



Alignment Document

State of Texas And Aventa Learning Earth Science

Earth Science 2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
112.44	Environmental Systems		
0	Scientific processes.		
112.44.1	The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.		
112.44.1.A	demonstrate safe practices during field and laboratory investigations;		
112.44.1.B	make wise choices in the use and conservation of resources and the disposal or recycling of materials.		
112.44.2	The student uses scientific methods during field and laboratory investigations.		
112.44.2.A	plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;		
112.44.2.B	collect data and make measurements with precision;		
112.44.2.C	organize, analyze, evaluate, make inferences, and predict trends from data;		
112.44.2.D	communicate valid conclusions.		
112.44.3	The student uses critical thinking and scientific problem solving to make informed decisions.		



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112.44.3.A	analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;		
112.44.3.B	make responsible choices in selecting everyday products and services using scientific information;		
112.44.3.C	evaluate the impact of research on scientific thought, society, and the environment;		
112.44.3.D	describe the connection between environmental science and future careers;		
112.44.3.E	research and describe the history of environmental science and contributions of scientists.		
0	Science concepts.		
112.44.4	The student knows the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes.		
112.44.4.A	identify indigenous plants and animals, assess their role within an ecosystem, and compare them to plants and animals in other ecosystems and biomes;		
112.44.4.B	make observations and compile data about fluctuations in abiotic cycles and evaluate the effects of abiotic factors on local ecosystems and biomes;		
112.44.4.C	evaluate the impact of human activity such as methods of pest control, hydroponics, organic gardening, or farming on ecosystems;		
112.44.4.D	predict how the introduction, removal, or reintroduction of an organism may alter the food chain and affect existing populations;		
112.44.4.E	predict changes that may occur in an ecosystem if biodiversity is increased or reduced.		
112.44.5	The student knows the interrelationships among the resources within the local environmental system.		
112.44.5.A	summarize methods of land use and management;		
112.44.5.B	identify source, use, quality, and conservation of water;		



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112.44.5.C	document the use and conservation of both renewable and non-renewable resources;		
112.44.5.D	identify renewable and non-renewable resources that must come from outside an ecosystem such as food, water, lumber, and energy;		
112.44.5.E	analyze and evaluate the economic significance and interdependence of components of the environmental system;		
112.44.5.F	evaluate the impact of human activity and technology on land fertility and aquatic viability.		
112.44.6	The student knows the sources and flow of energy through an environmental system.		
112.44.6.A	summarize forms and sources of energy;		
112.44.6.B	explain the flow of energy in an ecosystem;		
112.44.6.C	investigate and explain the effects of energy transformations within an ecosystem;		
112.44.6.D	investigate and identify energy interactions in an ecosystem.		
112.44.7	The student knows the relationship between carrying capacity and changes in populations and ecosystems.		
112.44.7.A	relate carrying capacity to population dynamics;		
112.44.7.B	calculate exponential growth of populations;		
112.44.7.C	evaluate the depletion of non-renewable resources and propose alternatives;		
112.44.7.D	analyze and make predictions about the impact on populations of geographic locales, natural events, diseases, and birth and death rates.		
112.44.8	The student knows that environments change.		
112.44.8.A	analyze and describe the effects on environments of events such as fires, hurricanes, deforestation, mining, population growth, and municipal development;		
112.44.8.B	explain how regional changes in the environment may have a global effect;		
112.44.8.C	describe how communities have restored an ecosystem;		
112.44.8.D	examine and describe a habitat restoration or protection program.		



112.48	Astronomy		
0	Scientific processes.		
112.48.1	The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.		
112.48.1.A	demonstrate safe practices during field and laboratory investigations;		
112.48.1.B	make wise choices in the use and conservation of resources and the disposal or recycling of materials.		
112.48.2	The student uses scientific methods during field and laboratory investigations.		
112.48.2.A	plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;		
112.48.2.B	collect data and make measurements with precision;		
112.48.2.C	organize, analyze, evaluate, make inferences, and predict trends from data;		
112.48.2.D	communicate valid conclusions.		
112.48.3	The student uses critical thinking and scientific problem solving skills to make informed decisions.		
112.48.3.A	analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;		
112.48.3.B	draw inferences based on data related to promotional materials for products and services;		
112.48.3.C	evaluate the impact of research on scientific thought, society, and the environment;		
112.48.3.D	describe the connection between astronomy and future careers;	Planet Earth	Astronomy
		Planet Earth	Earth Science Career Paths
		Earth and Space	Exploring Space
112.48.3.E	research and describe the history of astronomy and contributions of scientists.	Planet Earth	Astronomy



