

# 6<sup>th</sup> Grade (Earth Science)/7<sup>th</sup> Grade (Life Science)/8<sup>th</sup> Grade (Physical Science)

## Essential Standards

### Science

Based on State Key Content Standards compiled by the Pulliam Group

Strand	Standard 6 <sup>th</sup> Grade (Earth)	Standard 7 <sup>th</sup> Grade (Life)	Standard 8 <sup>th</sup> Grade (Physical)
	<p><b>Earth Science-</b></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 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</p>	<p><b>1. Cell Biology-</b> All living organisms are composed of cells. Students should know that:</p> <p>a. cells function similarly in all living organisms.</p> <p>b. the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.</p> <p>c. the nucleus is the repository for genetic information in plant and animal cells.</p> <p>e. cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes.</p> <p><b>2. Genetics-</b> Cells contain genetic instructions that specify its traits. Students should know that:</p> <p>b. sexual reproduction produces offspring that inherit half their genes from each parent.</p> <p>c. an inherited trait can be determined by one or more genes.</p> <p>d. plant and animal cells contain many thousands of different genes and typical have two copies of every gene. The copies, or alleles, of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive.</p> <p>e. DNA is the genetic material of living organisms and is located in the chromosomes of each cell.</p> <p><b>3. Evolution-</b> Evolution accounts for diversity of species. Students should know that:</p> <p>a. that genetic variation and environmental factors cause evolution and diversity of organisms.</p> <p>c. how independent lines of evidence from geology, fossils, and comparative anatomy provide the bases for the theory of evolution.</p> <p><b>Earth Science-</b></p> <p>4. Evidence from rocks allows us to understand evolution. Students should know that:</p> <p>a. that Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time.</p> <p>b. that the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids.</p> <p>c. that fossils provide evidence of how life and environmental conditions have changed.</p> <p>5. Structure and functions in living systems. Structure and function are complementary in animals and plants. Students should know:</p> <p>a. that plants and animals have levels of organization for structure and function, including cells, tissues, organs,</p>	<p><b>Physical Science-</b></p> <p>1. Motion- Velocity is the rate of change of position. Students should know:</p> <p>a. position is defined in relation to a standard reference point and a set of directions.</p> <p>b. average speed is the total distance traveled divided by the total time elapsed and that the speed of an object along the path traveled can vary.</p> <p>c. how to solve problems involving distance, time, and average speed.</p> <p>d. the velocity of an object must be described by specifying, both the direction and the speed of the object.</p> <p>2. Forces- Unbalanced forces cause changes in velocity. Students should know that:</p> <p>a. a force has both direction and magnitude.</p> <p>c. when the forces on an object are balanced, the motion of the object does not change.</p> <p>e. when the forces on an object are unbalanced, the object will change its velocity.</p> <p>f. the greater the mass of an object, the more force is needed to achieve the same rate of change in motion.</p> <p>3. Structure of Matter- Each element has distinctive properties and an atomic number. Students should know:</p> <p>a. the structure of the atom and know it is composed of protons, neutrons, and electrons.</p> <p>b. that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.</p> <p>d. the states of matter (solid, liquid, gas) depend on molecular motion.</p> <p>f. how to use the periodic table to identify elements in simple compounds.</p> <p>4. Earth in the Solar System- Structure and composition of the universe. Students should know that:</p> <p>a. galaxies are clusters of billions of stars and may be different shapes.</p> <p>b. the Sun is one of many stars in the Milky Way galaxy and that stars may differ in size temperature, and color.</p> <p>d. stars are the source of light for all bright objects in outer space and that the Moon and planets shine by reflected sunlight, not by their own light.</p> <p>5. Reactions- Chemical reactions are atoms arranged into different combination. Students should know:</p> <p>a. that reactant atoms and molecules interact to form</p>

	<p>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>	<p>organ systems, and the whole organism.</p> <p>b. that organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.</p> <p>c. how bones and muscles work together to provide a structural framework for movement.</p> <p>g. how to relate the structures of the eye and ear to their functions.</p> <p><b>Physical Science-</b></p> <p>6. Physical principles underlie biological systems. Students should know that:</p> <p>b. that for an object to be seen, light emitted by or scattered from it must be detected by the eye.</p> <p>d. how simple lenses are used in a magnifying glass, the eye, a camera, a telescope, and a microscope.</p> <p>f. light can be reflected, refracted, transmitted, and absorbed by matter.</p>	<p>products with different chemical properties.</p> <p>b. that the idea of atoms explains the conservation of matter: in chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same.</p> <p>6. Chemistry of Living Systems- Chemistry is the basis of biological systems. Students should know:</p> <p>a. that carbon, because of its ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms.</p> <p>b. that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.</p> <p>7. Periodic Table- students should know that:</p> <p>a. how to identify regions corresponding to metals, nonmetals, and inert gases.</p> <p>b. each element has a specific number of protons in the nucleus (the atomic number) and each isotope of the element has a different by specific number of neutrons in the nucleus.</p> <p>8. Density/Buoyancy- objects are buoyant immersed in fluid. Students should know:</p> <p>a. that density is mass per unit volume.</p> <p>b. how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume.</p>
Investigations and Experimentation	<p>7. Students will develop a hypothesis and perform investigations.</p> <p>b. select and use appropriate tools and technology to perform tests, collect, display data.</p> <p>c. construct appropriate graphs from data and develop quantitative statements about the relationships between variables.</p> <p>d. communicate the steps and results from an investigation in written reports and oral presentations.</p> <p>f. read a topographic map and a geologic map for evidence provided on the maps.</p> <p>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>	<p>7. Students will develop questions and perform investigations.</p> <p>a. Select and use appropriate tools and technology to perform tests, collect and display data.</p> <p>c. Communicate the logical connection among hypotheses, science concepts, test conducted, data collected, and conclusions drawn from scientific evidence.</p> <p>d. Construct models, and appropriately labeled diagrams to communicate scientific knowledge (e.g., cell structure).</p> <p>e. Communicate the steps and results from an investigation in written reports and oral presentations.</p>	<p>9. Students will develop questions and perform investigations.</p> <p>a. Plan and conduct a scientific investigation to test hypotheses.</p> <p>c. Distinguish between variable and controlled parameters in a test.</p> <p>e. Construct appropriate graphs from data and develop quantitative statements about the relationships between variables.</p> <p>f. Apply simple mathematic relationships to determine a missing quantity in a mathematic expression, given the two remaining terms (including speed= distance/time, density=mass/volume, force=pressure x area, volume = area x height).</p>