Delaware Valley School District

PLANNED INSTRUCTION

A PLANNED COURSE FOR:

Earth Science

Grade Level: 6

Date of Board Approval: 2019

Planned Instruction

Title of Planned Instruction: 6th Grade Earth Science

Subject Area: Earth Science **Grade(s):** 6

Course Description: The sixth grade science course focuses on Earth and the Solar System. Students will learn about the composition of the Earth and its dynamic existence. Rock formation and the water cycle will be used to elaborate changes in the Earth over time and how available resources are found and used. The course will also investigate weather and climate patterns. Finally, students will learn about the solar system and star life cycles. The course complements direct instruction with a variety of relevant, hands-on activities and labs.

Time/Credit for the Course: Full Year

Curriculum Writing Committee: Brigid Grey, Stephen Kim, Amanda Pope, Brian McCarthy

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Curriculum Map

1. **Marking Period One:**
   - **Overview based on 45 days:**

     The Dynamic Earth
     - Unit One: Earth's Surface
     - Unit Two: Earth's History
     - Unit Three: Minerals and Rocks

   - **Goals: Understanding of:**

     Earth's Surface
     - Earth's Spheres
     - Weathering
     - Erosion and Deposition by Water
     - Erosion and Deposition by Wind, Ice, and Gravity
     - Soil Formation

     Earth's History
     - Geologic Change over Time
     - Relative Dating
     - Absolute Dating
     - The Geologic Time Scale

     Minerals and Rocks
     - Minerals
     - The Rock Cycle
     - Three Classes of Rock

2. **Marking Period Two:**
   - **Overview based on 45 days:**

     Continuation of The Dynamic Earth
     - Unit Four: The Restless Earth

     Earth's Water and Atmosphere
     - Unit Five: Earth's Water
     - Unit Six: Oceanography

   - **Goals: Understanding of:**

     The Restless Earth
     - Earth's Layers
     - Plate Tectonics
     - Mountain Building
     - Volcanoes
     - Earthquakes
     - Measuring Earthquake Waves

     Earth's Water
     - Water and Its Properties
     - The Water Cycle
     - Surface Water and Groundwater

Oceanography
- Earth's Oceans and the Ocean Floor
- Ocean Waves
- Ocean Currents

3. **Marking Period Three:**
   - **Overview based on 45 days:**

     Continuation of Earth's Water and Atmosphere
     - Unit Seven: Earth's Atmosphere
     - Unit Eight: Weather and Climate

     Space Science
     - Unit Nine: The Universe

   - **Goals: Understanding of:**

     Earth's Atmosphere
     - The Atmosphere
     - Energy Transfer
     - Wind in the Atmosphere

     Weather and Climate
     - Elements of Weather
     - Clouds and Cloud Formation
     - What Influences Weather
     - Severe Weather and Weather Safety
     - Weather Maps and Weather Prediction
     - Climate
     - Climate Change

     The Universe
     - Structure of the Universe
     - Stars
     - The Life Cycle of Stars

4. **Marking Period Four:**
   - **Overview based on 45 days:** Space Science
     - Unit Ten: The Solar System
     - Unit Eleven: The Earth-Moon-Sun System
     - Unit Twelve: Exploring Space

   - **Goals: Understanding of:**

     The Solar System
     - Models of the Solar System
     - Gravity and the Solar System
     - The Sun
     - The Terrestrial Planets
     - The Gas Giant Planets
     - Small Bodies in the Solar System

     The Earth-Moon-Sun System
     - Earth's Days, Years, and Seasons
     - Moon Phases and Eclipses

- Earth's Tides
- Exploring Space
  - Images from Space
  - Technology for Space Exploration
  - History of Space Exploration

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Curriculum Plan

Unit One: Earth's Surface **Marking Period:** 1

Standard(s): PA Academic Standards; 3.2.7.B, 3.5.7.A

Anchor(s): S8.A.3.2, S8.D.1.1

Big Idea: Continuous processes on Earth's surface results in the formation and destruction of landforms and the formation of soil.

Essential Questions:

- How do matter and energy move through Earth's spheres?
- How does weathering change Earth's surface?
- How does water change Earth's surface?
- How do wind, ice, and gravity change Earth's surface?
- How does soil form?

Concepts:

- The Earth's System and its Spheres
- Interactions Between Spheres
- Earth's Energy Budget
- Weathering
- Physical Weathering
- Chemical Weathering
- Erosion and Deposition
- Erosion and Deposition by Streams
- Formation of Landforms by Streams
- Erosion and Deposition by Groundwater and Waves
- Erosion and Deposition by Wind
- Erosion and Deposition by Ice
- Erosion and Deposition by Gravity
- Soil Formation
- Soil Horizons
- Soil Characteristics

Competencies:

- Describe Earth's spheres and their interactions, and explain the energy budget.
- Analyze the effects of weathering on Earth's surface and give examples.
- To relate the process of erosion and deposition by water to the landforms that result from these processes.
- To describe erosion and deposition by wind, ice, and gravity and identify landforms that result from these processes.
- To describe the physical and chemical characteristics of soil layers and

identify the factors that affect soil formation, including the actions of living things.

Overview: This unit is designed to show students the overview of Earth: its surface, history, and make up.

Goals:

- Students will be able to describe The Earth's System and its Spheres
- Students will be able to describe Interactions Between Spheres
- Students will be able to explain Earth's Energy Budget
- Students will be able to explain Weathering
- Students will be able to explain Physical Weathering
- Students will be able to explain Chemical Weathering
- Students will be able to explain Erosion and Deposition
- Students will be able to describe Erosion and Deposition by Streams
- Students will be able to describe the Formation of Landforms by Streams
- Students will be able to describe Erosion and Deposition by Groundwater and Waves
- Students will be able to describe Erosion and Deposition by Wind
- Students will be able to describe Erosion and Deposition by Ice
- Students will be able to describe Erosion and Deposition by Gravity
- Students will be able to explain Soil Formation
- Students will be able to explain Soil Horizons
- Students will be able to explain Soil Characteristics

Objectives:

1. Describe Earth's spheres and their interactions, and explain the energy budget. (DOK Level 3)
2. Analyze the effects of weathering on Earth's surface and give examples. (DOK Level 3)
3. To relate the process of erosion and deposition by water to the landforms that result from these processes. (DOK Level 3)
4. To describe erosion and deposition by wind, ice, and gravity and identify landforms that result from these processes. (DOK Level 3)
5. To describe the physical and chemical characteristics of soil layers and identify the factors that affect soil formation, including the actions of living things. (DOK Level 3)

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Provide illustrations of Earth's spheres and their interactions.
3. Discuss the energy budget.
4. Present the effects of weathering on Earth's surface and give examples.
5. Provide illustrations to demonstrate the process of erosion and deposition by

water.

6. Discuss the different erosion and deposition processes by wind, ice, and gravity and identify landforms that result from these processes.
7. Describe the physical and chemical characteristics of soil layers and identify the factors that affect soil formation, including the actions of living things.

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 1 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities

- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

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Curriculum Plan

Unit Two: Earth's History **Marking Period:** 1

Standard(s): 3.5.7.A, 3.8.7.B

Anchor(s): S8.A.1.3, S8.D.1.1.2

Big Idea: Rock, fossils, and other types of natural evidence are used to study Earth's history and measure geologic time.

Essential Questions:

- How do we learn about Earth's history?
- How are the relative ages of rock measured?
- How is the absolute age of rock measured?
- What is the geologic time scale?

