

Wilson Area School District Planned Course Guide

Title of planned course: Science of the Earth

Subject Area: Science

Grade Level: 12 and transfer students

Course Description: Science of the Earth is a senior level course that will include studies of the scientific theories of the formation of Earth and the ongoing transformations and process. This will include earth's geologic time and structure, minerals, rocks and the rock cycle, plate tectonics, earthquakes and volcanoes. An introduction to mapping will be included as well as Pennsylvania geology.

Time/Credit for this Course: 1 period per day; 5 days / week; 1 semester; 0.5 credit

Curriculum Writing Committee: Carolyn Evans

Curriculum Map

<u>August / January:</u>	An Introduction to Geology
<u>September / February:</u>	Geologic Time Minerals
<u>October / March:</u>	The Rock Cycle
<u>November / April:</u>	Plate Tectonics and Earthquakes
<u>December / May:</u>	Volcanoes Water and the Hydrologic Cycle
<u>January / June:</u>	Geology of Pennsylvania Final Exam

Wilson Area School District Planned Course Materials

Course Title: Science of the Earth

Textbook: None

Teacher Resources:

- <http://geology.usgs.gov/>
- <http://www.dcnr.state.pa.us/topogeo/classroom/index.aspx>
- Kahn Academy
- <http://www.gis.dcnr.state.pa.us/geology/index.html>
- <http://www.sciencecourseware.org/GLOL/>
- <http://geology.com/>
- Geotours Workbook; M. Scott Wilkerson, M Beth Wilkerson, Stephen Marshak; W.W. Norton & Company; copyright 2012
- Video set: Faces of Earth

Curriculum Scope & Sequence

Planned Course: Science of the Earth

Unit: An Introduction to Geology

Time frame: 2 weeks

State Standards: 3.3.10.A1, A7

Anchor(s) or adopted anchor: S11.D.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Discuss the importance of geology and the tools of a geologist
- Describe the development of geology as a science, including the principles and theories of geology
- Describe the structure of a dynamic Earth

Core Activities: Students will complete/participate in the following:

- What do geologists do?
- Illustrating Earth's Structure
- Earth's Internal Structure
- Earth's External Disarray
- Modeling and mapping topography
- Geological mapping
- Orange Peel Plate tectonics (USGS)

Extensions:

- Investigate scientists who have contributed to the advancements in geology
- In-depth investigation into methods in geology

Remediation: Teacher directed based on teacher formative assessment

Instructional Methods:

- Student research / presentations
- Direct instruction
- PowerPoint presentations/ notes
- Cooperative learning structures
- Guided practice
- Videos
- Labs

Materials & Resources: Science Kits obtained from Flinn Scientific

Assessments:

- Individual participation / consultation
- Test, Quizzes
- Other individualized assessment strategies as necessary

Curriculum Scope & Sequence

Planned Course: Science of the Earth

Unit: Geologic Time

Time frame: 2 weeks

State Standards: 3.3.10.A7; 3.3.12.A3, A7

Anchor(s) or adopted anchor: S11.A.3.2

Essential content/objectives: At end of the unit, students will be able to:

- Describe the geological time scale from the formation of the earth to today
- Discuss and apply dating techniques

Core Activities: Students will complete/participate in the following:

- Create a geologic time line
- Cup Cake Core Sampling
- Carbon dating activity
- Ice core dating
- Relative Dating
- Absolute Dating
- Climate Change - It's Causes and Effects
- Geologic Time
- Earth History

Extensions: In-depth investigation into specific time periods of Earth's formation

Remediation: Teacher directed based on teacher formative assessment

Instructional Methods:

- Student research / presentations
- Direct instruction
- PowerPoint presentations/ notes
- Cooperative learning structures
- Guided practice
- Videos
- Labs

Materials & Resources:

- Science Kits obtained from Flinn Scientific
- USGS
- Carlsbad Caverns Geology
- Geotours Workbook

Assessments:

- Individual participation / consultation
- Test, Quizzes
- Other individualized assessment strategies as necessary

Curriculum Scope & Sequence

Planned Course: Science of the Earth

Unit: Minerals

Time frame: 2 weeks

State Standards: 3.3.10.A1; 3.3.12.A2

Anchor(s) or adopted anchor: S11.D.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Describe a mineral, the formation of minerals
- Identify the six classifications of minerals
- Identify common minerals using the properties

Core Activities: Students will complete/participate in the following:

- Mineral Identification Flow Chart
- Venn Diagram
- Rock Cycle Chart
- Rock Identification Flow Chart
- Mineral Identification
- Formation and Identification of Minerals
- Chocolate Chip Cookie Mining
- Extracting Metal (Copper) From a Rock
- Mineral Flash Cards
- Personal Mineral Consumption
- Minerals
- Energy & Mineral Resources

Extensions: In-depth investigation into specific minerals

Remediation: Teacher directed based on teacher formative assessment

Instructional Methods:

- Student research / presentations
- Direct instruction
- PowerPoint presentations/ notes
- Cooperative learning structures
- Guided practice
- Videos
- Labs

Materials & Resources:

- USGS
- Geotours Workbook
- Science Kits obtained from Flinn Scientific

Assessments:

- Individual participation / consultation
- Test, Quizzes
- Other individualized assessment strategies as necessary

Curriculum Scope & Sequence

Planned Course: Science of the Earth

Unit: The Rock Cycle: Igneous Rock, Sediments and Sedimentary Rock, and Metamorphic Rock

Time frame: 4 weeks

State Standards: 3.3.10.A1; 3.3.12.A2

Anchor(s) or adopted anchor: S11.D.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Define and describe the rock cycle.
- Describe the formation and characteristics of igneous rocks.
- Identify igneous intrusions.
- Describe the formation and characteristics of sedimentary rocks.
- Illustrate chemical and mechanical weathering of sedimentary rocks.
- Identify depositional environments.
- Define and identify the types of metamorphic rocks

Core Activities: Students will complete/participate in the following:

- Rocks and Rock Cycle
- Observe and identify igneous rocks.
- Chemical and Mechanical Weathering of Sedimentary Rock
- Chemical Weathering of Rocks
- Reading River Sediments
- Rock Formation and Identification
- Sedimentary Rocks
- Igneous Rocks
- Metamorphic Rocks

Extensions: In-depth investigation into rock types.

