

Jemez Valley Public Schools
EIGHTH GRADE SCIENCE • CONTENT MAP

Quadrant I	Quadrant II	Quadrant III	Quadrant IV
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.			
<p>(Apply Throughout Year)</p> <p>Evaluate the accuracy and reproducibility of data and observations</p> <p>Use a variety of technologies to gather, analyze and interpret scientific data</p> <p>Know how to recognize and explain anomalous data</p> <p>Examine alternative explanations for observations</p> <p>Describe ways in which science differs from other ways of knowing and from other bodies of knowledge (e.g., experimentation, logical arguments, skepticism)</p> <p>Know that scientific knowledge is built on questions posed as testable hypotheses, which are tested until the results are accepted by peers</p> <p>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)</p> <p>Create models to describe phenomena</p>			<p>Evaluate the accuracy and reproducibility of data and observations</p> <p>Use a variety of technologies to gather, analyze and interpret scientific data</p> <p>Examine alternative explanations for observations</p> <p>Create models to describe phenomena</p>
Quadrant I	Quadrant II	Quadrant III	Quadrant IV
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.			
<p>Know how to use density, boiling point, freezing point, conductivity, and color to identify various substances</p> <p>Distinguish between metals and non-metals</p> <p>Understand the differences among elements, compounds, and mixtures by: classification of materials as elements, compounds, or mixtures, interpretation of chemical formulas, and separation of mixtures into compounds by methods including evaporation, filtration, screening, magnetism</p>	<p>Understand the differences among elements, compounds, and mixtures by: classification of materials as elements, compounds, or mixtures, interpretation of chemical formulas, and separation of mixtures into compounds by methods including evaporation, filtration, screening, magnetism</p> <p>Describe various familiar physical and chemical changes that occur naturally (e.g., snow melting, photosynthesis, rusting, burning)</p> <p>Identify factors that influence the rate at</p>	<p>Understand how light and radio waves carry energy through vacuum or matter by: straight-line travel unless an object is encountered, reflection by a mirror, refraction by a lens, absorption by a dark object, separation of white light into different wavelengths by prisms, visibility of objects due to light emission or scattering</p> <p>Understand that vibrations of matter (e.g., sound, earthquakes, water waves) carry wave energy, including: sound transmission through solids, liquids, and gases, relationship of pitch and loudness</p>	

<p>Identify the protons, neutrons, and electrons within an atom and describe their locations (i.e., in the nucleus or in motion outside the nucleus)</p> <p>Explain that elements are organized in the periodic table according to their properties</p> <p>Know that compounds are made of two or more elements, but not all sets of elements can combine to form compounds</p> <p>Know that phase changes are physical changes that can be reversed (e.g., evaporation, condensation, melting)</p> <p>Describe various familiar physical and chemical changes that occur naturally (e.g., snow melting, photosynthesis, rusting, burning)</p>	<p>which chemical reactions occur (e.g., temperature, concentration)</p> <p>Know that chemical reactions can absorb energy (endothermic reactions) or release energy (exothermic reactions)</p> <p>Know that energy exists in many forms and that when energy is transformed some energy is usually converted to heat</p> <p>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: transformation of gravitational potential energy of position into kinetic energy of motion by a falling object</p> <p>Distinguish between renewable and nonrenewable sources of energy</p> <p>Know that electrical energy is the flow of electrons through electrical conductors that connect sources of electrical energy to points of use, including: electrical current paths through parallel and series circuits, production of electricity by fossil-fueled and nuclear power plants, wind generators geothermal plants, and solar cells, use of electricity by appliances and equipment (e.g., calculators, hair dryers, light bulbs, motors)</p>	<p>of sound to rate and distance (amplitude) of vibration, ripples made by objects dropped in water</p> <p>Know that there are fundamental forces in nature (e.g., gravity, electromagnetic forces, nuclear forces)</p> <p>Know that a force has both magnitude and direction</p> <p>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</p> <p>Know that electric charge produces electrical fields and magnets produce magnetic fields Know how a moving magnetic field can produce an electric current (generator) and how an electric current can produce a magnetic field (electromagnet)</p> <p>Know that Earth has a magnetic field</p> <p>Know that an object's motion is always described relative to some other object or point (i.e., frame of reference) Understand and apply Newton's Laws of Motion: Objects in motion will continue in motion and objects at rest will remain at rest unless acted upon by an unbalanced force (inertia). If a greater force is applied to an object a proportionally greater acceleration will occur. If an object has more mass the effect of an applied force is proportionally less</p>	
Quadrant I	Quadrant II	Quadrant III	Quadrant IV
Strand II: Content of Science			
Standard I: (Life Science) Understand the properties, structures, and processes of living things and the interdependence of living things and their environments..			
<p>Understand that living organisms are made mostly of molecules consisting of a limited number of elements (e.g., carbon, hydrogen, nitrogen, oxygen)</p> <p>Identify DNA as the chemical compound involved in heredity in living organisms</p> <p>Describe the widespread role of carbon in the chemistry of living systems</p>	<p>Describe how matter moves through ecosystems (e.g., water cycle, carbon cycle)</p> <p>Describe how energy flows through ecosystems (e.g., sunlight, green plants, food for animals)</p> <p>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)</p>		

	<p>Describe how cells use chemical energy obtained from food to conduct cellular functions (i.e., respiration)</p> <p>Explain that photosynthesis in green plants captures the energy from the sun and stores it chemically</p> <p>Describe how chemical substances can influence cellular activity (e.g., pH)</p>		
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<p>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.</p>			
	<p>Understand the geologic conditions that have resulted in energy resources (e.g., oil, coal, natural gas) available in New Mexico</p>		<p>Understand how energy from the sun and other stars, in the form of light, travels long distances to reach Earth</p> <p>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: temperatures of different stars, distances in the solar system and the universe</p> <p>Understand how gravitational force acts on objects in the solar system and the universe, including: similar action on masses on Earth and on other objects in the solar system, explanation of the orbits of the planets around the sun</p> <p>Describe the role of pressure (and heat) in the rock cycle</p> <p>Understand the unique role water plays on Earth, including: ability to remain liquid at most Earth temperatures, properties of water related to processes in the water cycle: evaporation, condensation, precipitation, surface run-off, percolation, dissolving of minerals and gases and transport to the oceans, fresh and salt water in oceans, rivers, lakes, and glaciers, reactant in photosynthesis</p> <p>Understand the geologic conditions that have resulted in energy resources (e.g., oil, coal, natural gas) available in New Mexico</p>

Quadrant I	Quadrant II	Quadrant III	Quadrant IV
Strand II: Science and Society			
Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.			
		<p>Describe how scientific information can help to explain environmental phenomena (e.g., floods, earthquakes, volcanoes, fire, extreme weather)</p> <p>Describe how technological revolutions have significantly influenced societies (e.g., energy production, warfare, space exploration)</p> <p>Critically analyze risks and benefits associated with technologies related to energy production</p>	<p>Analyze the interrelationship between science and technology (e.g., germ theory, vaccines)</p> <p>Describe how scientific information can help to explain environmental phenomena (e.g., floods, earthquakes, volcanoes, fire, extreme weather)</p> <p>Describe how technological revolutions have significantly influenced societies (e.g., energy production, warfare, space exploration)</p> <p>Critically analyze risks and benefits associated with technologies related to energy production</p>