Concepts:

- Uniformitarianism and Fossils
- The Rock Record
- Earth's Changing Climate
- Dating Undisturbed Rock Layers
- Dating Disturbed Rock Layers
- Fossils and Relative Dating
- Geologic Columns
- Absolute Dating
- Radiometric Dating
- The Age of Earth
- Index Fossils
- A Historic Perspective of Geologic Change
- The Geologic Time Scale
- Milestones in Earth History

Competencies:

- Explain how Earth materials, such as rock, fossils, and ice, show that Earth has changed over time.
- Summarize how scientists measure the absolute age of rock layers and identify gaps in the rock record.
- Summarize how scientists measure the absolute age of rock layers, including by radiometric dating.
- Understand how geologists use the geologic time scale to divide Earth's history

Overview: This unit is designed to show students the Earth's history and measure geologic times through the use of rocks, fossils, and other types of natural history.

Goals:

- Students will be able to discuss Uniformitarianism and Fossils
- Students will be able to explain the Rock Record
- Students will be able to explain Earth's Changing Climate
- Students will be able to discuss Dating Rock Layers
- Students will be able to describe fossils and Relative Dating
- Students will be able to explain Geologic Columns
- Students will be able to explain Absolute and Radiometric Dating
- Students will be able to discuss The Age of Earth
- Students will be able to describe Index Fossils
- Students will be able to discuss A Historic Perspective of Geologic Change
- Students will be able to describe The Geologic Time Scale
- Students will be able to explain Milestones in Earth History

Objectives:

1. Explain how Earth materials, such as rock, fossils, and ice, show that Earth has changed over time. (DOK2)
2. Summarize how scientists measure the absolute age of rock layers and identify gaps in the rock record. (DOK 2)
3. Summarize how scientists measure the absolute age of rock layers, including by radiometric dating. (DOK 2)
4. Understand how geologists use the geologic time scale to divide Earth's history. (DOK 3)

Core Activities and Corresponding Instructional Methods:

1. State the principle of uniformitarianism
2. Describe the ways organisms can be preserved as fossils.
3. List examples of trace fossils.
4. Explain how fossils supply evidence of geologic change
5. Relate the composition and texture of sedimentary rocks to the environment in which the rocks formed
6. Describe and give evidence for the movement of continents over time.
7. List types of evidence that support that Earth's climate has changed over time.
8. Describe deposition of sedimentary rock layers.
9. Summarize and apply the law of superposition.
10. Explain and apply the law of crosscutting relationships
11. Summarize how scientists can use fossils to determine the relative age of rock layers.
12. Describe geologic column and their use.
13. Apply the concept of half-life to problems of determining the age of a sample.
14. Explain radiometric dating and identify radiometric dating methods.
15. Identify approximately how old Earth is.
16. Explain how scientists have determined the age of Earth.

17. Explain how index fossils can be used to determine the age of rock.
18. Describe the principle of catastrophism in terms of the rate of geologic change.
19. Describe the principle of uniformitarianism in terms of the rate of geologic change.
20. Explain what geologic mean today when they use the term uniformitarianism.
21. Explain how the age of Earth has been determined.
22. Describe the geologic time scale and explain how it is divided into different spans of time.
23. List the four major divisions of earth's history.
24. Describe major events in the geologic history of Earth during Precambrian time, the Paleozoic era, Mesozoic era, and the Cenozoic era.

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 2 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook

- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

Curriculum Plan

Unit Three: Minerals and Rocks **Marking Period:** 1

Standard(s): 3.1.7.B, 3.2.7.B, 3.5.7.A

Anchor(s): S8.D.1.1.2

Big Idea # 1: Minerals and rocks are basic building blocks of Earth and can change over time from one type of mineral or rock to another.

Essential Questions:

- What are minerals, how do they form, and how can they be identified?
- What is the rock cycle?
- How do rocks form?

Concepts:

- Matter and Minerals
- Formation of Minerals
- Types of Minerals
- Properties of Minerals
- Weathering, Erosion, and Deposition
- Three Classes of Rock
- Rock Cycle
- Tectonic Plate Motion and the Rock Cycle
- Rocks and Their Classification
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Competencies:

- To describe the basic structure of minerals and identify different minerals by using their physical properties.
- To describe the series of processes and classes of rocks that make up the rock cycle.
- To describe the formation and classification of the three classes of rocks.

Overview: This unit is designed to show students that minerals and rocks are the building blocks of Earth and can change over time.

Goals:

- Students will be able to classify matter and minerals
- Students will be able to describe the formation of minerals
- Students will be able to identify types of minerals

- Students will be able to identify the properties of minerals
- Students will be able to explain weathering, erosion, and deposition
- Students will be able to identify the three classes of rock
- The students will be able to explain the rock cycle
- Students will be able to explain tectonic plate motion and the rock cycle
- Students will be able to identify rocks and their classification
- Students will be able to identify igneous rock
- Students will be able to identify sedimentary rock
- Students will be able to identify metamorphic rock

Objectives:

1. To describe the basic structure of minerals and identify different minerals by using their physical properties.
2. To describe the series of processes and classes of rocks that make up the rock cycle.
3. To describe the formation and classification of the three classes of rocks.

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Compare elements and compounds.
3. List the characteristics of minerals
4. Summarize three ways that minerals form.
5. Describe silicate minerals and name some common silicate minerals.
6. Identify the main classes of non-silicate minerals.
7. Identify physical properties that are used to identify minerals.
8. Describe sedimentary rock formation.
9. Describe igneous rock formation.
10. Describe metamorphic rock formation.
11. Discuss how rock changes as it goes through the rock cycle.
12. Describe the components of rock.
13. Describe two properties that are used to classify rock.
14. Identify the three major classes of rock.
15. Describe the process by which igneous rock forms.
16. Explain where intrusive igneous rock forms.
17. Explain where extrusive igneous rock forms.
18. Describe the process by which sedimentary rock forms.
19. Identify the three major types of sedimentary rock and explain how they form.
20. Describe the process by which metamorphic rock forms.
21. Describe the two types of metamorphic rock.

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 3 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
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- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

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Curriculum Plan

Unit Four: The Restless Earth **Marking Period:** 2
(Continuation of The Dynamic Earth)

Standard(s): 3.2.7.B, 3.5.7.A

Anchor(s): S8.D.1.1

Big Idea # 1: The movement of tectonic plates accounts for important features of Earth's surface and major geologic events.

Essential Questions:

- What are Earth's Layers?
- What is plate tectonics?
- How do mountains form?
- How do volcanoes change Earth's surface?
- Why do earthquakes happen?
- How are seismic waves are used to study earthquakes?

Concepts:

- Earth is divided into three layers based upon chemical composition
- Earth's physical layers.
- The Theory of Plate Tectonics
- Tectonic plates.
- Types of Plate Boundaries
- Causes of Tectonic Plate Motion.
- Deformation and Folding.
- Faulting
- Mountains
- Volcanoes
- Volcanic Landforms
- Where Volcanoes Forms
- Where Earthquakes Are and Why they Happen
- Effects of Earthquakes
- Causes of Earthquakes
- Seismic Waves and Their Measurement
- Earthquake Magnitude and Intensity
- Factors Determining the Effects of Earthquakes

Competencies:

- To identify Earth's compositional and physical layers and describe their properties.
- To explain the theory of plate tectonics and plate movement, and identify the geologic events caused by this
- To describe how the movement of Earth's tectonic plates

causes mountain building
- To describe various kinds of volcanoes and eruptions, including where they occur and how they change Earth's surface.
- To describe the causes of earthquakes and identify where earthquakes happen.
- To understand how seismic waves are useful in determining the strength, location, and effects of an earthquake

Overview: This unit is designed to show students the Earth's Water, Atmosphere and Oceanography