0	Science concepts.		
112.48.4	The student knows scientific information about the universe.		
112.48.4.A	observe and record data about lunar phases and uses that information to model the earth, moon, and sun system;		
112.48.4.B	describe characteristics of galaxies.		
112.48.5	The student knows the scientific theories of the evolution of the universe.		
112.48.5.A	research and analyze scientific empirical data on the estimated age of the universe;		
112.48.5.B	research and describe the historical development of the Big Bang Theory;		
112.48.5.C	interpret data concerning the formation of galaxies and our solar system.		
112.48.6	The student knows the characteristics and the life cycle of stars.		
112.48.6.A	describe nuclear reactions in stars;		
112.48.6.B	identify the characteristics of stars such as temperature, age, relative size, composition, and radial velocity using spectral analysis;	Earth and Space	The Solar System and the Universe
112.48.6.C	identify the stages in the life cycle of stars by examining the Hertzsprung-Russell diagram.		
112.48.7	The student knows how mathematical models, computer simulations, and exploration can be used to study the universe.		
112.48.7.A	demonstrate the use of units of measurement in astronomy such as light year and Astronomical Units;	Earth and Space	The Solar System and the Universe
112.48.7.B	research and describe the historical development of the laws of universal gravitation and planetary motion and the theory of special relativity;		
112.48.7.C	analyze a model that simulates planetary motion and universal gravitation;		
112.48.7.D	identify the historical origins of the perceived patterns of constellations and their role in ancient and modern navigation;		
112.48.7.E	analyze the impact of the space program on the collection of data about the Earth and the universe.	Earth and Space	Exploring Space



112.48.8	The student knows the role of the Sun in our solar system.		
112.48.8.A	identify the approximate mass, size, motion, temperature, structure, and composition of the Sun;	Earth and Space	The Solar System and the Universe
112.48.8.B	identify the source of energy within the Sun and explain that the Sun is the major source of energy for the Earth;	Earth and Space	The Solar System and the Universe
112.48.8.C	describe the Sun's effects on the Earth.	Planet Earth	Earth as a Complex System
		Changes in the Atmosphere	Heating the Atmosphere
112.48.9	The student knows that planets of different size, composition, and surface features orbit around the Sun.		
112.48.9.A	observe the night-time sky to determine movement of the planets relative to stars;		
112.48.9.B	compare the planets in terms of orbit, size, composition, rotation, atmosphere, moons, and geologic activity;	Earth and Space	The Solar System and the Universe
112.48.9.C	identify objects, other than planets, that orbit the Sun;	Earth and Space	The Solar System and the Universe
112.48.9.D	relate the role of gravitation to the motion of the planets around the Sun and to the motion of moons and satellites around the planets.		
112.48.10	The student knows how life on Earth is affected by its unique placement and orientation in our solar system.		
112.48.10.A	compare the factors essential to life on Earth such as temperature, water, mass, and gases to conditions on other planets;	Earth and Space	The Solar System and the Universe
112.48.10.B	determine the effects of the Earth's rotation, revolution, and tilt on its environment;	Earth and Space	Earth and the Moon
112.48.10.C	identify the effects of the moon on tides.	Earth and Space	Earth and the Moon
112.49	Geology, Meteorology, and Oceanography		
0	Scientific processes.		
112.49.1	The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.		
112.49.1.A	demonstrate safe practices during field and laboratory investigations;		
112.49.1.B	make wise choices in the use and conservation of resources and the disposal or recycling of materials.		



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112.49.2	The student uses scientific methods during field and laboratory investigations.		
112.49.2.A	plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;		
112.49.2.B	collect data and make measurements with precision;		
112.49.2.C	organize, analyze, evaluate, make inferences, and predict trends from data;		
112.49.2.D	communicate valid conclusions.		
112.49.3	The student uses critical thinking and scientific problem solving to make informed decisions.		
112.49.3.A	analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;		
112.49.3.B	draw inferences based on data related to promotional materials for products and services;		
112.49.3.D	describe the connections between geology, meteorology, oceanography, and future careers;	Planet Earth	Earth Science Career Paths
		Planet Earth	Oceanography
		Planet Earth	Meteorologists
112.49.3.E	research and describe the history of geology, meteorology, oceanography, and contributions of scientists.		
0	Science concepts.		
112.49.4	The student knows the Earth's unique characteristics and conditions.		
112.49.4.A	research and describe the Earth's unique placement in the solar system;		
112.49.4.B	analyze conditions on Earth that enable organisms to survive.		
112.49.5	The student knows about the formation and history of the Earth.		
112.49.5.A	research and describe the historical development of scientific theories of the Earth's formation;		
112.49.5.B	use current theories to design and construct a geologic time scale.		



