

**Pequea Valley School District**  
**Science**

**Unit: Earth Science/ Space**

**Course: Science**

**Grade: 4**

**Planning the Focus Based on the Desired Result**  
**What do you want all students to know, understand and do by the end of the unit?**

**Unit Essential Question(s):**

Unit EQ: How does rotation and revolution affect our daily life?

What is rotation?

What is revolution?

How does rotation and revolution affect the weather?

What are the planets and constellations in our solar system?

**Keystone Eligible Content/PA Core Standard**

3.3.3.B1 - Relate the rotation of the earth and day/night, to the apparent movement of the sun, moon, and stars across the sky. Describe the changes that occur in the observable shape of the moon over the course of a month.

3.3.4.B1 - Identify planets in our solar system and their basic characteristics. Describe the earth's place in the solar system that includes the sun (a star), planets, and many moons. Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.

**Pacing:** Approximate number of class sessions per unit

- 1 - 2 days

**Tier 3 Vocabulary** (Content specific vocabulary)

- Rotation
- Revolution
- Stars
- Constellations

**Know** - What do learners need to **know** in order to be able to do and understand? *List concepts, such as facts, formulas, key vocabulary and knowledge "nuggets".*

- Relate the rotation of the earth and day/night, to the apparent movement of the sun, moon, and stars across the sky. Describe the changes that occur in the observable shape of the moon over the course of a month.
- Identify planets in our solar system and their basic characteristics. Describe the earth's place in the solar system that includes the sun (a star), planets, and many moons. Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.

**Understand** - What do learners need to **understand**? What is the **big idea**? *List broad concepts or “big ideas” in a statement of enduring understanding.*

- Relate the rotation of the earth and day/night, to the apparent movement of the sun, moon, and stars across the sky. Describe the changes that occur in the observable shape of the moon over the course of a month.
- Identify planets in our solar system and their basic characteristics. Describe the earth’s place in the solar system that includes the sun (a star), planets, and many moons. Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.

**Learning Outcome** - What do learners need to be able to **accomplish** by the unit’s end? *List skills and competencies. (Culminating Project of Demonstrating Mastery)*

- Explain how rotation is related to the sun, and moon.
- Demonstrate how the seasons are related to the revolution of the earth.
- Identify the planets in our solar system.
- Recognize we are part of a complex system of planets, stars and galaxies.

**Literature:**

**Software/Resources:**

Planetarium visit

**Pequea Valley School District**  
**Science**

**Unit: Ecosystems**

**Course: Science**

**Grade: 4**

**Planning the Focus Based on the Desired Result**  
**What do you want all students to know, understand and do by the end of the unit?**

**Unit Essential Question(s):**

Unit EQ: How do organisms live, grow, respond to their environment and reproduce?

Lesson EQ's:

What can we learn about ecosystems from observing relationships that exist on earth?

What are the relationships between organisms in an ecosystem?

How does nature affect an ecosystem?

How do humans affect an ecosystem?

How can people help to stop the effects of pollutants on ecosystems?

What are the different types of water in an ecosystem?

**Keystone Eligible Content/PA Core Standard**

**3.1.4.A1** Classify plants and animals according to the physical characteristics that they share.

**3.1.4.A2** Describe the different resources that plants and animals need to live.

**3.1.4.A3** Identify differences in the life cycles of plants and animals.

**3.1.4.A4** Describe common functions living things share to help them function in a specific environment.

**3.3.4.A4** Recognize Earth's different water resources, including both fresh and saltwater. Describe phase changes in the forms of water on Earth.

**3.3.4.A6** MODELS/SCALE Identify basic landforms using models and simple maps. CONSTANCY/ CHANGE Identify simple changes in the earth system as air, water, soil and rock interact. SCALE Explain how basic weather elements are measured.

**Pacing:** Approximate number of class sessions per unit

- 5-6 weeks

**Tier 3 Vocabulary** (Content specific vocabulary)

- Behaviors
- Reproduce
- Structure
- Lentic
- Lotic
- Producers

- Consumers
- Decomposers

**Know** - What do learners need to **know** in order to be able to do and understand? *List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.*

- Reproduction is essential to the continued existence of every kind of organisms
- Plants and animals have unique and diverse life cycles that include birth, growth, reproduction, and death.
- Animals depend on each other and their surroundings to get what they need, including food, water, shelter and a stable temperature. Groups have different functions and vary in size.
- When changes in physical characteristics, temperature, availability of resources, some organisms survive, others move, yet others may die.
- The environment also affects the traits that an organism develops
- Water occurs underground, above ground, and in the atmosphere
- A variety of hazards result from natural processes. Humans cannot eliminate the hazards, but can take steps to reduce the impact.
- Food chains and food webs are used to show how animals and plants support one another.