Goals:
- Students will be able to explain that the Earth is divided into three layers based upon chemical composition
- Students will be able to describe Earth's physical layers
- Students will be able to explain the Theory of Plate Tectonics
- Students will be able to explain that the earth is comprised of tectonic plates
- Students will be able to describe the types of plate boundaries
- Students will be able to explain the causes of tectonic plate motion
- Students will be able to explain how tectonic plate motion causes deformation and folding
- Students will be able to explain faulting
- Students will be able to describe how mountains are formed
- Students will be able to describe how volcanoes are formed
- Students will be able to describe volcanic landforms
- Students will be able to explain where volcanoes form
- Students will be able to explain where earthquakes are and why they happen
- Students will be able to describe the effects of earthquakes
- Students will be able to explain the causes of earthquakes
- Students will be able to describe seismic waves and explain how they are measured
- Students will be able explain earthquake magnitude and intensity
- Students will be able explain factors determining the effects of earthquakes

Objectives:
1. To identify Earth's compositional and physical layers and describe their properties. (DOK Level 3)
2. To explain the theory of plate tectonics and plate movement, and identify the geologic events caused by this (DOK Level 3)
3. To describe how the movement of Earth's tectonic plates causes mountain building (DOK Level 3)
4. To describe various kinds of volcanoes and eruptions, including where they occur and how they change Earth's surface. (DOK Level 3)
5. To describe the causes of earthquakes and identify where earthquakes happen. (DOK Level 3)
6. To understand how seismic waves are useful in determining the strength, location, and effects of an earthquake (DOK Level 3)

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Compare and contrast types of crust using a Venn diagram
3. Create a booklet that includes each of the physical layers of Earth
4. Conduct a lab that demonstrates how a dense material sinks when combined with a dense material
5. Model sea floor spreading
6. Model the process of deformation and folding
7. Demonstrate how deformation and folding
8. Write a short story that describes how mountains and faults form
9. Lab demonstrating the concept of viscosity
10. Create a graphic organizer that identifies the different types of volcanic landforms
11. Using spring toys create waves that are similar to seismic waves
12. Triangulate using a compass to find the epicenter

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 4 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets

- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

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Curriculum Plan

Unit Five: Earth's Water **Marking Period:** 2

Standard(s): 3.2.7.B, 3.3.7.D

Anchor(s): S8.A.2.1.5, S8.D.1.1.4

Big Idea # 1: Water moves through Earth's atmosphere, oceans, and land in a cycle and is essential to life on Earth.

Essential Questions:

- What makes water so important?
- How does water change state and move around on Earth?
- How does fresh water flow on Earth?

Concepts:

- Importance and Distribution of Water
- Structure of Water
- States of Water
- Properties of Water
- Water Cycle and Change of State
- Water in the Atmosphere
- Water in the Oceans and on Land
- Transport of Matter and Energy
- Surface Water
- Groundwater

Competencies:

- To describe water's structure, its properties, and its importance to Earth's systems
- To describe the water cycle and the different processes that are part of the water cycle on Earth
- To explain the processes involved in the flow of water, both above and below the ground

Overview: This unit is designed to show students that water moves through the Earth's atmosphere, oceans and land in a cycle and is essential for life on Earth.

Goals:

- Students will be able to describe water and its properties
- Students will be able to explain the water cycle
- Students will be able to differentiate between surface water and groundwater

Objectives:

1. To describe water's structure, its properties, and its importance to Earth' systems (DOK Level 2)
2. To describe the water cycle and the different processes that are part of the water cycle on Earth (DOK Level 2)
3. To explain the processes involved in the flow of water, both above and below the ground (DOK Level 3)

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Explain water's importance to Earth's surface and weather, and to living organisms, including humans.
3. Describe the distribution of water on Earth.
4. Describe the structure of water.
5. Explain why water is a polar molecule.
6. Describe the three states of water on Earth.
7. Describe the properties of water in each of these three states.
8. Explain the properties of water.

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 5 Tests
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

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Curriculum Plan

Unit Six: Oceanography **Marking Period:** 2

Standard(s): 3.5.7.A, 3.5.7.B

Anchor(s): S8.A.1.3.3, S8.A.2.1.5, S8.D.1.1, S8.D.1.1.1

Big Idea # 1: The oceans are a connected system of water in motion that transports matter and energy around Earth's surface.

Essential Questions:

- What lies within and beneath Earth's oceans?
- How does an ocean wave move?
- How does water move in the ocean?

Concepts:

- Describe the characteristics of Earth's global ocean.
- Identify Earth's main oceans
- Explain sources of ocean
- salts and why salinity varies.
- Explain how location affects ocean water temperature.
- Describe the three main ocean temperature layers.
- Identify two factors that affect ocean water density.
- Relate differences in density to movement of ocean water
- Determine how the ocean floor is studied.
- Identify the two main regions of the ocean floor.
- Describe features of the ocean floor.

Competencies:

- To describe the properties and physical features of Earth's oceans
- To describe the characteristics of ocean waves and what happens as they move through the ocean
- To describe the movement of ocean water, explain what factors influence this movement, and explain why ocean circulation is important in Earth's system

Overview: The oceans are a connected system of water in motion that transports matter and energy around Earth's surface.

Goals:

- Students will be able to describe the characteristics of Earth's global ocean.
- Students will be able to identify Earth's main oceans
- Students will be able to explain sources of ocean salts and why salinity varies.
- Students will be able to explain how location affects ocean water temperature.
- Students will be able to describe the three main ocean temperature layers.
- Students will be able to identify two factors that affect ocean water density.
- Students will be able to relate differences in density to movement of ocean water
- Students will be able to determine how the ocean floor is studied.
- Students will be able to identify the two main regions of the ocean floor.
- Students will be able to describe the features of the ocean floor.

Objectives:

1. Describe the properties and physical features of Earth's oceans. (DOK Level 2)
2. Describe the characteristics of ocean waves and explain what happens as they move through the ocean. (DOK 3)
3. Describe the movement of ocean water, explain what factors influence this movement, and explain why ocean circulation is important in Earth's system. (DOK 3)

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Describe the characteristics of Earth's global ocean.
3. Identify Earth's main oceans
4. Explain sources of ocean salts and why salinity varies.
5. Explain how location affects ocean water temperature.
6. Describe the three main ocean temperature layers.
7. Identify two factors that affect ocean water density.
8. Relate differences in density to movement of ocean water.
9. Determine how the ocean floor is studied.
10. Identify the two main regions of the ocean floor.
11. Describe features of the ocean floor.

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments

- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 6 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
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- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

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Curriculum Plan

Unit Seven: Earth's Atmosphere **Marking Period:** 3

Standard(s): 3.5.7.C, 3.6.7.A

Anchor(s): S8.A.1.1.3, S8.A.1.1.4, S8.D.2.1, S8.D.2.1.1

Big Idea # 1: Earth's atmosphere is a mixture of gases that interacts with solar energy.

Essential Questions:

- What is the atmosphere?
- How does energy move through Earth's system?
- What is wind?

Concepts:

- Composition, Air Pressure, and Temperature of the Atmosphere
- Structure of the Atmosphere
- Life and the Atmosphere
- Temperature, Heat, Thermal Energy, Thermal Expansion
- Radiation
- Convection
- Conduction
- The Movement of Air
- Global Winds
- Local Winds

Competencies:

- To describe the composition and structure of the atmosphere and explain how the atmosphere protects life and insulates Earth.
- To summarize the three mechanisms by which energy is transferred through Earth's system.
- To explain how energy provided by the sun causes atmospheric movement, called wind.

Overview: This unit will discuss Earth's atmosphere and its interactions with the Sun's energy.

