

## 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

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

## Wilson Area School District Planned Course Materials

**Course Title:** Science of the Earth

**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