

4th / 5th / 6th Grade (Earth) Science Essential Standards Science

Based on State Key Content Standards compiled by the Pulliam Group

Strand	Standard 4 th Grade	Standard 5 th Grade	Standard 6 th Grade (Earth)
Physical Science	<p>1. Electricity and magnetism are related effects that have many useful applications in everyday life.</p> <p>a. Students know how to design and build simple series and parallel circuits by using components such as wires, batteries, and bulbs.</p> <p>b. Students know how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field.</p> <p>c. Students know electric currents produce magnetic fields and know how to build a simple electromagnet.</p>	<p>1. Elements and their combinations account for all the varied types of matter in the world.</p> <p>a. Students know that during chemical reactions the atoms in the reactants rearrange to form products with different properties.</p> <p>b. Students know all matter is made of atoms, which combine to form molecules.</p> <p>c. Students know that metals have properties in common, such as high electrical and thermal conductivity. Some metals, such as aluminum (Al), iron (Fe), nickel (Ni), copper (Cu), silver (Ag), and gold (Au), are pure elements; other, such as steel and brass, are composed of a combination of elemental metals.</p>	
Life Science	<p>2. All organisms need energy and matter to live and grow.</p> <p>a. Students know that plants are the primary source of matter and energy entering most food chains.</p> <p>b. Students know that producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.</p> <p>c. Students know that decomposers, including many fungi, insects and microorganisms, recycle matter from dead plants and animals.</p> <p>3. Living organisms depend on one another and on the environment for survival.</p> <p>a. Students know that ecosystems can be characterized by their living and nonliving components.</p> <p>b. Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.</p>	<p>2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials.</p> <p>a. Students know that many multi-cellular organisms have specialized structures to support the transport of materials.</p> <p>b. Students know how blood circulates through the heart, lungs, and body and how carbon dioxide and oxygen are exchanged in the lungs and tissues.</p> <p>c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.</p>	
Earth Science	<p>4. The properties of rocks and minerals reflect the processes that formed them.</p> <p>a. Students know how to differentiate among igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation (the rock cycle).</p> <p>5. Waves, wind, water, and ice shape and reshape Earth's land surface.</p> <p>a. Students know some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.</p> <p>c. Students know that moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in</p>	<p>3. Water on Earth moves between the oceans and land through the processes of evaporation and condensation.</p> <p>a. Students know that most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface.</p> <p>b. Students know that when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.</p> <p>c. Students know that water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.</p> <p>4. Air movements cause changing weather patterns.</p> <p>a. Students know that uneven heating of Earth causes</p>	<p>1. Plate tectonics and Earth's Structure, Earth's surface, and major geologic events are caused by Plate Tectonics. Students should know that:</p> <p>a. evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, volcanoes, and mid-ocean ridges; and the distribution of fossils, rock types, and ancient climatic zones.</p> <p>b. Earth is composed of several layers: a cold, brittle lithosphere; a hot, convection mantle; and a dense, metallic core.</p> <p>c. Lithospheric plates the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.</p> <p>d. earthquakes are sudden motions along breaks in the crust called faults and that volcanoes and fissures are</p>

	<p>other places (weathering, transport, and deposition).</p>	<p>air movements.</p> <p>b. Students know the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.</p> <p>d. Students know how to use weather maps and data to predict local weather and know that weather forecasts depend on many variables.</p> <p>5. The solar system consists of planets and other bodies that orbit the sun in predictable paths.</p> <p>a. Students know that the Sun, and average star, is the central and largest body in the solar system and is composed primarily of hydrogen and helium.</p> <p>b. Students know that the solar system includes the planet Earth, the Moon, the Sun, eight other planets and their satellites, and smaller objects such as asteroids and comets.</p>	<p>locations where magma reaches the surface.</p> <p>e. major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.</p> <p>2. Shaping Earth's Surface- Topography is shaped by weathering and soil deposits. Students should know that:</p> <p>a. water running downhill is the dominant process in shaping the landscape, including California's landscape.</p> <p>b. rivers and streams are dynamic systems that erode, transport sediment; change courses, and flood their banks in natural and recurring patterns.</p> <p>d. earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.</p> <p>3. Thermal Energy Heat moves from warmer to cooler by various means. Students should know that:</p> <p>a. energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.</p> <p>b. when fuel is consumed, most of the energy released becomes heat energy.</p> <p>c. heat flows in solids by conduction and in fluids by conduction and convection.</p> <p>4. Energy in the Earth's System- The Earth's surface is affected by the transfer of energy. Students should know that:</p> <p>a. the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.</p> <p>b. solar energy reaches Earth through radiation, mostly in the form of visible light.</p> <p>c. heat from Earth's interior reaches the surface primarily through convection.</p> <p>e. differences in pressure, heat, air movement, and humidity results in change of weather.</p> <p>5. Ecology- Organisms in ecosystems exchange energy and nutrients. Students should know that:</p> <p>a. energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organisms to organism through food webs.</p> <p>b. matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.</p> <p>c. populations of organisms can be categorized by the functions they serve in an ecosystem.</p> <p>e. the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as light, water, temperature, and soil composition.</p> <p>6. Resources- Chemistry is the basis of biological systems. Students should know that:</p> <p>b. different energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and how to classify them as renewable or non-renewable.</p>
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<p>Investigations and Experimentation</p>	<p>b. Students will measure and estimate the weight, length, or volume of objects. e. Students will construct and interpret graphs from measurements. f. Students will follow a set of written instruction for a scientific investigation (or building project). From standards for grade five: a. Students will classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria.</p>	<p>c. Students will plan and conduct a simple investigation from a student-developed question and write instructions so others can carry out the procedure. f. Students will select appropriate tools and make quantitative observations. g. Students will record data by using appropriate graphic representations and make inferences based on those data. i. Students will write a report of an investigation that includes conducting test, collecting data or examining evidence, and drawing conclusions.</p>	<p>7. Students will develop a hypothesis and perform investigations. b. select and use appropriate tools and technology to perform tests, collect, display data. c. construct appropriate graphs from data and develop quantitative statements about the relationships between variables. d. communicate the steps and results from an investigation in written reports and oral presentations. f. read a topographic map and a geologic map for evidence provided on the maps. h. identify changes in natural phenomena over time without manipulating the phenomena. (e.g., a tree limb, a grove of trees, a stream, and a hill slope).</p>
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