Goals:

- Students will be able to discuss Composition, Air Pressure, and Temperature of the Atmosphere.
- Students will be able to explain the Structure of the Atmosphere.
- Students will be able to describe Life and the Atmosphere.
- Students will be able to discuss Temperature, Heat, Thermal Energy, Thermal Expansion.
- Students will be able to explain Radiation.

- Students will be able to describe Convection.
- Students will be able to discuss Conduction.
- Students will be able to explain The Movement of Air.
- Students will be able to describe Global Winds.
- Students will be able to discuss Local Winds.

Objectives:

1. Describe the composition and structure of the atmosphere and explain how the atmosphere protects life and insulates Earth. (DOK Level 3)
2. Summarize the three mechanisms by which energy is transferred through Earth's system. (DOK Level 3)
3. Explain how energy provided by the sun causes atmospheric movement, called wind. (DOK Level 3)

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Identify the main components of Earth's atmosphere.
3. Describe how air pressure changes with altitude.
4. Explain why temperature changes as altitude increases.
5. List the four main layers of the atmosphere.
6. Identify the properties of each layer of Earth's atmosphere.
7. Describe how the atmosphere protects life.
8. Describe how the atmosphere insulates the planet.

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 7 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions

- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

Delaware Valley School District

Curriculum Plan

Unit Eight: Weather and Climate **Marking Period:** 3

Standard(s): 3.2.7.B, 3.5.7.C

Anchor(s): S8.A.1.1.3, S8.D.2.1.3

Big Idea # 1: Air pressure, temperature, air movement, and humidity in the atmosphere affect both weather and climate.

Essential Questions:

- What is weather and how can we describe different types of weather conditions?
- How do clouds form, and how are clouds classified?
- How do the water cycle and other global patterns affect local weather?
- How can humans protect themselves from hazardous weather?
- What tools do we use to predict weather?
- How is climate affected by energy from the sun and variations on Earth's surface?
- What are the causes and effects of climate change?

Concepts:

- Elements of Weather
- Measuring Elements of Weather
- Introduction to Clouds
- Cloud Formation
- Cloud Classification
- Fog
- How the Water Cycle Influences Weather
- How Patterns in the Atmosphere Affect Weather
- How Patterns in the Ocean Influence Weather
- Hazardous Weather
- Safety and Weather
- Introduction to Weather Forecasting
- Weather Forecasting Data
- Weather Maps
- Weather Forecasts

Competencies:

- To describe elements of weather and explain how they are measured.
- To describe the formation and classification of clouds.
- To explain how global patterns in Earth's system influence weather.
- To describe the major types of hazardous weather and the ways human beings can protect themselves from hazardous weather and

from sun exposure.
- To understand how meteorologists forecast the weather using weather maps and other data.
- To describe the main factors that affect climate and explain how scientists classify climates.
- To describe climate change and the causes and effects of climate change.

Overview: Weather and climate are influenced by the conditions of the atmosphere.

Focus Question(s):
- What is weather and how can we describe different types of weather conditions?
- How do clouds form, and how are clouds classified?
- How do the water cycle and other global patterns affect local weather?
- How can humans protect themselves from hazardous weather?
- What tools do we use to predict weather?
- How is climate affected by energy from the sun and variations on Earth's surface?
- What are the causes and effects of climate change?

Goals:
- Students will be able to describe the elements of weather.
- Students will be able to explain measuring elements of weather.
- Students will be able to discuss clouds, cloud formation, and cloud classification.
- Students will be able to explain fog.
- Students will be able to describe how the water cycle influences weather.
- Students will be able to discuss how patterns in the atmosphere affect weather.
- Students will be able to describe how patterns in the ocean influence weather.
- Students will be able to explain hazardous weather.
- Students will be able to discuss safety and weather.
- Students will be able to describe weather forecasting and weather forecasting data
- Students will be able to explain weather maps.
- Students will be able to explain weather forecasts.

Objectives:
1. Describe elements of weather and explain how they are measured. (DOK Level 3)
2. Describe the formation and classification of clouds. (DOK Level 2)
3. Explain how global patterns in Earth's system influence weather. (DOK Level 3)
4. Describe the major types of hazardous weather and the ways human beings can protect themselves from hazardous weather and from sun exposure. (DOK Level 2)
5. Understand how meteorologists forecast the weather using weather maps and other data. (DOK Level 3)
6. Describe the main factors that affect climate and explain how scientists classify

climates. (DOK Level 3)

7. Describe climate change and the causes and effects of climate change. (DOK Level 2)

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Explain how each of the following relates to weather: Temperature, Humidity, Precipitation, Air pressure, Wind direction and speed, and Visibility.
3. Describe how each of these is measured: Temperature, Humidity, Precipitation, Air pressure, Wind direction and speed.
4. Describe technology that is used in weather data collection.
5. Briefly state what a cloud is.
6. Explain why clouds are important to climate.
7. Explain why clouds are important to weather.
8. Explain how a cloud forms.
9. Describe dew point.
10. Tell how water droplets form.
11. Describe cooling processes.
12. Tell about solar energy's role in cloud formation.
13. List two classifications.
14. Describe the basic shapes and the altitude classes.
15. Contrast clouds of vertical development.
16. Describe cloud naming.
17. Briefly state what fog is and how fog forms.
18. Describe two ways in which air can cool to form fog.
19. Explain ways in which the water cycle influences weather.
20. Define air mass and front; explain how weather is affected by air masses.
21. Describe a cold front and a warm front.
22. Describe a high-pressure and a low-pressure system.
23. Define jet stream, and explain how the polar jet stream influences weather.
24. Describe how ocean currents influence weather.
25. Define thunderstorm, hurricane, and tornado and describe how each is formed.
26. Describe the dangers and damaging effects of thunderstorms, tornadoes, and hurricanes.
27. Explain how to prepare for hazardous weather such as high winds or heavy rains.
28. Describe how to be safe during a thunderstorm, hurricane, and tornado.
29. Describe how to protect against overexposure to the sun and to stay safe from summer heat.
30. Distinguish meteorology from other sciences.
31. Describe weather forecasting.
32. Explain how different forms of weather data are obtained.
33. Describe the observation of surface weather, and how to get upper air data.
34. Describe data from satellites.
35. Explain what kind of weather data radar provides.
36. List types of weather maps.
37. Describe surface weather maps and what they show.

38. Explain station models.
39. Explain upper air charts.
40. List eight weather elements.
41. Compare types of forecasts.
42. List three types of hazardous weather forecasts.
43. Distinguish between climate and weather.
44. Identify the two main factors that determine climate.
45. Define latitude and state why latitude affects climate.
46. Explain the effect of the sun's energy on precipitation, winds.
47. Describe how winds can affect climate.
48. Explain the effects of topography and elevation on climate.
49. Explain how mountains affect precipitation.
50. Explain the effect of large bodies of water and surface currents on climate.
51. Explain how latitude is related to air temperature.
52. Locate the polar, temperate and tropical climate zones.
53. Explain that Earth's climate has naturally varied throughout geologic history.
54. Identify examples of natural events that cause changes in Earth's climate.
55. Explain that human activities increase levels of greenhouse gases in the atmosphere and contribute to global warming.
56. Identify some predicted effects of climate change linked to global warming.
57. Identify ways that humans can reduce the rate of global warming.
58. Recognize that global warming is a global issue and involves economic, political, and scientific factors.

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 8 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum

- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

Delaware Valley School District

Curriculum Plan

Unit Nine: The Universe **Marking Period:** 3

Standard(s): 3.2.7.B, 3.5.7.C, 3.8.7.B

Anchor(s): 3.8.7.B

Big Idea: The sun is one of billions of stars in one of billions of galaxies in the universe.