Remediation: Teacher directed based on teacher formative assessment

Instructional Methods:

- Student research / presentations
- Direct instruction
- PowerPoint presentations/ notes
- Cooperative learning structures
- Guided practice
- Videos
- Labs

Materials & Resources:

- Science Kits obtained from Flinn Scientific
- Geotours Workbook

Assessments:

- Individual participation / consultation
- Test, Quizzes
- Other individualized assessment strategies as necessary

Curriculum Scope & Sequence

Planned Course: Science of the Earth

Unit: Plate Tectonics and Earthquakes

Time frame: 2 weeks

State Standards: 3.3.10.A1, A3; 3.3.12.A1, A7

Anchor(s) or adopted anchor: S11.D.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Describe Pangea and the movement of tectonic plates
- Predict the effect of tectonic plate movement and earthquakes on Earth's surface
- Locate tectonic plates and regions on Earth of high probability of earthquakes

Core Activities: Students will complete/participate in the following:

- Exploring Earthquakes
- Finding the epicenter
- Investigating plate tectonics
- Tectonics and Resulting Geologic Structures
- Plate Tectonics
- Earthquakes

Extensions: In-depth investigation into the formation of the Appalachian Mountains

Remediation: Teacher directed based on teacher formative assessment

Instructional Methods:

- Student research / presentations
- Direct instruction
- PowerPoint presentations/ notes
- Cooperative learning structures
- Guided practice
- Videos
- Labs

Materials & Resources:

- Science Kits obtained from Flinn Scientific
- Carlsbad Cavern Geology
- Geotours Workbook

Assessments:

- Individual participation / consultation
- Test, Quizzes
- Other individualized assessment strategies as necessary

Curriculum Scope & Sequence

Planned Course: Science of the Earth

Unit: Volcanoes

Time frame: 2 weeks

State Standards: 3.3.10.A1; 3.3.12.A1, A7

Anchor(s) or adopted anchor: S11.D.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Identify the types of volcanoes and eruptions
- Locate volcanoes on Earth

Core Activities: Students will complete/participate in the following:

- Modeling a Volcano
- Investigating Earthquakes and Volcanoes
- Volcanoes

Extensions: In-depth investigation into a specific volcano and its impact on society

Remediation: Teacher directed based on teacher formative assessment

Instructional Methods:

- Student research / presentations
- Direct instruction
- PowerPoint presentations/ notes
- Cooperative learning structures
- Guided practice
- Videos
- Labs

Materials & Resources:

- Science Kits obtained from Flinn Scientific
- Geotours Workbook

Assessments:

- Individual participation / consultation
- Test, Quizzes
- Other individualized assessment strategies as necessary

Curriculum Scope & Sequence

Planned Course: Science of the Earth

Unit: Water and the Hydrologic Cycle

Time frame: 2 weeks

State Standards: 3.3.10.A3, A4, A5; 3.3.12.A5

Anchor(s) or adopted anchor: S11.D.1.3

Essential content/objectives: At end of the unit, students will be able to:

- Differentiate between surface water bodies and groundwater bodies
- Describe and identify types of surface water bodies
- Define water table, aquifers and water wells

Core Activities: Students will complete/participate in the following:

- Exploring Groundwater
- What's in our Water?
- Groundwater Models and Water Table Gradient
- Stream Landscapes
- Oceans & Coastlines
- Groundwater & Karst Landscapes
- Desert Landscapes
- Glacial Landscapes
- Global Change

Extensions: In-depth investigation into climate change and Earth's changing processes

Remediation: Teacher directed based on teacher formative assessment

Instructional Methods:

- Student research / presentations
- Direct instruction
- PowerPoint presentations/ notes
- Cooperative learning structures
- Guided practice
- Videos
- Labs

Materials & Resources:

- Science Kits from Flinn Scientific
- Carlsbad Cavern Geology
- Geotours Workbook

Assessments:

- Individual participation / consultation
- Test, Quizzes
- Other individualized assessment strategies as necessary

Curriculum Scope & Sequence

Planned Course: Science of the Earth

Unit: The Geology of Pennsylvania

Time frame: 2 weeks

State Standards: 3.3.12.A2, A3

Anchor(s) or adopted anchor: S11.D.1.1

Essential content/objectives: At end of the unit, students will be able to:

- Describe and identify minerals and geologic structures of Pennsylvania
- Describe the geologic history of Pennsylvania

Core Activities: Students will complete/participate in the following:

- Observing Sights in Pennsylvania
- Geologic History of Pennsylvania
- Pennsylvania During the Ice Age
- Pennsylvania Groundwater
- Pennsylvania Minerals
- Pennsylvania Fossils
- The Delaware Water Gap

Extensions: Independently visit a geological site in Pennsylvania and write a summary report to be presented to the class

Remediation: Teacher directed based on teacher formative assessment

Instructional Methods:

- Student research / presentations
- Direct instruction
- PowerPoint presentations/ notes
- Cooperative learning structures
- Guided practice
- Videos
- Labs

Materials & Resources: PA Department of Natural Resources

Assessments:

- Individual participation / consultation
- Test, Quizzes
- Other individualized assessment strategies as necessary