112.49.6	The student knows the processes of plate tectonics.		
112.49.6.A	research and describe the historical development of the theories of plate tectonics including continental drift and sea-floor spreading;	Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Internal structure of the Earth
112.49.6.B	analyze the processes that power the movement of the Earth's continental and oceanic plates and identify the effects of this movement including faulting, folding, earthquakes, and volcanic activity;	Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Earthquake activity
		Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Volcanism
		Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Earthquakes
		Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Deformation
112.49.6.C	analyze methods of tracking continental and oceanic plate movement.		
112.49.7	The student knows the origin and composition of minerals and rocks and the significance of the rock cycle.		
112.49.7.A	demonstrate the density, hardness, streak, and cleavage of particular minerals;	Minerals, Rocks, and the Rock Cycle	Identifying Minerals
112.49.7.B	identify common minerals and describe their economic significance;		
112.49.7.C	classify rocks according to how they are formed during a rock cycle;	Minerals, Rocks, and the Rock Cycle	Minerals, Rocks, and the Rock Cycle
		Minerals, Rocks, and the Rock Cycle	The Rock Cycle



112.49.7.D	examine and describe conditions such as depth of formation, rate of cooling, and mineral composition that are factors in the formation of rock types.		
112.49.8	The student knows the processes and end products of weathering.		
112.49.8.A	distinguish chemical from mechanical weathering and identify the role of weathering agents such as wind, water, and gravity;	Weathering, Erosion, and Deposition	Weathering and Erosion
112.49.8.B	identify geologic formations that result from differing weathering processes;	Weathering, Erosion, and Deposition	Erosion, Deposition, and Landscape Development
112.49.8.C	illustrate the role of weathering in soil formation.	Weathering, Erosion, and Deposition	Weathering and Erosion
112.49.9	The student knows the role of natural energy resources.		
112.49.9.A	research and describe the origin of fossil fuels such as coal, oil, and natural gas;		
112.49.9.B	analyze issues regarding the use of fossil fuels and other renewable, non-renewable, or alternative energy resources;		
112.49.9.C	analyze the significance and economic impact of the use of fossil fuels and alternative energy resources.		
112.49.10	The student knows the interactions that occur in a watershed.		
112.49.10.A	identify the characteristics of a local watershed such as average annual rainfall, run-off patterns, aquifers, locations of river basins, and surface water reservoirs;		
112.49.10.B	analyze the impact of floods, droughts, irrigation, and industrialization on a watershed;		
112.49.10.C	describe the importance and sources of surface and subsurface water.		
112.49.11	The student knows characteristics of oceans.		
112.49.11.A	identify physical characteristics of ocean water including salinity, solubility, heat capacity, colligative properties, and density;		
112.49.11.B	evaluate the effects of tides, tidal bores, and tsunamis;		
112.49.11.C	compare the topography of the ocean floor to the topography of the continents.		



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112.49.12	The student knows the characteristics of the atmosphere.		
112.49.12.A	identify the atmosphere as a mixture of gases, water vapor, and particulate matter;	The History of Earth and the Atmosphere	The Atmosphere
112.49.12.B	analyze the range of atmospheric conditions that organisms will tolerate including types of gases, temperature, particulate matter, and moisture;		
112.49.12.C	determine the impact on the atmosphere of natural events and human activity.	The History of Earth and the Atmosphere	The Atmosphere
112.49.13	The student knows the role of energy in governing weather and climate.		
112.49.13.A	describe the transfer of heat energy at the boundaries between the atmosphere, land masses, and oceans resulting in layers of different temperatures and densities in both the ocean and atmosphere;		
112.49.13.B	identify, describe, and compare climatic zones;		
112.49.13.C	describe the effects of phenomena such as El Niño and the Jet Stream on local weather.	Changes in the Atmosphere	Wind