Essential Questions:

- What makes up the universe?
- What are some properties of stars?
- How do stars change over time?

Concepts:

- Solar System and Planets
- Stars and Galaxies
- Structure and Size of the Universe
- Stars
- Brightness and Luminosity
- Temperature and Size
- An Overview of Stars and Their Life Cycle
- The Life Cycle of Low-Mass Stars
- The Life Cycle of High-Mass Stars
- The Hertzsprung-Russell Diagram

Competencies:

- To describe the structure of the universe, including the scale of distances in the universe.
- To describe stars and their physical properties.
- To describe the stages of the life cycles of stars.

Overview: This unit describes that the sun is one of billions of stars in one of billions of galaxies in the universe.

Goals:

- Students will be able to describe the solar system and planets
- Students will be able to describe the stars and galaxies
- Students will be able to explain the structure and size of the universe
- Students will be able to describe stars
- Students will be able to describe how brightness and luminosity are related
- Students will be able to explain how the temperature and size are related
- Students will be able to give an overview of stars and their life cycle
- Students will be able to describe the life cycle of low-mass stars

- Students will be able to explain the life cycle of high-mass stars
- Students will be able to utilize the Hertzsprung-Russell Diagram

Objectives:

1. To describe the structure of the universe, including the scale of distances in the universe.
2. To describe stars and their physical properties.
3. To describe the stages of the life cycles of stars.

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Describe the sizes of the planets.
3. Explain the differences in composition of the planets.
4. Describe the sizes and compositions of stars.
5. Describe the sizes and compositions of galaxies.
6. Describe the composition of the universe.
7. Describe the scale of distances in the universe.
8. Describe the enormous amount of time it takes a spacecraft to travel long distances.
9. Identify the different types of star systems.
10. Describe the way in which astronomers measure the brightness of stars.
11. Describe the way in which astronomers measure the luminosity of stars.
12. Analyze the way in which astronomers use color to determine the surface temperatures of stars.
13. Describe the way in which astronomers use the sun as a yardstick to measure the size of stars.
14. Compare the size of the sun to the size of other stars
15. Describe where stars form.
16. Summarize how stars form.
17. Describe a star's existence.
18. Explain what happens when the fusion process ceases.
19. Summarize how a low-mass star becomes a giant.
20. Explain how a white dwarf forms.
21. Describe the final phase in a low-mass star's life cycle.
22. Summarize how a high-mass star becomes a supergiant.
23. Explain a supernova's cause.
24. Describe how a high-mass star can end its life cycle.
25. Explain how to use the Hertzsprung-Russell diagram.
26. Identify the main sequence region on the H-R diagram.

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 9 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

Delaware Valley School District

Curriculum Plan

Unit 10: The Solar System **Marking Period:** 3

Standard(s):

Standards Addressed: 3.1.7.B, 3.1.7.D, 3.2.7.B, 3.4.7.D

Anchor(s): S8.A.1.1.3, S8.D.3.1.1, S8.D.3.1.3

Big Idea: Planets and a variety of other bodies form a system of objects orbiting the Sun.

Essential Questions:

- How have people modeled the solar system?
- Why is gravity important in the solar system?
- What are the properties of the sun?
- What is known about the terrestrial planets?
- What is known about the gas giant planets?
- What is found in the solar system besides the sun, planets, and moons?

Concepts:

- Solar System Overview
- Early Theories
- A Heliocentric Model
- The order of planets starting closest to the Sun: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
- Gravity Overview
- The Laws of Planetary Motion
- Universal Gravitation
- Formation of the Solar System
- Composition and Structure
- The Sun's Energy
- Rotation
- Sunspots, Solar Flares, and Prominences
- Mercury
- Venus
- Earth
- Mars
- Jupiter
- Saturn
- Uranus
- Neptune
- Dwarf Planets
- Kuiper Belt Objects, Comets, and the Oort Cloud
- Asteroids

- Meteors

Competencies:

- To compare various historical models of the solar system
- To explain the role that gravity played in the formation of the solar system and in determining the motion of the planets
- To describe the structure and rotation of the sun, energy production and transport in the sun, and solar activity
- To describe some of the properties of the terrestrial planets and how the properties of Mercury, Venus, and Mars differ from the properties of Earth
- To compare and contrast the properties of small bodies in the solar system.

Overview: Planets and a variety of other bodies form a system of objects orbiting the sun.

Goals:

- Students will be able to relate that the mountains around the edge of the Maria on the Moon were probably created by impacts of bodies from space.
- Students will be able to explain that the Moon probably has not had tectonic activity recently. There is no magnetic field and though the Moon once had lava flows, there is no evidence of recent volcanic activity. The craters are still there and are not being shifted or moved around and they are not being filled with lava.
- Students will be able to relate that the phases of the Moon are caused by the relative positions of the Sun, Earth, and Moon.
- Students will be able to explain that lunar eclipses are caused by the Moon going into Earth's shadow and solar eclipses are caused by the Moon going between the Sun and Earth, casting a shadow on Earth.
- Students will be able to explain that a total solar eclipse can be seen from only a small part of Earth. The umbrella of the Moon's shadow is relatively small and casts only a small shadow over Earth's surface.
- Students will be able to describe that tides are caused primarily by the pulls of the Moon and Earth on each other.
- Students will be able to tell that a new Moon might bring on a spring tide.
- The students will be able to construct an overview of the Solar System
- The students will be able to identify and explain early theories
- The students will be able to identify and explain the Heliocentric Model
- The students will be able to list the order of planets starting closest to the Sun: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune
- The students will be able to describe the role of gravity in the motions within galaxies and the solar system.
- The students will be able to explain the Laws of Planetary Motion
- The students will be able to explain what universal gravitation is and the

role that it played in the formation of the Solar System

- The students will be able to explain the composition and structure of the Solar System
- The students will be able to explain how the Sun produces energy
- The students will be able to describe the rotation of the Sun.
- The students will be able to differentiate among solar activity such as sunspots, solar flares, and prominences
- The students will be able to identify the important characteristics of Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
- The students will be able to identify the important characteristics of Dwarf Planets
- The students will be able to identify the important characteristics of Kuiper Belt Objects, Comets, and the Oort Cloud
- The students will be able to identify the important characteristics of asteroids
- The students will be able to identify the important characteristics of meteors

Objectives:

1. Describe the surface of the Moon. (DOK Level 2)
2. Describe the phases of the Moon. (DOK Level 2)
3. Explain solar and lunar eclipses. (DOK Level 3)
4. Explain ocean tides. (DOK Level 3)
5. Explain and compare various historical models of the solar system. (DOK Level 3)
6. Explain the role that gravity played in the formation of the solar system and in determining the motion of the planets (DOK Level 3)
7. Describe the structure and rotation of the sun, energy production and transport in the sun, and solar activity. (DOK Level 2)
8. Describe some of the properties of the terrestrial planets and how the properties of Mercury, Venus, and Mars differ from the properties of Earth (DOK Level 2)
9. Describe some of the properties of the gas giant planets and how these properties differ from properties of Earth (DOK3)
10. Compare and contrast the properties of small bodies in the solar system. (DOK 3)

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Discuss the difference between the Moon and Earth.
3. Illustrate the phases of the Moon.
4. Discuss the difference between Solar and Lunar eclipses.
5. Present the causes of the tides.
6. Present unit vocabulary in a format to aid in retention and application of knowledge.
7. Define solar system.
8. Define geocentric and heliocentric.
9. Describe Aristotle's explanation of the universe and how Aristarchus' view of the solar system differed from that of Aristotle.

