

## Earth Science CR

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
9.3	Earth and Space Science		
9.3.1	Earth Structure and Processes		
9.3.1.1	The relationships among earthquakes, mountains, volcanoes, fossil deposits, rock layers and ocean features provide evidence for the theory of plate tectonics.		
9.3.1.1.1	Compare and contrast the interaction of tectonic plates at convergent and divergent boundaries.	Unit 4: The Interior of the Earth	Section 1: Plate Tectonics
9.3.1.1.2	Use modern earthquake data to explain how seismic activity is evidence for the process of subduction.		
9.3.1.1.3	Describe how the pattern of magnetic reversals and rock ages on both sides of a mid-ocean ridge provides evidence of sea-floor spreading.	Unit 4: The Interior of the Earth	Section 1: Plate Tectonics
9.3.1.1.4	Explain how the rock record provides evidence for plate movement.	Unit 4: The Interior of the Earth	Section 1: Plate Tectonics
9.3.1.1.5	Describe how experimental and observational evidence led to the theory of plate tectonics.	Unit 4: The Interior of the Earth	Section 1: Plate Tectonics
9.3.1.3	By observing rock sequences and using fossils to correlate the sequences at various locations, geologic events can be inferred and geologic time can be estimated.		
9.3.1.3.1	Use relative dating techniques to explain how the structure of the Earth and life on Earth has changed over short and long periods of time.	Unit 6: Geologic Time, Relative Age Dating, and Absolute Age Dating	Section 1: Geologic Time and Ordering Events Section 2: Relative Time, Fossils, Rocks, and Faunal Succession

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9.3.1.3.2	Cite evidence from the rock record for changes in the composition of the global atmosphere as life evolved on Earth.		
9.3.2	Interdependence Within the Earth System		
9.3.2.1	The Earth system has internal and external sources of energy, which produce heat and drive the motion of material in the oceans, atmosphere and solid earth.		
9.3.2.1.1	Compare and contrast the energy sources of the Earth, including the sun, the decay of radioactive isotopes and gravitational energy.	Unit 3: Surface of the Earth	Section 3: Erosion
		Unit 7: Atmosphere and Climate	Section 2: Heat, Temperature, and Pressure Section 3: Heating the Atmosphere
9.3.2.1.2	Explain how the outward transfer of Earth's internal heat drives the convection circulation in the mantle to move tectonic plates.	Unit 4: The Interior of the Earth	Section 1: Plate Tectonics
9.3.2.2	Global climate is determined by distribution of energy from the sun at the Earth's surface.		
9.3.2.2.1	Explain how Earth's rotation, ocean currents, configuration of mountain ranges, and composition of the atmosphere influence the absorption and distribution of energy, which contributes to global climatic patterns.	Unit 5: The World's Water	Section 2: Ocean Movement
		Unit 7: Atmosphere and Climate	Section 2: Heat, Temperature, and Pressure Section 3: Heating the Atmosphere
		Unit 8: The World of Weather	Section 1: Wind
9.3.2.2.2	Explain how evidence from the geologic record, including ice core samples, indicates that climate changes have occurred at varying rates over geologic time and continue to occur today.	Unit 7: Atmosphere and Climate	Section 2: Heat, Temperature, and Pressure Section 3: Heating the Atmosphere

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9.3.2.3	Material in the Earth system cycles through different reservoirs, and is powered by the Earth's sources of energy.		
9.3.2.3.1	Trace the cyclical movement of carbon, oxygen and nitrogen through the lithosphere, hydrosphere, atmosphere and biosphere.	Unit 6: Geologic Time, Relative Age Dating, and Absolute Age Dating	Section 3: Geologic Time and Radiometric Dating (carbon only)
		Unit 7: Atmosphere and Climate	Section 1: Structure of Atmosphere (nitrogen only)
9.3.3	The Universe		
9.3.3.2	The solar system, sun, and Earth formed over billions of years.		
9.3.3.2.1	Describe how the solar system formed from a nebular cloud of dust and gas 4.6 billion years ago.		
9.3.3.2.2	Explain how the Earth evolved into its present habitable form through interactions among the solid earth, the oceans, the atmosphere and organisms.	Unit 5: The World's Water	Section 2: Ocean Movement
		Unit 7: Atmosphere and Climate	Section 1: Structure of Atmosphere
9.3.3.2.3	Compare and contrast the environmental conditions that make life possible on Earth with conditions found on the other planets and moons of our solar system.	Unit 7: Atmosphere and Climate	Section 1: Structure of Atmosphere
		Unit 10: Astronomy	Section 2: Astronomical Distances
9.3.3.3	The big bang theory states that the universe expanded from a hot, dense chaotic mass, after which elements formed and clumped together to eventually form stars and galaxies.		
9.3.3.3.1	Explain how evidence is used to understand the composition, early history and expansion of the universe.	Unit 10: Astronomy	Section 2: Astronomical Distances
9.3.3.3.2	Explain how gravitational clumping leads to nuclear fusion, producing energy and the chemical elements of a star.	Unit 7: Atmosphere and Climate	Section 3: Heating the Atmosphere
		Unit 10: Astronomy	Section 2: Astronomical Distances

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9.3.4	Human Interactions with the Earth System		
9.3.4.1	People consider potential benefits, costs and risks to make decisions on how they interact with natural systems.		
9.3.4.1.1	Analyze the benefits, costs, risks and tradeoffs associated with natural hazards, including the selection of land use and engineering mitigation.		
9.3.4.1.2	Explain how human activity and natural processes are altering the hydrosphere, biosphere, lithosphere and atmosphere, including pollution, topography and climate.	Unit 5: The World's Water	Section 3: Oceanography
		Unit 7: Atmosphere and Climate	Section 2: Heat, Temperature, and Pressure
			Section 3: Heating the Atmosphere
		Unit 9: Earth's Environment	Section 1: Energy Flow Section 2: Land and Air Pollution