Earth and Space Standards and Benchmarks

Standard 1: Understands and applies principles of scientific inquiry				
Concepts: Scientific Reasoning, Conducting Scientific Investigations, Safety				
Course Level Benchmarks	**Vocabulary**	**Knowledge**	**Skills**	**Classroom Resources**
A. Formulates and revises scientific explanations and models	• scientific explanation • scientific model • data • within tolerance • scientific method	• Knows scientific explanations and models are based on data • Know new data may lead to the modification of scientific explanations and models	• Analyzes data with respect to scientific explanations and models • Adjusts scientific explanations and models based on data	Earth and Space Curriculum Guide Emphasized throughout the entire curriculum
B. Understands how scientific knowledge changes with new evidence	• scientific knowledge • evidence • influence	• Knows examples of scientific knowledge that changed when new evidence was presented • Knows that science is an ongoing process and is always open to new ideas	• Describes how earth science concepts have evolved with the discovery of new evidence • Hypothesizes how current earth science concepts and practices will influence future societies	
C. Uses technology and mathematics to perform accurate scientific investigations and communications	• technology • mathematics • accuracy • scientific investigations • scientific communication	• Knows how technology can help scientific investigations and communications • Knows mathematical computations and formulas are essential to scientific investigations	• Determines technologies most appropriate to use given a particular situation • Uses the necessary mathematics for a particular situation • Calculates results with a given degree of accuracy	
D. Demonstrates safe handling procedures	• OSHA • EPA • MSDS • Right to Know • hazardous • safety procedures	• Knows appropriate safety procedures for a given situation • Knows where safety devices are located in the classroom • Understands the process of waste disposal	• Follows required safety procedures • Recognizes, reports, and corrects safety problems • Follows waste disposal procedures	

Earth and Space Standards and Benchmarks

Standard 2: Understands and applies principles of earth science				
Concepts: Descriptive Earth				
Course Level Benchmarks	**Vocabulary**	**Knowledge**	**Skills**	**Classroom Resources**
A. Examines the structure and composition of the Earth **1. Rocks and Minerals**	**Rocks and Minerals** • mineral • inorganic • crystal • streak • luster • Mohs hardness scale • cleavage • fracture • igneous rocks • sedimentary rocks • metamorphic rocks • fossils • geologic history • decay rates	**Rocks and Minerals** • Knows geologic history can be reconstructed by observing sequences of rock types and fossils to correlate bedrock at various times • Knows fossils preserved in rocks provide information about past environmental conditions • Understands how the major classes of rock form • Understands how rocks can change from one class to another	**Rocks and Minerals** • Explains the properties of rocks based on the physical and chemical conditions in which they formed • Investigates layering as a process of determining the earth's origin • Explains the fluidity of the rock cycle • Recognizes rock texture and mineral composition of rocks • Describes the characteristics of a mineral • Identifies mineral specimens	Earth and Space Curriculum Guide Geological Timetable

Earth and Space Standards and Benchmarks

Standard 2: Understands and applies principles of earth science				
Concepts: Descriptive Earth				
Course Level Benchmarks	**Vocabulary**	**Knowledge**	**Skills**	**Classroom Resources**
A. Examines the structure and composition of the Earth (con't) **2. Chemistry**	**Chemistry** • element • compound • physical properties • chemical properties • phase change • energy	**Chemistry** • Knows substances can be described by their physical and chemical properties • Knows energy ca be absorbed or released by a substance	**Chemistry** • Explains how a chemical change differs from a physical change • Illustrates how energy is added or removed in a substance by changing its temperature	Earth and Space Curriculum Guide
3. Interior of the Earth	**Interior of Earth** • crust • mantle • inner core • outer core • lithosphere • asthenosphere • mesosphere • convection	**Interior of Earth** • Knows the core, mantle, and crust of the Earth are dynamic systems constantly in motion • Understands our knowledge about the interior of the Earth is gathered through indirect measures	**Interior of Earth** • Names the major divisions of the Earth's structure as physical areas and chemical areas • Explains physical and chemical characteristics of the inter layers of the Earth	