10. Define parallax and explain the "parallax problem."
11. Explain the contributions of Copernicus, Kepler, and Galileo to the heliocentric model of the solar system.
12. Define gravity.
13. State Kepler's first, second, and third laws of planetary motion.
14. State Newton's law of universal gravitation.
15. Define centripetal force
16. Describe the formation of the solar system.
17. Define terrestrial planet and identify some general physical properties.
18. Describe the physical properties of Mercury.
19. Describe the physical properties of Venus.
20. Explain the difference between prograde and retrograde rotation.
21. Describe the physical properties of Earth.
22. Describe the physical properties of Mars.
23. Define gas giant planet and identify some physical properties.
24. Describe the physical properties of Jupiter.
25. Describe the physical properties of Saturn.
26. Describe the physical properties of Uranus.
27. Describe the physical properties of Neptune.
28. Define dwarf planet.
29. Describe the composition, size, and speed of dwarf planets and where they are located.
30. Define and describe the Kuiper Belt and Kuiper Belt objects, including comets. Define and describe the Oort cloud.
31. Define and describe an asteroid.
32. Define and describe meteoroids, meteors, and meteorites

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 10 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

Delaware Valley School District

Curriculum Plan

Unit Eleven: The Earth-Sun-Moon System **Marking Period:** 4

Standard(s):

Standards Addressed:
3.4.7.D

Anchor(s):
S8.A.1.1.4

Big Idea: Earth and the moon move in predictable ways and have predictable effects on each other as they orbit the sun.

Essential Questions:

- How are Earth's days, years, and seasons related to the way Earth moves in space?
- How do Earth, the moon, and the sun affect each other?
- What causes tides?

Concepts:

- Earth's Rotation
- Earth's Orbit Around the Sun
- Earth's Tilted Axis and Solar
- Energy
- The Seasons
- Earth, Moon, and Sun
- Phases of the Moon
- Lunar Eclipses
- Solar Eclipses
- Tides and Their Causes
- Tidal Ranges
- Tidal Cycles

Competencies:

- To relate Earth's days, years, and seasons to Earth's movement in space
- To describe the effects that the sun and the moon have on Earth, including gravitational attraction, moon phases, and eclipses
- To explain what tides are and what causes them in Earth's oceans and to describe variations in the tides

Overview: This unit is designed to show that Earth and the moon move in predictable ways and have predictable effects on each other as they orbit the sun.

Goals:

- Students will be able to relate that rotation is one complete turn of a planet on its axis. A day is the time it takes for a planet to complete one turn on its axis.
- Earth rotates about its axis once in approximately 24 hours, so a solar day on Earth is 24 hours long.
- A revolution is one complete trip of a planet around the sun.
- A year is the time it takes a planet to complete one revolution around the sun.
- Each complete revolution of Earth around the sun takes 365¼ days, or about 1 year.
- Earth's axis is tilted 23.5 degrees. The parts of Earth tilted toward the sun are warmer and receive the sun's rays head-on.
- Near the equator, the temperatures are almost the same year round. Near the poles, there are large changes in temperatures.
- There are more hours of daylight in the Northern Hemisphere when the North Pole is tilted toward the sun.
- The tilt of Earth's axis causes the seasons.
- At an equinox, the hours of daylight and darkness are about equal everywhere.
- At a solstice, the area of sunlight is at a maximum in one hemisphere and a minimum in the other hemisphere.
- Gravity is the force exerted by all bodies
- with mass that pulls other objects with mass
- toward themselves.
- Because Earth orbits the sun and the moon orbits Earth, at times, the moon is between Earth and the sun.
- Only one side of the moon can be seen from Earth because the moon turns once on its axis each time it orbits Earth.
- Lunar phases are the different appearances of the moon due to its changing position relative to the sun and Earth.
- During a new moon, the moon is between Earth and the sun. As the moon moves along its orbit, the sunlit side of the moon waxes until a full moon is seen, when Earth is between the sun and the moon. Then, the sunlit side of the moon wanes until a new moon is seen.
- A lunar eclipse happens when the entire
- moon passes through Earth's shadow.
- A total lunar eclipse occurs when the moon passes through Earth's umbra, the darkest part of its shadow.
- A partial lunar eclipse occurs when part of the moon stays sunlit.
- A solar eclipse occurs when the moon's shadow falls onto part of Earth.
- A total eclipse is seen by people who are at locations within the umbra.
- A solar eclipse occurs when the moon's shadow falls onto part of Earth.
- A total eclipse is seen by people who are at locations within the umbra.

Objectives:

1. To relate Earth's days, years, and seasons to Earth's movement in space (DOK Level 2)
2. To describe the effects, the sun and the moon have on Earth, including gravitational attraction, moon phases, and eclipses (DOK Level 2)
3. To explain what tides are and what causes them in Earth's oceans and to describe variations in the tides (DOK Level 3)

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Present Earth's rotation on its axis
3. Present Earth's orbit around the sun
4. Present Earth's tilted axis and solar energy
5. Present how the seasons occur
6. Present a model of the Earth, Moon, and Sun and how their relative positions create the phases of the Moon
7. Provide illustrations of lunar eclipses
8. Provide illustrations of solar eclipses
9. Present models of tides and explain their causes
10. Present models of tidal ranges
11. Present models of tidal cycles

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 11 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum

- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

Delaware Valley School District

Curriculum Plan

Unit Twelve: Exploring Space **Marking Period:** 4

Standard(s):

Standards Addressed: 3.1.7.C, 3.4.7.D

Anchor(s): 3.4.7.D

Big Idea: People develop and use technology to explore and study space.

Essential Questions:

- What can we learn from space images?
- How do we explore space?
- What are some milestones of space exploration?

Concepts:

- The Electromagnetic Spectrum
- Observing and Detecting Electromagnetic Radiation
- Using Images from Space
- Introduction to the Technology of Space Exploration
- Crewed Exploration of Space
- Un-crewed Exploration of Space
- Artificial Satellites
- Introduction to Space Exploration
- Crewed Space Exploration
- Un-crewed Space Exploration

Competencies:

- Describe ways of collecting information from space and analyze how different wavelengths of the electromagnetic spectrum provide different information
- Describe how technology has increased our knowledge and understanding of space
- Understand some of the achievements of space exploration

Overview: This unit is designed to show students how technology is used in crewed and un-crewed space exploration.

Goals:

- Students will be able to describe the electromagnetic spectrum

- Students will be able to discuss observing and detecting electromagnetic radiation
- Students will be able to describe images from space
- Students will be able to explain technology used in space exploration
- Students will be able to explain artificial satellites
- Students will be able to discuss the differences between crewed space exploration and un-crewed space exploration

Objectives:

1. Describe ways of collecting information from space and analyze how different wavelengths of the electromagnetic spectrum provide different information (DOK Level 3)
2. Describe how technology has increased our knowledge and understanding of space (DOK Level 3)
3. Explain some of the achievements of space exploration (DOK Level 2)

Core Activities and Corresponding Instructional Methods:

1. Present unit vocabulary in a format to aid in retention and application of knowledge.
2. Describe the electromagnetic spectrum and its parts.
3. Explain how they are related in terms of wavelength, frequency, and energy.
4. Describe how telescopes and detectors are used in space science.
5. Describe how people can make observations from a distance.
6. Compare images taken from space with other types of information.
7. Give examples of the uses of images from space of earth and of other objects.