**Understand** - What do learners need to **understand**? What is the **big idea**? *List broad concepts or “big ideas” in a statement of enduring understanding.*

- Reproduction is essential to the continued existence of every kind of organisms
- Plants and animals have unique and diverse life cycles that include birth, growth, reproduction, and death.
- Animals depend on each other and their surroundings to get what they need, including food, water, shelter and a stable temperature. Groups have different functions and vary in size.
- When changes in physical characteristics, temperature, availability of resources, some organisms survive, others move, yet others may die.
- The environment also affects the traits that an organism develops
- Water occurs underground, above ground, and in the atmosphere
- A variety of hazards result from natural processes. Humans cannot eliminate the hazards, but can take steps to reduce the impact.
- Food chains and food webs are used to show how animals and plants support one another.

**Learning Outcome** - What do learners need to be able to **accomplish** by the unit’s end? *List skills and competencies, NOT learning activities.*

- Identify the various types of water environments in Pennsylvania
- Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
- Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
- Use models to explain how reproduction is essential for every kind of organism.
- Develop a model to describe the commonalities of life cycles of different organisms.
- Based on observations, construct an argument that some animals form groups that help members survive.
- Create a graphic source to represent the interdependence of plants and animals in an ecosystem.

**Literature:**

**Software/Resources:**

STC Ecosystems Unit

Additional readings from:

Readworks.com

PSSA Finish Line 4th grade Science; Continental Press

Ladders to Success Science Level C; Triumph Learning

**Pequea Valley School District**  
**Science**

**Unit: Electric Circuits**

**Course: Science**

**Grade: 4**

**Planning the Focus Based on the Desired Result**  
**What do you want all students to know, understand and do by the end of the unit?**

**Unit Essential Question(s):**

Unit EQ: How does electricity flow?

Lesson EQ's:

How does electricity flow?

What is an insulator and a conductor?

What is the difference between a series and a parallel circuit?

What kinds of energy are produced by a complete circuit?

**Keystone Eligible Content/PA Core Standard**

**3.2.4.B3** - Understand that objects that emit light often emit heat.

**3.2.3.B4** - Identify and classify objects and materials that are conductors or insulators of electricity. Identify and classify objects and materials as magnetic or non-magnetic.

**3.2.4.B4** - Apply knowledge of basic electrical circuits to the design and construction of simple direct current circuits. Compare and contrast series and parallel circuits. Demonstrate that magnets have poles that repel and attract each other.

**Pacing:** Approximate number of class sessions per unit

- 3-4 weeks

**Tier 3 Vocabulary** (Content specific vocabulary)

- Conductor
- Electricity
- Insulator
- Parallel circuit
- Series circuit
- System
- Closed Circuit
- Open circuit
- Switch
- Current

**Know** - What do learners need to **know** in order to be able to do and understand? *List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.*

- Materials that allow electricity to flow are conductors: those that do not are insulators.
- Electrical circuits require a complete loop through which an electrical current can pass.
- An open circuit is an incomplete electric pathway; a closed circuit is a complete pathway.
- Types of circuits, parallel and series
- Electricity in circuits produce a magnetic field as well as light and heat.

**Understand** - What do learners need to **understand**? What is the **big idea**? *List broad concepts or “big ideas” in a statement of enduring understanding.*

- Student will understand that materials that allow electricity to flow are conductor: those that do not are insulators.
- Student will understand that electrical circuits require a complete loop through which an electrical current can pass.
- Student will understand that an open circuit is an incomplete electric pathway; a closed circuit is a complete pathway.
- Student will understand there are different types of circuits, parallel and series.

**Learning Outcome** - What do learners need to be able to **accomplish** by the unit’s end? *List skills and competencies, NOT learning activities.*

- Investigate and describe conductors and insulators
- Construct series and parallel circuits and describe the path of electrons in the circuit
- Demonstrate and explain open and closed circuits utilizing switches
- Demonstrate how a magnetic field, heat and light are all produced by a complete circuit

### **Literature:**

### **Software/Resources:**

STC Electric Circuits Kit

PSSA Finish Line 4th grade Science; Continental Press

Ladders to Success Science Level C; Triumph Learning

**Pequea Valley School District**  
**Science**

**Unit: Forces and Motion**

**Course: Science**

**Grade: 4**

**Planning the Focus Based on the Desired Result**  
**What do you want all students to know, understand and do by the end of the unit?**

**Unit Essential Question(s):**

Unit EQ: How can one explain and predict interactions between objects within a system?

Lesson EQ's:

What is force?

How can you determine an object has moved?

How can you predict what will happen to the object due to a force?

