that living organisms are made mostly of molecules consisting of a limited number of elements (e.g., carbon, hydrogen, nitrogen, oxygen).</li><li>2. Identify DNA as the chemical compound involved in heredity in living organisms.</li><li>3. Describe the widespread role of carbon in the chemistry of living systems.</li></ol>

# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

## Strand II: Content of Science

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

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

Grade	Performance Standards
5	<ol style="list-style-type: none"> <li>1. Understand that all living organisms are composed of cells from one to many trillions, and that cells are usually only visible through a microscope.</li> <li>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).</li> <li>3. Describe the relationships among cells, tissues, organs, organ systems, whole organisms, and ecosystems.</li> </ol>
6	<ol style="list-style-type: none"> <li>1. Explain how fossil fuels were formed from animal and plant cells.</li> <li>2. Describe the differences between substances that were produced by living organisms (e.g., fossil fuels) and substances that result from nonliving processes (e.g., igneous rocks).</li> </ol>
7	<p><b>Structure of Organisms</b></p> <ol style="list-style-type: none"> <li>1. Understand that organisms are composed of cells and identify unicellular and multicellular organisms.</li> <li>2. Explain how organs are composed of tissues of different types of cells (e.g., skin, bone, muscle, heart, intestines).</li> </ol> <p><b>Function of Cells</b></p> <ol style="list-style-type: none"> <li>3. Understand that many basic functions of organisms are carried out in cells, including: <ul style="list-style-type: none"> <li>• growth and division to produce more cells (mitosis)</li> <li>• specialized functions of cells (e.g., reproduction, nerve-signal transmission, digestion, excretion, movement, transport of oxygen).</li> </ul> </li> <li>4. Compare the structure and processes of plant cells and animal cells.</li> <li>5. Describe how some cells respond to stimuli (e.g., light, heat, pressure, gravity).</li> <li>6. Describe how factors (radiation, UV light, drugs) can damage cellular structure or function.</li> </ol>
8	<ol style="list-style-type: none"> <li>1. Describe how cells use chemical energy obtained from food to conduct cellular functions (i.e., respiration).</li> <li>2. Explain that photosynthesis in green plants captures the energy from the sun and stores it chemically.</li> <li>3. Describe how chemical substances can influence cellular activity (e.g., pH).</li> </ol>

# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

## Strand II: Content of Science

**Standard III (Earth and Space Science):** Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

**5-8 Benchmark I:** Describe how the concepts of energy, matter, and force can be used to explain the observed behavior of the solar system, the universe, and their structures.

Grade	Performance Standards
5	<ol style="list-style-type: none"> <li>1. Know that many objects in the universe are huge and are separated from one another by vast distances (e.g., many stars are larger than the sun but so distant that they look like points of light).</li> <li>2. Understand that Earth is part of a larger solar system, which is part of an even larger galaxy (Milky Way), which is One of many galaxies.</li> <li>3. Know that there have been manned and unmanned journeys to space and to the moon.</li> </ol>
6	<p><b>Universe</b></p> <ol style="list-style-type: none"> <li>1. Describe the objects in the universe, including: <ul style="list-style-type: none"> <li>• billions of galaxies, each containing billions of stars</li> <li>• different sizes, temperatures, and colors of stars in the Milky Way galaxy.</li> </ul> </li> </ol> <p><b>Solar System</b></p> <ol style="list-style-type: none"> <li>2. Locate the solar system in the Milky Way galaxy.</li> <li>3. Identify the components of the solar system, and describe their defining characteristics and motions in space, including: <ul style="list-style-type: none"> <li>• sun as a medium sized star</li> <li>• sun's composition (i.e., hydrogen, helium) and energy production</li> <li>• nine planets, their moons, asteroids.</li> </ul> </li> <li>4. Know that the regular and predictable motions of the Earth-moon-sun system explain phenomena on Earth, including: <ul style="list-style-type: none"> <li>• Earth's motion in relation to a year, a day, the seasons, the phases of the moon, eclipses, tides, and shadows</li> <li>• moon's orbit around Earth once in 28 days in relation to the phases of the moon.</li> </ul> </li> </ol>
7	<ol style="list-style-type: none"> <li>1. Explain why Earth is unique in our solar system in its ability to support life.</li> <li>2. Explain how energy from the sun supports life on Earth.</li> </ol>

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<b>8</b>	<ol style="list-style-type: none"><li>1. Understand how energy from the sun and other stars, in the form of light, travels long distances to reach Earth.</li><li>2. Explain how the properties of light (e.g., emission, reflection, refraction) emitted from the sun and stars are used to learn about the universe, including:<ul style="list-style-type: none"><li>• distances in the solar system and the universe</li><li>• temperatures of different stars.</li></ul></li><li>3. Understand how gravitational force acts on objects in the solar system and the universe, including:<ul style="list-style-type: none"><li>• similar action on masses on Earth and on other objects in the solar system</li><li>• explanation of the orbits of the planets around the sun.</li></ul></li></ol>
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# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

