

Middlesex County Schools Curriculum Pacing Guide

Grade/Course Earth Science

School Year _____

2009-2010

Time Frame	Unit/SOLs	SOL #	Strand
4 wks	<p style="text-align: center;">Meteorology</p> <p>12a) scientific evidence for atmospheric changes over geologic time 12b) current theories related to the effects of early life on the chemical makeup of the atmosphere 12c) comparison of the Earth's atmosphere to that of other planets 12d) atmospheric regulation mechanisms including the effects of density differences and energy transfer 12e) potential atmospheric compositional changes due to human, biologic, and geologic activity 13a) observation and collection of weather data 13b) prediction of weather patterns 13c) severe weather occurrences, such as tornadoes, hurricanes, and major storms 13d) weather phenomena and the factors that affect climate including radiation and convection 1a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools 1b) technologies including computers, probeware, and global positioning systems (GPS), are used to collect, analyze, and report data to demonstrate concepts and simulate experimental conditions 1c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted 1d) variables are manipulated with repeated trials 1e) a scientific viewpoint is constructed and defended (the nature of science) 2a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems 2b) evidence is required to evaluate hypotheses and explanations 2c) comparing different scientific explanations for a set of observations about the Earth 2d) explaining that observation and logic are essential for reaching a conclusion 2e) evaluating evidence for scientific theories 3a) use and interpret maps (bathymetric, geologic, topographic, and weather) and star charts 3b) use images such as aerial photography and satellite images 3c) direction and measurements of distance on any map or globe; and</p>	<p>12</p> <p>13</p> <p>1</p> <p>2</p> <p>3</p>	<p>origin and evolution of the atmosphere, interrelationship of geologic and biologic processes, and human activities on it</p> <p>energy transfer between the sun, earth, and its atmosphere drives weather and climate on Earth</p> <p>plan and conduct investigations</p> <p>demonstrate scientific reasoning and logic</p> <p>read and interpret maps, globes, models, charts, and imagery</p>
3wks	<p style="text-align: center;">Oceanography & Groundwater</p> <p>9a) processes of soil development 9b) development of karst topography 9c) identification of groundwater zones including the water table, zone of saturation, and zone of aeration 9d) identification of other sources of fresh water including rivers, springs, and aquifers, in the hydrologic cycle 9e) dependence on freshwater resources and the effects of human usage on water quality</p>	<p>9</p> <p>11</p>	<p>investigate and understand how fresh-water resources are influenced by geologic processes and the activities of humans</p> <p>investigate and understand that oceans are complex, interactive</p>

	<p>9f) identify the major watershed systems in Virginia including the Chesapeake Bay and its tributaries</p> <p>11a) physical and chemical changes resulting in tides, waves, currents, sea level and ice cap variations, upwelling, and salinity variations</p> <p>11b) importance of environmental and geologic implications</p> <p>11c) systems interactions (density differences, energy transfer, weather, and climate)</p> <p>11d) features of the sea floor (continental margins, trenches, mid-ocean ridges, and abyssal plains) as reflections of tectonic processes</p> <p>11e) economic and public policy issues concerning the oceans and the coastal zone including the Chesapeake Bay</p> <p>1a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools</p> <p>1b) technologies including computers, probeware, and global positioning systems (GPS), are used to collect, analyze, and report data to demonstrate concepts and simulate experimental conditions</p> <p>1c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted</p> <p>1d) variables are manipulated with repeated trials</p> <p>1e) a scientific viewpoint is constructed and defended (the nature of science)</p> <p>2a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems</p> <p>2b) evidence is required to evaluate hypotheses and explanations</p> <p>2c) comparing different scientific explanations for a set of observations about the Earth</p> <p>2d) explaining that observation and logic are essential for reaching a conclusion</p> <p>2e) evaluating evidence for scientific theories</p> <p>3a) using and interpreting maps (bathymetric, geologic, topographic, and weather) and star charts</p> <p>3b) use images such as aerial photography and satellite images</p> <p>3c) direction and measurements of distance on any map or globe; and</p>		<p>physical, chemical, and biological systems and are subject to long- and short-term variations</p> <p>1 plan and conduct investigations</p> <p>2 demonstrate scientific reasoning and logic</p> <p>3 read and interpret maps, globes, models, charts, and imagery</p>
3 wks	<p style="text-align: center;">Astronomy</p> <p>4a) position of the Earth in the solar system</p> <p>4b) sun-Earth-moon relationships (seasons, tides, and eclipses)</p> <p>4c) characteristics of the sun, planets and their moons, comets, meteors, and asteroids</p> <p>4d) history and contributions of the space program</p> <p>(Benchmark include Standard 4)</p> <p>14a) nebulae</p> <p>14b) origin of stars and star systems</p> <p>14c) stellar evolution</p> <p>14d) galaxies</p> <p>14e) cosmology including the big bang theory</p> <p>1a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools</p> <p>1b) technologies including computers, probeware, and global positioning systems (GPS), are used to collect, analyze, and report data to demonstrate concepts and simulate experimental conditions</p> <p>1c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted</p>		<p>4 investigate and understand the characteristics of the Earth and the solar system</p> <p>14 investigate and understand scientific concepts related to the origin and evolution of the universe</p> <p>1 plan and conduct investigations</p>