Assessments:

Diagnostic:

- Pretests
- Class Discussions
- Teacher Observations

Formative:

- Teacher Observations
- Class Discussions
- Quizzes
- Assignments
- Homework Assignments
- Practice Tests
- Laboratory Exploration

Summative:

- Unit 12 Test
- Major Projects

Extensions:

- Lab Manual Workbook
- Google Expeditions
- Digital Curriculum
- Take It Home
- School-Home Connection

Correctives:

- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies

Materials and Resources:

- Write-in Student Edition
- Teacher Edition
- Lab Manual Workbook
- Digital Curriculum
- Google Expeditions
- Take It Home
- School-Home Connection
- Leveled TE Activities
- Alternative Assessment Worksheets
- Online Student Edition
- Differentiated Instruction Strategies
- SAS Website
- Various websites and online resources

Primary Textbook(s) Used for this Course of Instruction

Name of Textbook:

Science Fusion: The Dynamic Earth
Science Fusion: Earth's Water and Atmosphere
Science Fusion: Space Science

Textbook ISBN #:

987-0-544-77863-4
987-0-544-77864-2
987-0-544-77865-8

Textbook Publisher & Year of Publication:

Houghton Mifflin Harcourt 2017 Curriculum Textbook is utilized in (title of course): 6th Grade Earth Science

Appendix

Vocabulary Terms

Unit One: Earth's Surface

Earth system geosphere hydrosphere cryosphere atmosphere biosphere energy budget	weathering physical weathering chemical weathering abrasion oxidation acid precipitation	erosion deposition floodplain delta alluvial fan ground water shoreline beach sandbar barrier island	dune loess glacier glacier drift creep rockfall landslide mudflow	soil humus soil profile soil horizon

Unit Two: Earth's History

uniformitarianism fossil trace fossil climate ice core	relative dating superposition unconformity fossil geologic column	absolute dating radiometric dating radioactive decay half-life	geology geologic time scale

Unit Three: Minerals and Rocks

mineral element atom compound matter crystal streak luster cleavage	weathering erosion deposition igneous rock sedimentary rock metamorphic rock rock cycle uplift subsidence rift zone	rock composition texture

Unit Four: The Restless Earth

core crust mantle convection lithosphere asthenosphere mesosphere	Pangaea convection sea-floor spreading divergent boundary convergent boundary transform boundary plate tectonics tectonic plate	deformation compression tension shear stress folding fault	volcano magma lava vent tectonic plate hot spot	earthquake epicenter focus fault elastic rebound deformation tectonic plate boundary	focus seismic waves magnitude epicenter seismogram intensity

Unit Five: Earth's Water

polarity cohesion adhesion specific heat solvent	water cycle evaporation transpiration sublimation condensation precipitation	surface water groundwater water table channel tributary watershed divide aquifer

Unit Six: Oceanography

salinity continental margin mid-ocean ridge thermocline deep-ocean basin ocean trench	wave ocean wave crest trough wavelength wave period mechanical wave tsunami	ocean current surface current Coriolis effect deep current convection current upwelling

Unit Seven: Earth's Atmosphere

atmosphere mesosphere ozone layer air pressure stratosphere greenhouse effect thermosphere troposphere	temperature thermal energy thermal expansion heat radiation convection conduction	wind Coriolis effect global wind jet stream local wind

Unit Eight: Weather and Climate

weather humidity relative humidity dew point precipitation air pressure wind visibility	cloud dew point stratus cloud cumulus cloud cirrus cloud fog	air mass jet stream front	thunderstorm lightning thunder hurricane storm sturge tornado	weather forecasting meteorology station model	weather latitude elevation climate topography surface current	ice age greenhouse effect global warming

Unit Nine: The Universe

solar system galaxy planet light-year star universe	star luminosity apparent magnitude absolute magnitude	nebula neutron star white dwarf H-R diagram supernova main sequence

Unit Ten: The Solar System

solar system parallax heliocentric geocentric	gravity perihelion planetesimal orbit centripetal force aphelion solar nebula	nuclear fusion solar flare sunspot prominence	terrestrial planet astronomical unit	gas giant planetary ring	dwarf planet comet meteoroid Kuiper Belt Oort cloud meteor Kuiper Belt object asteroid meteorite

Unit Eleven: The Earth-Moon-Sun System

rotation day revolution year season equinox solstice	satellite gravity lunar phases eclipse umbra penumbra	tide tidal range spring tide neap tide

Unit Twelve: Exploring Space

wavelength electromagnetic spectrum spectrum	space shuttle probe orbiter lander rover artificial satellite	NASA

Standard and Anchors Science Standards

3.1.7.B Describe the use of models as an application of scientific or technological concepts…

- Apply models to predict specific results and observations…

3.1.7.C Identify patterns as repeated processes or recurring elements in science and technology.

- Identify different forms of patterns and use them to group and classify specific objects…

3.1.7.D Explain scale as a way of relating concepts and ideas to one another by some measure.

- Describe scale as a form of ratio and apply to a life situation.

3.2.7.B Apply process knowledge to make and interpret observations…

- Describe relationships by making inferences and predictions.
- Communicate, use space/time relationships, define operationally, raise questions, formulate hypotheses, test and experiment…
- Interpret data, formulate models, design models, and produce solutions.

3.3.7.D Explain basic concepts of natural selection…

- Describe the role that fossils play in studying the past…
- Explain how biologic extinction is a natural process…

3.4.7.D Describe essential ideas about the composition and structure of the universe and the Earth's place in it.

- Compare various plants' characteristics.
- Describe basic star types and identify the sun as a star type.
- Describe and differentiate comets, asteroids, and meteors.
- Identify gravity as the force that keeps planets in orbit around the sun and governs the rest of the movement of the solar system and the universe.
- Illustrate how the positions of stars and constellations change in relation to the Earth during an evening and from month to month.

3.5.7.A Describe Earth features and processes.

- Describe major layers of the Earth.
- Describe the processes involved in the creation of geologic features (e.g., folding, faulting, volcanism, sedimentation) and that these processes seen today (e.g., erosion, weathering crustal plate movement) are similar to those in the past…
- Distinguish between examples of rabid surface changes (e.g., landslides, earthquakes) and slow surface changes (e.g., weathering)…

3.5.7.B Recognize Earth resources and how they affect everyday life.

- Explain the process involved in the formation of oil and coal in Pennsylvania…

3.5.7.C Describe basic elements of meteorology.

- Explain weather forecasts by interpreting weather data and symbols.
- Explain the oceans' impact on local weather and the climate of a region.
- Identify how cloud types, wind directions, and barometric pressure changes are associated with weather patterns in different regions of the country.
- Explain and illustrate the processes of cloud formation and precipitation.
- Describe and illustrate the major layers of the Earth's atmosphere.
- Identify different air masses and global wind patterns and how they relate to the weather patterns in different regions of the U.S.

3.5.7.D Explain the behavior and impact of the Earth's water systems.

- Explain the water cycle using the processes of evaporation and condensation.
- Describe factors that affect evaporation and condensation…
- Compare the effect of water type (e.g., polluted, fresh, salt water) and the life contained in them…

3.6.7.A Explain biotechnologies that relate to related technologies of propagating, growing, maintaining, adapting, treating, and converting…

- Explain the factors that were taken into consideration when a specific object was designed…

3.8.7.B Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life…

4.2.7.B Examine the renewability of resources…

4.2.7.C Explain natural resource distribution.

- Distinguish between readily available and less accessible resources…

4.2.7.D Describe the role of recycling and waste management.

- Identify materials that can be recycled in the community…

Assessment Anchors and Eligible Content

S8.A.1.1 Explain, interpret, and apply scientific, environmental, or technological knowledge presented in a variety of formats (e.g. visuals, scenarios, graphs).

S8.A.1.2 Identify and explain the impacts of applying scientific, environmental, or technological knowledge to address solutions to practical problems.

S8.A.1.3 Identify and analyze evidence that certain variables may have caused measurable changes in natural or human-made systems.

S8.A.1.1.1 Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data/information may change existing theories and practices.

S8.A.1.1.2 Explain how certain questions can be answered through scientific inquiry and/or technological design.

