Elizabethtown Area

School District

Earth Science/Honors Earth Science

Course Number: 301/300

Length of Course: 18 weeks

Grade Level: 9 Required

Total Clock Hours: 120

Length of Period: 80 minutes

Date Written: June 11, 2007

Periods per Week/Cycle: 5

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Credits (if app.): 1

Prerequisite: None

Weighting: Honors 1.1 (2007-08)

Course Description:

In this course, units will focus on meterology (weather and climate), surface and ground-water processes, earth materials (rocks and minerals), historical geology, plate tectonics (earthquakes, volcanoes, mountain buidling) and earth's natural resources. Labs occur, along with notes and activities, that enhance student understanding of the concepts.

Honors Earth Science: This course is intended for the highly motivated student. In addition to the Earth Science course content, students will have a more in-depth study of the material with emphasis on individual research of Earth Science concepts.

Placement Criteria: Recommended minimum final average of 83% in preceding Honors Science course or recommended minimum final average of 92% in preceding core science class.

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I. Overall Course/Grade Level Standards

A. Know the layers of the atmosphere and be able to list gases composing each.
B. Explain how the atmosphere is heated and cooled.
C. Describe what tools and techniques are involved in weather forecasting.
D. List and describe the known types of bonding between atoms.
E. Identify rocks and minerals in the field.
F. Use mineral properties in identification.
G. Read and use a topographic map.
H. Recognize the sources of energy that are available to us.
I. Know how energy resources are obtained and used.
J. Know what methods of conservation and recycling can be utilized in Pennsylvania.
K. Explain how pollution is influenced by type and use of resources.
L. Describe the two methods used to date earth materials.
M. Use the basic rules to determine relative age of rock materials.
N. Interpret data from different kinds of maps to find location, elevation or geologic age.
O. Identify the effects of weathering and erosion on earth materials.
P. Calculate a water budget.
Q. Know how groundwater is affected by human activity.
R. Explain tectonic theory.
S. Recognize what surface features are associated with each type of plate boundary.
T. Describe how plate tectonics has influenced topography in Pennsylvania.
U. Recognize what hazards are associated with earthquakes and volcanoes.
V. Describe the relationships between groundwater and topography.

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Curricular Differentiation of Honors and Remedial Earth Science from On – level Earth Science

Honors: In Honors Earth Science, students are expected to read the textbook and teacher provided articles and other prepared information in order to participate in classroom discussion and more student-designed laboratory activities. Honors students are expected to complete out-of-class assignments related to class work approximately 3 times per week. Much of the rigor assigned to honors students comes in the form of extra reading (out of the text and off the internet and articles from newspapers and magazines), out-of-class assignments (research and prelab activities), and more in-depth discussion.

Remedial: In Remedial Earth Science, all curricular items designated as "compacted (C)" in priority are dropped and items designated as "important (I)" are lowered to "compacted" status as needed. Out-of-class assignments for remedial students will be limited to the completion of unfinished in-class activities and some reading activities and related worksheets to check comprehension. Also, the following "Essential (E)" item will be moved to Important priority based on ability of the students in the class; 1.) Calculation of water budgets. More test time and assistance, less rigorous questions and differentiated questions for short answer essay questions.

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II. Content

Major Areas of Study

List all units of study below:

Unit	Estimated Time	Materials
1. Meteorology	3 – 4 weeks	Textbooks, tests, videos, lab supplies, meteorlogic instruments, art supplies, worksheets, maps…
2. Earth Materials	2 – 3 weeks	Mineral specimens, rock specimens, HCl, lab supplies, art supplies, videos, textbooks, tests, worksheets, IMC….
3. Earth Resources	3 – 4 weeks	IMC, textbooks, Internet, art supplies, worksheets, lab supplies, tests, videos…
4. Historical Geology	4 weeks	Textbooks, videos, Internet, art supplies, fossil examples, worksheets, maps, tests….
5. Water Processes	2 – 3 weeks	Negley's Run, textbooks, worksheets, maps, art supplies, lab supplies, videos, tests…
6. Plate Tectonics	2 – 3 weeks	Lab supplies, textbooks, tests, art supplies, worksheets, videos, maps, IMC

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Name of Course: Earth Science Name of Unit: Meteorology
Essential Question for the Unit: How do atmospheric and surface conditions influence weather?

