Investigating Earth Systems Correlation Science Content for California Schools

Grade Six - Focus on Earth Science / Grade Seven and Eight - Earth Science related Standards

Correlation Key: **"XX"** In-depth Coverage = In-depth coverage of concept in student edition **"X"** Coverage = Coverage in student edition and/or Teacher Edition supports the development of the concept	Climate and Weather	Dynamic Planet	Energy Resources	Fossils	Materials and Minerals	Oceans	Rocks and Landfroms	Soil	Water as a Resource
Grade 6 - Focus on Earth Science **Plate Tectonics** **1. Plate tectonics accounts for important features of Earth's surface and major geologic events. As a basis for understanding this concept:**									
a. *Students know* evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, volcanoes, and midocean ridges; and the distribution of fossils, rock types, and ancient climatic zones.		**XX**							
b. *Students know* Earth is composed of several layers: a cold, brittle lithosphere; a hot, convecting mantle; and a dense, metallic core.		**XX**							
c. *Students know* lithospheric plates the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.		**XX**				**XX**			
d. *Students know* that earthquakes are sudden motions along breaks in the crust called faults and that volcanoes and fissures are locations where magma reaches the surface.		**XX**							
e. *Students know* major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.		**XX**				**XX**			
f. *Students know* how to explain major features of California geology (including mountains, faults, volcanoes) in terms of plate tectonics.		**XX**							
g. *Students know* how to determine the epicenter of an earthquake and know that the effects of an earthquake on any region vary, depending on the size of the earthquake, the distance of the region from the epicenter, the local geology, and the type of construction in the region.		**XX**							
Shaping Earth's Surface **2. Topography is reshaped by the weathering of rock and soil and by the transportation an deposition of sediment. As a basis for understanding this concept:**									
a. *Students know* water running downhill is the dominant process in shaping the landscape, including California's landscape.							**XX**		**X**

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b. *Students know* rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.				**X**			**XX**		
c. *Students know* beaches are dynamic systems in which the sand is supplied by rivers and moved along the coast by the action of waves.						**X**	**XX**		
d. *Students know* earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.		**XX**					**XX**		
Heat (Thermal Energy) (Physical Science) **3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:**									
a. *Students know* 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.		**XX**	**XX**			**XX**			
b. *Students know* that when fuel is consumed, most of the energy released becomes heat energy.			**XX**						
c. *Students know* heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and by convection (which involves flow of matter).		**XX**	**XX**						
d. *Students know* heat energy is also transferred between objects by radiation (radiation can travel through space).		**XX**	**XX**						
Energy in the Earth System **4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convention currents. As a basis for understanding this concept:**									
a. *Students know* the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.	**X**		**XX**			**X**			**XX**
b. *Students know* solar energy reaches Earth through radiation, mostly in the form of visible light.	**X**		**X**						
c. *Students know* heat from Earth's interior reaches the surface primarily through convection.		**XX**							
d. *Students know* convection currents distribute heat in the atmosphere and oceans.	**XX**					**XX**			
e. *Students know* differences in pressure, heat, air movement, and humidity result in changes of weather.	**XX**								

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Ecology (Life Science) **5. Organisms in ecosystems exhange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:**									
a. *Students know* energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.						**XX**			
b. *Students know* matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.						**XX**			
c. *Students know* populations of organisms can be categorized by the functions they serve in an ecosystem.						**XX**			
d. *Students know* different kinds of organisms may play similar ecological roles in similar biomes.						**X**			
e. *Students know* the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.						**X**			
Resources **6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept:**									
a. *Students know* the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process.			**XX**						
b. *Students know* different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.			**XX**		**XX**			**X**	**XX**
c. *Students know* the natural origin of the materials used to make common objects.			**XX**		**XX**				
Investigation and Experimentation **7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three standards, students should develop their own questions and perform investigations. Students will:**									
a. Develop a hypothesis.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**

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b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
d. Communicate the steps and results from an investigation in written reports and oral presentations.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
e. Recognize whether evidence is consistent with a proposed explanation.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
f. Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.			**X**	**XX**	**X**		**XX**	**XX**	
g. Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions).	**X**			**XX**			**XX**		
h. Identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hill slope).	**XX**	**X**	**X**				**X**	**XX**	**X**
Grade 7 - Focus on Life Science **Earth and Life History (Earth Science)** **4. Evidence from rocks allows us to understand the evolution of life on Earth. As a basis for understanding this concept:**									
a. *Students know* 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.		**XX**	**X**	**X**	**X**	**X**	**XX**	**XX**	**X**
b. *Students know* the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids.		**XX**		**XX**					
c. *Students know* that the rock cycle includes the formation of new sediment and rocks and that rocks are often found in layers, with the oldest generally on the bottom.		**X**		**X**			**XX**		
d. *Students know* that evidence from geologic layers and radioactive dating indicates Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years.				**XX**					
e. *Students know* fossils provide evidence of how life and environmental conditions have changed.				**XX**					

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f. *Students know* how movements of Earth's continental and oceanic plates through time, with associated changes in climate and geographic connections, have affected the past and present distribution of organisms.		**XX**		**XX**					
g. *Students know* how to explain significant developments and extinctions of plant and animal life on the geologic time scale.				**XX**					
Investigation and Experimentation **7. Scientific progress is made by asking meaningul questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:**									
a. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
b. Use a variety of print and electronic resources (including the World Wide Web) to collect information and evidence as part of a research project.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
c. Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
d. Construct scale models, maps, and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
e. Communicate the steps and results from an investigation in written reports and oral presentations.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
Grade 8 - Focus on Physical Science **Earth in the Solar System (Earth Science)** **4. The structure and composition of the universe can be learned from studying stars and galaxies and their evolution. As a basis for understanding this concept:**									
a. *Students know* galaxies are clusters of billions of stars and may have different shapes.									
b. *Students know* that the Sun is one of many stars in the Milky Way galaxy and that stars may differ in size, temperature, and color.									
c. *Students know* how to use astronomical units and light years as measures of distances between the Sun, stars, and Earth.									

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d. *Students know* that 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.									
e. *Students know* the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.									
Investigation and Experimentation **9. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:**									
a. Plan and conduct a scientific investigation to test a hypothesis.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
b. Evaluate the accuracy and reproducibility of data.	**XX**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
c. Distinguish between variable and controlled parameters in a test.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
d. Recognize the slope of the linear graph as the constant in the relationship yÊ =Ê *kx* and apply this principle in interpreting graphs constructed from data.		**X**	**X**		**X**			**X**	
e. Construct appropriate graphs from data and develop quantitative statements about the relationships between variables.	**XX**	**XX**	**XX**	**X**	**X**	**XX**	**X**	**X**	**X**
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 ´ area, volume = area ´	**XX**	**XX**	**X**	**X**	**XX**	**X**	**X**	**X**	**XX**
g. Distinguish between linear and nonlinear relationships on a graph of data.	**X**	**X**	**X**		**X**			**X**	