Earth and Space Standards and Benchmarks

Standard 2: Understands and applies principles of earth science (con't)				
Concepts: Earth Processes				
Course Level Benchmarks	**Vocabulary**	**Knowledge**	**Skills**	**Classroom Resources**
B. Investigates processes that shape and change the Earth **1. Plate Tectonics**	**Plate Tectonics** • tectonic plates • continental drift • sea-floor spreading • convergent boundary • divergent boundary • transform boundary • deformation • compression • tension • folding • fault • uplift • mountain building	**Plate Tectonics** • Knows plate tectonics operating over geologic time has changed the patterns of land, sea, and mountains on the Earth's surface • Knows the features of the ocean floor provide evidence of plate tectonics	**Plate Tectonics** • Uses the theory of plate tectonics to explain the relationship among earthquakes, volcanoes, and plat boundaries • Explains how plate tectonics is involved in changing the Earth's surface	Earth and Space Curriculum Guide Mapping Skills
2. Earthquakes	**Earthquakes** • seismology • seismic waves • P waves • S waves • epicenter • focus • Richter Scale • tsunami	**Earthquakes** • Knows earthquakes are the result of relative motion along plate boundaries • Understands how earthquakes present geologic hazards to humans and the environment • Understands seismic wave data is used to determine the epicenter of an earthquake	**Earthquakes** • Explains why and how earthquakes occur and the scales used to measure their intensity and magnitude • Explains the impact earthquakes have on the Earth' surface and living organisms	Mapping Skills

Earth and Space Standards and Benchmarks

Standard 2: Understands and applies principles of earth science (con't)				
Concepts: Earth Processes				
Course Level Benchmarks	**Vocabulary**	**Knowledge**	**Skills**	**Classroom Resources**
B. Investigates processes that shape and change the Earth (con't)				Earth and Space Curriculum Guide
3. Volcanoes	**Volcanoes** • volcanoes • lava • magma • magma chamber • vents • crater • caldera • rift zone • hot spots • Mid Atlantic rift • ring of fire	**Volcanoes** • Knows volcanoes are the result of relative motion along plate boundaries • Understands how volcanoes present geologic hazards to humans and the environment	**Volcanoes** • Explains the impact volcanoes have on the Earth' surface and living organisms • Compares/contrasts the different types of eruptions and materials from volcanic activity • Relates volcanic activity to certain areas of the world	Mapping Skills
4. Weathering/Erosion	**Weathering/Erosion** • physical weathering • chemical weathering • weathering • erosion • deposition	**Weathering/Erosion** • Knows weathering and erosion are interrelated processes • Knows the more surface area exposed to weathering the faster the rock will wear down • Knows weathering occurs faster in warm, humid climates and at higher elevations	**Weathering/Erosion** • Distinguishes between physical and chemical weathering • Identifies the factors that affect rates of weathering • Analyzes weathering as a type of erosion	Topography Skills

Earth and Space Standards and Benchmarks

Standard 2: Understands and applies principles of earth science (con't)				
Concepts: The Universe				
Course Level Benchmarks	**Vocabulary**	**Knowledge**	**Skills**	**Classroom Resources**
C. Explores the components and dynamics of the universe				Earth and Space Curriculum Guide
1. Earth and Moon	**Earth and Moon** • rotation • revolution • axis • tilt • orbit • phases of the moon • eclipse • geology	**Earth and Moon** • Knows the Earth moves in two ways – revolves and rotates • Knows the motion of the Earth has affects on magnetic forces, weather, day and night • Knows the motion of the moon has effects on the Earth	**Earth and Moon** • Describes the rotation and revolution of the Earth • Explains how the tilt of the Earth affects life on the planet • Explains how the motion of the moon affects the view of the moon from Earth	Geological Timeline
2. Sun and Solar System	**Sun and Solar System** • fusion • solar system • revolution • rotation • gravity • inertia • asteroid • meteoroid • comet	**Sun and Solar System** • Knows the sun provides energy to living things • Knows planets move in two ways – revolves and rotates • Knows our solar system is located in the Milky Way	**Sun and Solar System** • Explains how energy is produced in the sun • Explains the theories of the origin of the solar system • Describes planetary motion in terms of revolution and rotation • Compares characteristics of the inner and outer planets	

Earth and Space Standards and Benchmarks

Standard 2: Understands and applies principles of earth science (con't)				
Concepts: The Universe				
Course Level Benchmarks	**Vocabulary**	**Knowledge**	**Skills**	**Classroom Resources**
C. Explores the components and dynamics of the universe (con't) **3. Stars and Galaxies**	**Stars and Galaxies** • galaxy • quasars • pulsars • neutron stars • black holes • pulsating stars	**Stars and Galaxies** • Understands the universe will likely expand forever • Knows stars are classified by their characteristics – color, temperature, size, composition, and brightness	**Stars and Galaxies** • Describes the nature and dimensions of our galaxy • Explains the theories of the origin of the universe • Describes the life cycle of a star	Earth and Space Curriculum Guide