Unit Objectives/Key Questions			
A. What is the structure and composition of the atmosphere?	E	A, C	3.4.10B, 3.7.10B, 4.6.10B, 3.5.10C
B. How is the atmosphere heated?	E	A, B,C	3.5.10C, 3.2.10A, 3.2.10C, 3.4.10C, 4.6.10C, 3.7.10B
C. How does pressure influence air movement?	E	A, B, C	4.6.10B, 3.7.10B, 3.5.10C
D. What is the function of atmospheric water?	C	A, B, C	3.5.10C, 3.7.10B, 4.6.10B, 3.4.10C
E. What factors are examined in making a weather forecast?	I	A, B, C	3.5.10C, 3.4.10B, 3.7.10B, 3.2.10C, 4.6.10C
F. How do humans affect the atmosphere?	I	A, B, C	3.5.10C, 3.4.10B, 4.6.10B, 3.4.10B, 3.2.10C, 3.7.10B
G.			
H.			
I.			
J.			

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Name of Course: Earth Science Name of Unit: Earth's Materials
Essential Question for the Unit: How is the Earth's composition determined?

Unit Objectives/Key Questions			
A. How does atomic structure influence bonding?	E	D	3.2.10C, 3.7.10B
B. How does bonding determine mineral type?	I	D, E, F	4.6.10B, 3.2.10C, 3.7.10B, 3.5.10A
C. What properties do geologists use to identify minerals?	C	E, F	3.5.10S, 3.2.10C
D. How does environment determine rock type?	E	D, E, F	3.5.10A, 3.2.10C, 3.7.10B
E.			
F.			
G,			
H.			
I.			
J.			

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Name of Course: Earth Science Name of Unit: Earth's Resources
Essential Question for the Unit: How does society utilize Earth's resouces?

Unit Objectives/Key Questions			
A. How are fossil fuels obtained and used as an energy resource?	E	H, I	3.2.10C, 3.7.10B, 3.5.10B, 3.5.12B
B. What alternative energy resources could be utilized in the future?	E	H, I	4.6.10B, 3.2.10C, 3.7.10B, 3.5.10A, 3.5.12B
C. What similarities and differences exist between renewable and nonrenewable resources?	C	H, I, J, K	3.2.10C, 3.7.10B, 3.5.10B, 3.5.12B 3.5.10A
D. How is pollution influenced by type and use of resources?	I	H, I, J, K	3.5.10A, 3.2.10C, 3.7.10B, 3.5.10B, 3.5.12B
E. What methods of conservation and recycling can be utilized in Pennsylvania?	I	H, I, J, K	3.2.10C, 3.7.10B, 3.5.10B, 3.5.12B 3.5.10A
F.			
G.			

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Name of Course: Earth Science Name of Unit: Historical Geology
Essential Question for the Unit: How is the rock record used to interperet Earth history?

Unit Objectives/Key Questions			
A. What are the two methods used to date Earth materials?	E	L, M	3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
B. What are the basic rules of determining the relative age of the rock record within a sequence of events? Explain 3 of these rules.	E	L, M, N	4.6.10B, 3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
C. How are the ages of different rock units, in different locations, compared?	E	L, M, N	3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
D. What can fossils tell historical geologists about the past? Cite 2 examples and explain them.	I	L, M, N	3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
E. What uses exist for topographic and geologic maps?	C	L, M, N, O ,G	3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
F. How is topography influenced by weathering and erosion?	I	O, M, N, G	3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
G.			
H.			

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Name of Course: Earth Science Name of Unit: Water Processes
Essential Question for the Unit: How does water interact with surface topography and subsurface geology?