S8.A.1.1.3 Use evidence, such as observations or experimental results, to support inferences about a relationship.

S8.A.1.1.4 Develop descriptions, explanations, predictions, and models using evidence.

S8.A.1.2.1 Describe the positive and negative, intended and unintended, effects of specific scientific results or technological developments (e.g., air/space travel, genetic engineering, nuclear fission/fusion, artificial intelligence, lasers, organ transplants).

S8.A.1.2.2 Identify environmental issues and explain their potential long-term health effects (e.g., pollution, pest controls, vaccinations).

S8.A.1.2.3 Describe fundamental scientific or technological concepts that could solve practical problems (e.g., Newton's laws of motion, Mendelian genetics).

S8.A.1.2.4 Explain society's standard of living in terms of technological advancements and how these advancements impact on agriculture (e.g., transportation, processing, production, storage).

S8.A.1.3.1 Use ratio to describe change (e.g., percents, parts per million, grams per cubic centimeter, mechanical advantage).

S8.A.1.3.2 Use evidence, observations, or explanations to make inferences about change in systems over time (e.g., carrying capacity, succession, population dynamics, loss of mass in chemical reactions, indicator fossils in geologic time scale) and the

variables affecting these changes.

S8.A.1.3.3 Examine systems changing over time, identifying the possible variables causing this change, and drawing inferences about how these variables affect this change.

S8.A.1.3.4 Given a scenario, explain how a dynamically changing environment provides for the sustainability of living systems.

S8.A.2.1 Apply knowledge of scientific investigation or technological design in different contexts to make inferences to solve problems.

S8.A.2.2 Apply appropriate instruments for specific purpose and describe the information the instrument can provide.

S8.A.2.1.1 Use evidence, observations, or a variety of scales (e.g., mass, distance, volume, temperature) to describe relationships.

S8.A.2.1.2 Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses.

S8.A.2.1.3 Design a controlled experiment by specifying how the independent variables will be manipulated, how the dependent variable will be measured, and which variables will be held constant.

S8.A.2.1.4 Interpret data/observations; develop relationships among variables based on data/observations to design models as solutions.

S8.A.2.1.5 Use evidence from investigations to clearly communicate and support conclusions.

S8.A.2.1.6 Identify a design flaw in a simple technological system and devise possible working solutions.

S8.A.2.2.1 Describe the appropriate use of instruments and scales to accurately and safely measure time, mass, distance, volume, or temperature under a variety of conditions.

S8.A.2.2.2 Apply appropriate measurement systems (e.g., time, mass, distance, volume, temperature) to record and interpret observations under varying conditions.

S8.A.2.2.3 Describe ways technology (e.g., microscope, telescope, micrometer, hydraulics, barometer) extends and enhances human abilities for specific purposes.

S8.A.3.1 Explain the parts of a simple system, their roles, and their relationships to the system as a whole.

S8.A.3.2 Apply knowledge of models to make predictions, draw inferences, or explain technological concepts.

S8.A.3.3 Describe repeated processes or recurring elements in natural, scientific, and technological patterns.

S8.A.3.1.1 Describe a system (e.g., watershed, circulatory system, heating system, agricultural system) as a group of related parts with specific roles that work together to achieve an observed result.

S8.A.3.1.2 Explain the concept of order in a system [e.g., (first to last: manufacturing steps, trophic levels); (simple to complex: cell, tissue, organ, organ system)].

S8.A.3.1.3 Distinguish among system inputs, system processes, system outputs, and feedback (e.g., physical, ecological, biological, informational).

S8.A.3.1.4 Distinguish between open loop (e.g., energy flow, food web) and closed loop (e.g., materials in the nitrogen and carbon cycles, closed-switch) systems.

S8.A.3.1.5 Explain how components of natural and human-made systems play different roles in a working system.

S8.A.3.2.1 Describe how scientists use models to explore relationships in natural systems (e.g., an ecosystem, river system, the solar system).

S8.A.3.2.2 Describe how engineers use models to develop new and improved technologies to solve problems.

S8.A.3.2.3 Given a model showing simple cause- and-effect relationships in a natural system, predict results that can be used to test the assumptions in the model (e.g., photosynthesis, water cycle, diffusion, infiltration).

S8.A.3.3.1 Identify and describe patterns as repeated processes or recurring elements in human-made systems (e.g., trusses, hub-and-spoke system in communications and transportation systems, feedback controls in regulated systems).

S8.A.3.3.2 Describe repeating structure patterns in nature (e.g., veins in a leaf, tree rings, crystals, water waves) or periodic patterns (e.g., daily, monthly, annually).

S8.D.1.1 Describe constructive and destructive natural processes that form different geologic structures and resources.

S8.D.1.3 Describe characteristic features of Earth's water systems or their impact on resources.

S8.D.1.1.1 Explain the rock cycle as changes in the solid earth and rock types (igneous – granite, basalt, obsidian, pumice; sedimentary – limestone, sandstone, shale, coal; and metamorphic – slate, quartzite, marble, gneiss).

S8.D.1.1.2 Describe natural processes that change Earth's surface (e.g., landslides, volcanic eruptions, earthquakes, mountain building, new land being formed, weathering, erosion, sedimentation, soil formation).

S8.D.1.1.3 Identify soil types (i.e., humus, topsoil, subsoil, loam, loess, and parent material) and their characteristics (i.e., particle size, porosity, and permeability) found in different biomes and in Pennsylvania, and explain how they formed.

S8.D.1.1.4 Explain how fossils provide evidence about plants and animals that once lived throughout Pennsylvania's history (e.g., fossils provide evidence of different environments).

S8.D.1.3.1 Describe the water cycle and the physical processes on which it depends (i.e., evaporation, condensation, precipitation, transpiration, runoff, infiltration, energy inputs, and phase changes).

S8.D.1.3.2 Compare and contrast characteristics of freshwater and saltwater systems on the basis of their physical characteristics (i.e., composition, density, and electrical conductivity) and their use as natural resources.

S8.D.1.3.3 Distinguish among different water systems (e.g., wetland systems, ocean systems, river systems, watersheds) and describe their relationships to each other as well as to landforms.

S8.D.1.3.4 Identify the physical characteristics of a stream and how these characteristics determine the types of organisms found within the stream environment (e.g., biological diversity, water quality, flow rate, tributaries, and surrounding watershed).

S8.D.2.1 Explain how pressure, temperature, moisture, and wind are used to describe atmospheric conditions that affect regional weather or climate.

S8.D.2.1.1 Explain the impact of water systems on the local weather or the climate of a region (e.g., lake effect snow, land/ocean breezes).

S8.D.2.1.2 Identify how global patterns of atmospheric movement influence regional weather and climate.

S8.D.2.1.3 Identify how cloud types, wind directions, and barometric pressure changes are associated with weather patterns in different regions of the country.

Checklist to Complete and Submit with Curriculum:

_____ **A hard copy of the curriculum using The template entitled "Planned Instruction," available on the district website**

_____ **Hard copies of all supplemental resources not available electronically**

_____ **The primary textbook form(s)**

_____ **The appropriate payment form, in compliance with the maximum curriculum writing hours noted on the first page of this document**

_____ **A USB/Flash Drive containing a single file that will print the curriculum in its intended sequence from beginning to end and all supplemental resources that are available in electronic format.**

Each principal and/or department chair has a schedule of First and Second Readers/Reviewers. Each Reader/Reviewer must sign & date below.

First Reader/Reviewer Printed Name_____

First Reader/Reviewer Signature_____**Date**_____

Second Reader/Reviewer Printed Name_____

Second Reader/Reviewer Signature_____**Date**

_____