



Alignment Document
State of Pennsylvania
And
Aventa Learning Earth Science Grades 8-10

Earth Science Grades 8-10
 2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
3.1.10	Unifying Themes		
3.1.10.A	Discriminate among the concepts of systems, subsystems, feedback and control in solving technological problems.		
3.1.10.A.1	Identify the function of subsystems within a larger system (e.g., role of thermostat in an engine, pressure switch).		
3.1.10.A.2	Describe the interrelationships among inputs, processes, outputs, feedback and control in specific systems.		
3.1.10.A.3	Explain the concept of system redesign and apply it to improve technological systems.		
3.1.10.A.4	Apply the universal systems model to illustrate specific solutions and troubleshoot specific problems.		
3.1.10.A.5	Analyze and describe the effectiveness of systems to solve specific problems.		
3.1.10.B	Describe concepts of models as a way to predict and understand science and technology.		
3.1.10.B.1	Distinguish between different types of models and modeling techniques and apply their appropriate use in specific applications (e.g., kinetic gas theory, DNA).		

3.1.10.B.2	Examine the advantages of using models to demonstrate processes and outcomes (e.g., blue print analysis, structural stability).		
3.1.10.B.3	Apply mathematical models to science and technology.		
3.1.10.C	Apply patterns as repeated processes or recurring elements in science and technology.		
3.1.10.C.1	Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order.		
3.1.10.C.2	Examine and describe stationary physical patterns.		
3.1.10.C.3	Examine and describe physical patterns in motion.		
3.1.10.D	Apply scale as a way of relating concepts and ideas to one another by some measure.		
3.1.10.D.1	Apply dimensional analysis and scale as a ratio.		
3.1.10.D.2	Convert one scale to another.		
3.1.10.E	Describe patterns of change in nature, physical and man made systems.		
3.1.10.E.1	Describe how fundamental science and technology concepts are used to solve practical problems (e.g., momentum, Newton's laws of universal gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, gas laws, feedback systems).		
3.1.10.E.2	Recognize that stable systems often involve underlying dynamic changes (e.g., a chemical reaction at equilibrium has molecules reforming continuously).		
3.1.10.E.3	Describe the effects of error in measurements.		
3.1.10.E.4	Describe changes to matter caused by heat, cold, light or chemicals using a rate function.		

3.2.10	Inquiry and Design		
3.2.10.A	Apply knowledge and understanding about the nature of scientific and technological knowledge.		
3.2.10.A.1	Compare and contrast scientific theories and beliefs.	Planet Earth	Astronomy
3.2.10.A.2	Know that science uses both direct and indirect observation means to study the world and the universe.	Earth and Space	The Solar System and the Universe
3.2.10.A.3	Integrate new information into existing theories and explain implied results.		
3.2.10.B	Apply process knowledge and organize scientific and technological phenomena in varied ways.		
3.2.10.B.1	Describe materials using precise quantitative and qualitative skills based on observations.		
3.2.10.B.2	Develop appropriate scientific experiments: raising questions, formulating hypotheses, testing, controlled experiments, recognizing variables, manipulating variables, interpreting data, and producing solutions.	Planet Earth	Steps of the Scientific Method
3.2.10.B.3	Use process skills to make inferences and predictions using collected information and to communicate, using space / time relationships, defining operationally.		
3.2.10.C	Apply the elements of scientific inquiry to solve problems.		
3.2.10.C.1	Generate questions about objects, organisms and/or events that can be answered through scientific investigations.		
3.2.10.C.2	Evaluate the appropriateness of questions.		
3.2.10.C.3	Design an investigation with adequate control and limited variables to investigate a question.		
3.2.10.C.4	Conduct a multiple step experiment		
3.2.10.C.5	Organize experimental information using a variety of analytic methods.		



3.2.10.C.6	Judge the significance of experimental information in answering the question.		
3.2.10.C.7	Suggest additional steps that might be done experimentally.		
3.2.10.D	Identify and apply the technological design process to solve problems.		
3.2.10.D.1	Examine the problem, rank all necessary information and all questions that must be answered.		
3.2.10.D.2	Propose and analyze a solution.		
3.2.10.D.3	Implement the solution.		
3.2.10.D.4	Evaluate the solution, test, redesign and improve as necessary.		
3.2.10.D.5	Communicate the process and evaluate and present the impacts of the solution.		
3.5.10	Earth Sciences		
3.5.10.A	Relate earth features and processes that change the earth.	Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Internal Structure of the Earth
		Weathering, Erosion, and Deposition	Weathering and Erosion
3.5.10.A.1	Illustrate and explain plate tectonics as the mechanism of continental movement and sea floor changes.	Planet Earth	Earth as a Complex System
		Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Internal Structure of the Earth
3.5.10.A.2	Compare examples of change to the earth's surface over time as they related to continental movement and ocean basin formation (e.g., Delaware, Susquehanna, Ohio Rivers system formations, dynamics).	Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Internal Structure of the Earth
3.5.10.A.3	Interpret topographic maps to identify and describe significant geologic history/structures in Pennsylvania.		
3.5.10.A.4	Evaluate and interpret geologic history using geologic maps.		
3.5.10.A.5	Explain several methods of dating earth materials and structures.	The History of Earth and the Atmosphere	The History of Earth
3.5.10.A.6	Correlate rock units with general geologic time periods in the history of the earth.	The History of Earth and the Atmosphere	The History of Earth

3.5.10.A.7	Describe and identify major types of rocks and minerals.	Minerals, Rocks, and the Rock Cycle	Identifying Minerals
		Minerals, Rocks, and the Rock Cycle	Minerals, Rocks, and the Rock Cycle
3.5.10.B	Explain sources and uses of earth resources.		
3.5.10.B.1	Compare the locations of strategic minerals and earth resources in the world with their geologic history using maps and global information systems.		
3.5.10.B.2	Demonstrate the effects of sedimentation and erosion before and after a conservation plan is implemented.		
3.5.10.B.3	Evaluate the impact of geologic activities/hazards (e.g., earthquakes, sinkholes, landslides).	Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Volcanism
		Plate Tectonics, Volcanoes, Earthquakes, and Deformation of Earth's Crust	Earthquakes
3.5.10.B.4	Evaluate land use (e.g., agricultural, recreational, residential, commercial) in Pennsylvania based upon soil characteristics.		
3.5.10.C	Interpret meteorological data.		
3.5.10.C.1	Analyze information from meteorological instruments and online sources to predict weather patterns.		
3.5.10.C.2	Describe weather and climate patterns on global levels.		
3.5.10.C.3	Evaluate specific adaptations plants and animals have made that enable them to survive in different climates.		
3.5.10.D	Assess the value of water as a resource.		
3.5.10.D.1	Compare specific sources of potable water (e.g., wells, public systems, rivers) used by people in Pennsylvania.		
3.5.10.D.2	Identify the components of a municipal/agricultural water supply system and a wastewater treatment system.		



3.5.10.D.3	Relate aquatic life to water conditions (e.g., turbidity, temperature, salinity, dissolved oxygen, nitrogen levels, pressure).		
3.5.10.D.4	Compare commercially important aquatic species in or near Pennsylvania.		
3.5.10.D.5	Identify economic resources found in marine areas.		
3.5.10.D.6	Assess the natural and man-made factors that affect the availability of clean water (e.g., rock and mineral deposits, man-made pollution).		