Unit Objectives/Key Questions			
A. How is a water budget calculated?	E	P, Q	3.2.10C, 3.7.10B, 3.5.10D, 3.5.12D
B. How are chemistry and topography influenced by stream age?	I	P, Q	4.6.10B, 3.2.10C, 3.7.10B, 3.5.10D, 3.5.12D
C. How is groundwater affected by human activity?	E	P, Q	3.5.10A, 3.2.10C, 3.7.10B, 3.5.10D, 3.5.12D
D. How do porosity and permeability affect groundwater availability?	E	P, Q, G	3.5.10A, 3.2.10C, 3.7.10B, 3.5.10D, 3.5.12D
E. What relationships exist between groundwater and topography?	C	P, Q, G	3.5.10A, 3.2.10C, 3.7.10B, 3.5.10D, 3.5.12D
F.			
G.			
H.			

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Name of Course: Earth Science Name of Unit: Plate Tectonics
Essential Question for the Unit: How do natural forces change the Earth?

Unit Objectives/Key Questions			
A. How can Earth's interior structure be determined?	C	R, T, S, V	3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
B. How can tectonic theory be proven?	I	R, T, S, V	4.6.10B, 3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
C. What types of movements occur at plate boundaries?	E	R, S, T	3.5.10A, 3.2.10C, 3.5.10A, 3.5.12A
D. What surface features are associated with each type of plate boundary?	E	R, S, T	3.5.10A, 3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
E. What hazards are associated with earthquakes and volcanoes?	I	R, S, T, U, V	3.5.10A, 3.2.10C, 3.5.10A, 3.5.12A
F. How has plate tectonics influenced topography in Pennsylvania?	E	R, S, T, V	3.5.10A, 3.2.10C, 3.7.10B, 3.5.10A, 3.5.12A
G.			

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III. Course Assessments

Check types of assessments to be used in the teaching of the course.
(Provide examples of each type.)

__/__ Objective Tests/Quizzes
__/__ Constructed Responses
____ Essays
____ Reports
__/__ Projects
____ Portfolios
__/__ Presentations
__/__ Performance tasks
____ _____

____ Response Journals
____ Logs
__/__ Computer Simulations
__/__ Research Papers
____ Class Participation
____ Notetaking
__/__ Daily Assignments
__/__ Writing Samples
____ _____

Provide copies of common assessments that will be utilized for all students taking this course. Overall course/grade level standards will be measured by a common course assessment. Unit objectives will be measured on an ongoing basis as needed by the classroom teacher to assess learning and plan for instruction. List common assessements below and recommended date/time frame for administration (at least quarterly).

Name of Common Assessment	When given?
1. Pretest/Final exam	Beginning of term/End of term
2. Mineral Obituary Project	Earth Materials Unit
3. Geologic History of Pennsylvania Project	Historical Geology Unit Assessment
4. Meteorology Exam	Meteorology Unit Assessment
5.	
6.	

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IV. Expected levels of achievement

Current grading scale:

A+	98-100
A	95-97
A-	92-94
B+	89-91
B	86-88
B-	83-85
C+	80-82
C	77-79
C-	74-76
D+	71-73
D	68-70
D-	65-67
F	0-64

PA Proficiency Levels
Advanced Proficient
Basic Below Basic

Attach rubrics, checklists, or other documentation noting how levels of proficiency will be determined for common assessments. The following scoring documents have been developed for this course:

Mineral Obituary Project
Pennsylvania Geologic History Project – Unit Assessment

NAME _____BLOCK _____

MINERAL OBITUARIES

1. Select a mineral from the following list, or find one from the rock and mineral guide. Everyone will be working on their own mineral and no two people can do the same mineral for this project.

Calcite	azurite	sulfur	beryl	gold
Copper	graphite	gypsum	silver	quartz
Diamond	galena	pyrite	garnet	feldspar
fluorite	halite	malachite	magnetite	serpentine
Mica	corundum	platinum	labradorite	opal
Olivine	limonite	hematite	barite	cinnabar

2. Write an obituary notice that contains the following information. Use complete sentences and correct grammar and spelling. It should read like an obituary.

a. name of mineral
b. color(s) it comes in
c. two unusual or interesting facts
d. specific gravity (density), hardness and luster
e. chemical formula
f. where found, countries
g. picture

***** This can be NEATLY hand written in ink.

3. Create a background to post your notice on. This background MUST somehow show what your mineral is used in or for. It should be obvious what the backdrop is, I shouldn't have to guess. The backdrop will be approximately the size of notebook paper.

