

Norton City Schools Standards-Based Science Course of Study 2003

HIGH SCHOOL ELECTIVE

GEOLOGY (USED AS A SEMESTER OR BLOCK-SCHEDULED COURSE)

Earth and Space Sciences Standard (ES)

11-12 Benchmarks	Grade Level Indicators and Sub-Objectives	Teaching Strategies/Resources
<p>By the end of the 11-12 program, the student will:</p> <p><u>Earth and Space Sciences</u></p> <ul style="list-style-type: none"> ★ Explain how technology can be used to gather evidence and increase our understanding of the universe. (ES-A) ★ Describe how Earth is made up of a series of interconnected systems and how a change in one system affects other systems. (ES-B) ★ Explain that humans are an integral part of the Earth's system and the choices humans make today impact natural systems in the future. (ES-C) ★ Summarize the historical development of scientific theories and ideas and describe emerging issues in the study of Earth and space sciences. (ES-D) 	<p>By the end of Eleventh/Twelfth Grades, the student will:</p> <p><u>Earth Systems</u></p> <ul style="list-style-type: none"> ★ Explain how interactions among Earth's lithosphere, hydrosphere, atmosphere and biosphere have resulted in the ongoing changes of the Earth's system. (ES-11-6) ★ Describe the effects of particulates and gases in the atmosphere including those originating from volcanic activity. (ES-11-7) ★ Describe the normal adjustments of Earth, which may be hazardous for humans. Recognize that humans live at the interface between the atmosphere driven by solar energy and the upper mantle where convection creates changes in Earth's solid crust. Realize that as societies have grown, become stable and come to value aspects of the environment, vulnerability to natural processes of change has increased. (ES-11-8) ★ Analyze how materials from human societies (e.g., radioactive waste and air pollution) affect both physical and chemical cycles of Earth. (ES-11-10) ★ Explain how human behavior affects the basic processes of natural ecosystems and the quality of the atmosphere, hydrosphere and lithosphere. ★ Conclude that Earth has finite resources and explain that humans deplete some resources faster than they can be renewed. (ES-11-12) ★ Describe how scientists estimate how much of a given resource is available on Earth. (ES-12-6) 	

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Historical Perspectives and Scientific Revolutions

- ★ Use historical examples to show how new ideas are limited by the context in which they are conceived; are often rejected by the social establishment; sometimes spring from unexpected findings; and usually grow slowly through contributions from many different investigators (e.g., global warming, Heliocentric Theory and Theory of Continental Drift). (ES-11-13)
- ★ Describe advances in Earth and space science that have important long-lasting effects on science and society (e.g., global warming, Heliocentric Theory and Plate Tectonics Theory). (ES-11-14)

Sub-Objectives to Meet Indicators:

Earth Origins

- Trace the formation of the earth as part of the formation of the solar system.
- Cite evidence from structures of the earth, moon, meteors, and other planets used to support theories about the early earth.

Rock Forming Processes

- Distinguish between minerals and rocks.
- Identify minerals using physical properties.
- Describe the rock cycle and trace a single atom through the rock cycle.
- Identify texture and common mineralogy of rock samples.
- Use textural and mineralogical clues to identify rocks from a key.
- Describe how the texture of igneous rock is determined by its cooling history using examples.
- Interpret the history of a metamorphic rock based upon its texture and mineralogy.
- Describe volcanoes and other igneous rock features.
- Interpret the history of sedimentary rock based on its texture and mineralogy.

Geologic Processes

- Describe each of the three types of boundaries as to geologic activities and landforms.
- Describe the plate tectonics model.
- Identify past boundaries based on landforms.

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| | <ul style="list-style-type: none">• Correlate plate boundaries with active earthquake and volcanic zones.• Describe the stress release fault-earthquake model.• Label diagrams of types of faults.• Correlate types of faults with earth forces.• Describe efforts to reduce damage and loss of life during earthquakes.• Describe how folded and fault block mountains are produced and label diagrams of each.• Identify processes and effects of weathering on rocks.• List the major forces of erosion and distinctive landforms produced by each.• Determine experimentally the factors, which influence rate of water flow and erosion.• Describe major features in rocks left by erosion of water (e.g., apply to rocks at gorge to give current direction and current strength, etc.). <p>Geologic Interpretation and Earth History</p> <ul style="list-style-type: none">• Describe fossils and model how they form.• Develop methods to determine the ages of rocks based on ranges of fossils.• Describe how rocks are correlated from one area to another.• Infer past history of rocks in an area based on fossil and textural evidence.• Describe the basis of the geologic time scale.• Distinguish between relative and absolute dating.• Discuss the basis of radioactive dating.• List the major events of history in order.• Trace the successive changes in life during earth history.• Speculate based upon evidence researched about the cause of major extinctions. | |
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