	<p>1d) variables are manipulated with repeated trials</p> <p>1e) a scientific viewpoint is constructed and defended (the nature of science)</p> <p>2a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems</p> <p>2b) evidence is required to evaluate hypotheses and explanations</p> <p>2c) comparing different scientific explanations for a set of observations about the Earth</p> <p>2d) explaining that observation and logic are essential for reaching a conclusion</p> <p>2e) evaluating evidence for scientific theories</p>		2	demonstrate scientific reasoning and logic
2 wks	<p style="text-align: center;">Rocks & Minerals (Geology)</p> <p>5a) hardness, color and streak, luster, cleavage, fracture, and unique properties</p> <p>5b) uses of minerals</p> <p>6a) igneous (intrusive and extrusive) rocks</p> <p>6b) sedimentary (clastic and chemical) rocks</p> <p>6c) metamorphic (foliated and unfoliated) rocks</p> <p>1a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools</p> <p>1b) technologies including computers, probeware, and global positioning systems (GPS), are used to collect, analyze, and report data to demonstrate concepts and simulate experimental conditions</p> <p>1c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted</p> <p>1d) variables are manipulated with repeated trials</p> <p>1e) a scientific viewpoint is constructed and defended (the nature of science)</p> <p>2a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems</p> <p>2b) evidence is required to evaluate hypotheses and explanations</p> <p>2c) comparing different scientific explanations for a set of observations about the Earth</p> <p>2d) explaining that observation and logic are essential for reaching a conclusion</p> <p>2e) evaluating evidence for scientific theories</p>		5 6 1 2	<p>investigate and understand how to identify major rock-forming and ore minerals</p> <p>based on physical and chemical properties</p> <p>investigate and understand the rock cycle as it relates to the origin and transformation of rock types and how to identify common rock types based on mineral composition and textures</p> <p>plan and conduct investigations</p> <p>demonstrate scientific reasoning and logic</p>
2 wks	<p style="text-align: center;">Plate Tectonics/Igneous & Metamorphic Processes (Geology)</p> <p>8a) geologic processes are evidenced in the physiographic provinces of Virginia including the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateau</p> <p>8b) geologic processes (faulting, folding, volcanism, metamorphism, weathering, erosion, deposition, and sedimentation) and their resulting features</p> <p>8c) tectonic processes (subduction, rifting and sea floor spreading, and continental collision)</p> <p>1a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools</p>		8 1	<p>investigate and understand geologic processes including plate tectonics</p> <p>plan and conduct investigations</p>

	<p>1b) technologies including computers, probeware, and global positioning systems (GPS), are used to collect, analyze, and report data to demonstrate concepts and simulate experimental conditions</p> <p>1c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted</p> <p>1d) variables are manipulated with repeated trials</p> <p>1e) a scientific viewpoint is constructed and defended (the nature of science)</p> <p>2a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems</p> <p>2b) evidence is required to evaluate hypotheses and explanations</p> <p>2c) comparing different scientific explanations for a set of observations about the Earth</p> <p>2d) explaining that observation and logic are essential for reaching a conclusion</p> <p>2e) evaluating evidence for scientific theories</p> <p>3a) use and interpret maps (bathymetric, geologic, topographic, and weather) and star charts</p> <p>3b) use images such as aerial photography and satellite images</p> <p>3c) direction and measurements of distance on any map or globe; and</p> <p>3d) location by latitude and longitude and topographic profiles</p>	2	demonstrate scientific reasoning and logic
1 wk	<p style="text-align: center;">Geologic Principles (Geology)</p> <p>10a) traces and remains of ancient, often extinct, life are preserved by various means in many sedimentary rocks</p> <p>10b) superposition, cross-cutting relationships, index fossils, and radioactive decay are methods of dating bodies of rock</p> <p>10c) absolute and relative dating have different applications but can be used together to determine the age of rocks and structures</p> <p>10d) rocks and fossils from many different geologic periods and epochs are found in Virginia</p> <p>1a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools</p> <p>1b) technologies including computers, probeware, and global positioning systems (GPS), are used to collect, analyze, and report data to demonstrate concepts and simulate experimental conditions</p> <p>1c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted</p> <p>1d) variables are manipulated with repeated trials</p> <p>1e) a scientific viewpoint is constructed and defended (the nature of science)</p> <p>2a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems</p> <p>2b) evidence is required to evaluate hypotheses and explanations</p> <p>2c) comparing different scientific explanations for a set of observations about the Earth</p> <p>2d) explaining that observation and logic are essential for reaching a conclusion</p> <p>2e) evaluating evidence for scientific theories</p>	10	<p>investigate and understand that many aspects of the history and evolution of the Earth and life can be inferred by studying rocks and fossils</p> <p>1 plan and conduct investigations</p> <p>2 demonstrate scientific reasoning and logic</p>
1 wk	<p style="text-align: center;">Energy & Natural Resources (Geology)</p> <p>7a) fossil fuels, minerals, rocks, water, and vegetation</p> <p>7b) advantages and disadvantages of various energy sources</p> <p>7c) resources found in Virginia</p> <p>7d) making informed judgments related to resource use and its effects on Earth systems</p> <p>7e) environmental costs and benefits</p> <p>1a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools</p>	7	<p>investigate and understand the differences between renewable and nonrenewable resources</p> <p>1 plan and conduct investigations</p>

	<p>1b) technologies including computers, probeware, and global positioning systems (GPS), are used to collect, analyze, and report data to demonstrate concepts and simulate experimental conditions</p> <p>1c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted</p> <p>1d) variables are manipulated with repeated trials</p> <p>1e) a scientific viewpoint is constructed and defended (the nature of science)</p> <p>2a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems</p> <p>2b) evidence is required to evaluate hypotheses and explanations</p> <p>2c) comparing different scientific explanations for a set of observations about the Earth</p> <p>2d) explaining that observation and logic are essential for reaching a conclusion</p> <p>2e) evaluating evidence for scientific theories</p>	2	demonstrate scientific reasoning and logic
2 wk	SOL Review	All	