4. Total Points = 50 DUE DATE =

5. Schedule:
   a. You will be given ½ of a block to do the research. A really good site to access is www.galleries.com
   b. The day after research is completed you will be given ONE class block (two ½ blocks) to complete the project in class. Any other time needed will be on your own.

Recommendation for first ½ block;
- bring all information you have gathered and compare
- write obituary out

Recommendation for second ½ block;
- design and construct background
- put it all together

Mineral Obituary Evaluation Form

Name of Mineral _____/ 5

Color(s) the mineral is found in _____/5

Two unusual / interesting facts _____/6

Specific Gravity, harness, luster of the mineral _____/6

Chemical Formula _____/5

Where the mineral is commonly found _____/5

Picture or drawing of the mineral _____/2

Background is appropriate _____/5

Time on task in class _____/5

Grammar / spelling _____/3

Overall good presentation _____/3

TOTAL SCORE _____/50

Mineral Obituary Evaluation Form

Name of Mineral _____/ 5

Color(s) the mineral is found in _____/5

Two unusual / interesting facts _____/6

Specific Gravity, harness, luster of the mineral _____/6

Chemical Formula _____/5

Where the mineral is commonly found _____/5

Picture or drawing of the mineral _____/2

Background is appropriate _____/5

Time on task in class _____/5

Grammar / spelling _____/3

Overall good presentation _____/3

TOTAL SCORE _____/50

NAME _____ BLOCK _____

PENNSYLVANIA GEOLOGIC HISTORY PROJECT

Procedure:

1. In this project we will create a project that recalls the geologic history and the paleontology of the state of Pennsylvania and the county of Lancaster. The objective is very simple. We will be seeking the answer to the questions:

a. **How did Pennsylvania form? What were the geologic processes that were occurring, in what is now Pennsylvania, during each time period?**
b. **What species of plant and animal existed here throughout this time?** OR **What were the "representative species" of that time period?**
c. **What type of rocks (sedimentary, metamorphic or igneous) existed in most of Pennsylvania at this time?**

2. We will be in the IMC at least one day and possibly two. In that time you will need to answer the above questions for each time PERIOD and one ERA (Precambrian). Beginning with the Precambrian Era, you will need to use the following web sites, along with any that you find on your own, to answer the questions.

3. Once you find all of the information required for each time period. You will go to the **last** site listed below and look for Lancaster County on the map. Once you find it, you will include on the last page, of you project, a paragraph about the ages that the rocks in Pennsylvania formed. (When were they formed? What type of rocks are they?)

http://www.bucknell.edu/Academics/Colleges_Departments/Academic_Departments/Geology/Geology_of_Central_PA/Geologic_History.html

http://faculty.kutztown.edu/friehauf/Pennsylvania_history/1000_Pennsylvania_tectonic_history.html

http://www.paleoportal.org/time_space/state.php?name=Pennsylvania

http://www.usgs.gov/science/science.php?term=455

http://academic.keystone.edu/JSkinner/TunkCreekAtlas/GeologiMapOfPa.htm

4. EACH PART OF THIS PROJECT MUST BE HAND DONE. NO TYPED MATERIAL AT ALL!!!

a. You will draw pictures of either the land surface (drawing of what was predominately happening at this time – for example, if mountains are forming in some part of the state – draw mountains), or of a few of the species of plant or animal that was in existence during each time period. A score of O% will be given on this section of the rubric if you have ANY printed or copied pictures on the project.

b. All writing MUST be handwriting – a score of O% will be given to this section of the rubric if you have ANY part of the project typed or with typing on it. All written items on the pages must answer any of the above questions that are NOT already being answered by the pictures that you draw.

c. You will have a choice in format of presentation for your project. I will provide laminated copies of the state of Pennsylvania that you may use as a template to create your project (I will show you an example of this). You may also choose to create your project in more of a booklet format. I will show you copies of this as well.

d. You will be given only ONE class day to work on the project, unless all research is completed in one day. All other work MUST be completed at home.

e. We WILL start a new Unit of study, with new responsibilities, BEFORE the due date on this project. ***PLEASE PAY ATTENTION TO THE DUE DATE***. Anything turned in after this time WILL score only 50% or less.

f. The rubric for this project is found on the following page.