## Strand II: Content of Science

**Standard III (Earth and Space Science):** Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

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

Grade	Performance Standards
5	<ol style="list-style-type: none"> <li>1. Understand that water and air relate to Earth's processes, including:               <ul style="list-style-type: none"> <li>• how the water cycle relates to weather</li> <li>• how clouds are made of tiny droplets of water, like fog or steam.</li> </ul> </li> <li>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.</li> <li>3. Know that most of Earth's surface is covered by water, that most of that water is salt water in oceans, and that fresh water is found in rivers, lakes, underground sources, and glaciers.</li> <li>4. Recognize that the seasons are caused by Earth's motion around the sun and the tilt of Earth's axis of rotation.</li> </ol>
6	<p><b>Structure of Earth</b></p> <ol style="list-style-type: none"> <li>1. Know that Earth is composed of layers that include a crust, mantle, and core.</li> <li>2. Know that Earth's crust is divided into plates that move very slowly, in response to movements in the mantle.</li> <li>3. Know that sedimentary, igneous, and metamorphic rocks contain evidence of the materials, temperatures, and forces that created them.</li> </ol> <p><b>Weather and Climate</b></p> <ol style="list-style-type: none"> <li>4. Describe the composition (i.e., nitrogen, oxygen, water vapor) and strata of Earth's atmosphere, and differences between the atmosphere of Earth and those of other planets.</li> <li>5. Understand factors that create and influence weather and climate, including:               <ul style="list-style-type: none"> <li>• heat, air movement, pressure, humidity, oceans</li> <li>• how clouds form by condensation of water vapor</li> <li>• how weather patterns are related to atmospheric pressure</li> <li>• global patterns of atmospheric movement (e.g., El Niño)</li> <li>• factors that can impact Earth's climate (e.g., volcanic eruptions, impacts of asteroids, glaciers).</li> </ul> </li> <li>6. Understand how to use weather maps and data (e.g., barometric pressure, wind speeds, humidity) to predict weather.</li> </ol>

# NEW MEXICO Grades 5-8 SCIENCE STANDARDS

	<p><b>Changes to Earth</b></p> <p>7. Know that landforms are created and change through a combination of constructive and destructive forces, including:</p> <ul style="list-style-type: none"> <li>• weathering of rock and soil, transportation, deposition of sediment, and tectonic activity</li> <li>• similarities and differences between current and past processes on Earth’s surface (e.g., erosion, plate tectonics, changes in atmospheric composition)</li> <li>• impact of volcanoes and faults on New Mexico geology.</li> </ul> <p>8. Understand the history of Earth and how information about it comes from layers of sedimentary rock, including:</p> <ul style="list-style-type: none"> <li>• sediments and fossils as a record of a very slowly changing world</li> <li>• evidence of asteroid impact, volcanic and glacial activity.</li> </ul>
<p><b>7</b></p>	<p>1. Understand how the remains of living things give us information about the history of Earth, including:</p> <ul style="list-style-type: none"> <li>• layers of sedimentary rock, the fossil record, and radioactive dating showing that life has been present on Earth for more than 3.5 billion years.</li> </ul> <p>2. Understand how living organisms have played many roles in changes of Earth’s systems through time (e.g., atmospheric composition, creation of soil, impact on Earth’s surface).</p> <p>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.</p>
<p><b>8</b></p>	<p>1. Describe the role of pressure (and heat) in the rock cycle.</p> <p>2. Understand the unique role water plays on Earth, including:</p> <ul style="list-style-type: none"> <li>• ability to remain liquid at most Earth temperatures</li> <li>• properties of water related to processes in the water cycle: evaporation, condensation, precipitation, surface run-off, percolation</li> <li>• dissolving of minerals and gases and transport to the oceans</li> <li>• fresh and salt water in oceans, rivers, lakes, and glaciers</li> <li>• reactant in photosynthesis.</li> </ul> <p>3. Understand the geologic conditions that have resulted in energy resources (e.g., oil, coal, natural gas) available in New Mexico.</p>

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## Strand III: Science and Society

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

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

Grade	Performance Standards
5	<ol style="list-style-type: none"> <li>1. Describe the contributions of science to understanding local or current issues (e.g., watershed and community decisions regarding water use).</li> <li>2. Describe how various technologies have affected the lives of individuals (e.g., transportation, entertainment, health).</li> </ol>
6	<ol style="list-style-type: none"> <li>1. Examine the role of scientific knowledge in decisions (e.g., space exploration, what to eat, preventive medicine and medical treatment).</li> <li>2. Describe the technologies responsible for revolutionizing information processing and communications (e.g., computers, cellular phones, Internet).</li> </ol>
7	<ol style="list-style-type: none"> <li>1. Analyze the contributions of science to health as they relate to personal decisions about smoking, drugs, alcohol, and sexual activity.</li> <li>2. Analyze how technologies have been responsible for advances in medicine (e.g., vaccines, antibiotics, microscopes, DNA technologies).</li> <li>3. Describe how scientific information can help individuals and communities respond to health emergencies (e.g., CPR, epidemics, HIV, bio-terrorism).</li> </ol>
8	<ol style="list-style-type: none"> <li>1. Analyze the interrelationship between science and technology (e.g., germ theory, vaccines).</li> <li>2. Describe how scientific information can help to explain environmental phenomena (e.g., floods, earthquakes, volcanoes, fire, extreme weather).</li> <li>3. Describe how technological revolutions have significantly influenced societies (e.g., energy production, warfare, space exploration).</li> <li>4. Critically analyze risks and benefits associated with technologies related to energy production.</li> </ol>