**Keystone Eligible Content/PA Core Standard**

**3.2.3.B1** - Explain how movement can be described in many ways.

**3.2.4.B1** - Explain how an object's change in motion can be observed and measured.

**3.2.2.B2** - Explore energy's ability to cause motion or create change.

**3.2.3.B2** - Explore how energy can be found in moving objects, light, sound, and heat.

**3.2.4.B2** - Identify types of energy and their ability to be stored and changed from one form to another.

**Pacing:** Approximate number of class sessions per unit

- 4 - 5 weeks

**Tier 3 Vocabulary** (Content specific vocabulary)

- Force
- Motion
- Pattern
- Gravity
- Energy
- Collision
- Heat
- Light
- Magnets
- Sound
- Transformation

- Conversion
- Renewable
- Non-renewable
- Energy transfer

**Know** - What do learners need to **know** in order to be able to do and understand? *List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.*

- Objects in contact exert forces on each other.
- When past motion exhibits a regular pattern, future motion can be predicted from it.
- The faster a given object is moving, the more energy it possesses.
- Energy can be moved from place to place by moving objects through sound, light, or electric currents.
- Energy and fuels that humans use are derived for natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time and others are not.
- When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air. As a result, the air gets heated and sound is produced.

**Understand** - What do learners need to **understand**? What is the **big idea**? *List broad concepts or “big ideas” in a statement of enduring understanding.*

- Objects in contact exert forces on each other.
- When past motion exhibits a regular pattern, future motion can be predicted from it.
- The faster a given object is moving, the more energy it possesses.
- Energy can be moved from place to place by moving objects through sound, light, or electric currents.
- Energy and fuels that humans use are derived for natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time and others are not.
- When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air. As a result, the air gets heated and sound is produced.

**Learning Outcome** - What do learners need to be able to **accomplish** by the unit’s end? *List skills and competencies, NOT learning activities.*

- Use evidence to construct an explanation for the relationship between speed, energy and motion
- Carry out investigation to provide evidence that energy is transferred from place to place by sound, light, heat, electric currents, interacting magnets and moving or colliding objects.
- Obtain and communicate information for how technology allows humans to concentrate, transport, and store energy for practical use.
- Design and construct a device that converts energy from one form to another using given design criteria
- Develop a model using examples to explain differences between renewable and non-renewable sources of energy.
- Carry out investigations to provide evidence that energy is transferred from place to place by sound, light, heat, electric currents, interacting magnets, and moving or colliding objects
- Construct and explanation for the relationship between energy and motion
- Investigate the motion of objects to determine observable and measureable patterns to predict future motions

- Provide evidence that a pattern can be used to predict future motion
- Design and implement an investigation to demonstrate that objects in contact exert forces on each other.
- Ask questions and predict outcomes about the changes in energy that occur when objects collide.

**Literature:**

**Software/Resources:**

Speedology kit from Hot Wheels

PSSA Finish Line 4th grade Science; Continental Press

Ladders to Success Science Level C; Triumph Learning

**Pequea Valley School District**  
**Science**

**Unit: Landforms**

**Course: Science**

**Grade: 4**

**Planning the Focus Based on the Desired Result**  
**What do you want all students to know, understand and do by the end of the unit?**

**Unit Essential Question(s):**

Unit EQ: What are the basic landforms of PA and how are they formed? What are fossils and how are they formed?

Lesson EQ's:

What are the basic landforms?

What are the basic properties of Earth Materials and how do we differentiate between materials?

What are fossils and how are they formed?

How are landforms changed over time?

How does a map show landforms?

**Keystone Eligible Content/PA Core Standard**

**3.3.4.A1** - Describe basic landforms. Identify the layers of the earth. Recognize that the surface of the earth changes due to slow processes and rapid processes.

**3.3.4.A2** - Identify basic properties and uses of Earth's materials including rocks, soils, water, and gases of the atmosphere.

**3.3.4.A3** - Recognize that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time.

**3.3.4.A6** - MODELS/SCALE Identify basic landforms using models and simple maps. CONSTANCY/ CHANGE Identify simple changes in the earth system as air, water, soil and rock interact. SCALE Explain how basic weather elements are measured.

**Pacing:** Approximate number of class sessions per unit

- 1-2 weeks

**Tier 3 Vocabulary** (Content specific vocabulary)

- Glaciation
- Erosion
- Fossils
- Artifacts
- Piedmont

**Know** - What do learners need to **know** in order to be able to do and understand? *List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.*

- Describe basic landforms. Identify the layers of the earth. Recognize that the surface of the earth changes due to slow processes and rapid processes.
- Identify basic properties and uses of Earth’s materials including rocks, soils, water, and gases of the atmosphere.
- Recognize that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time.
- MODELS/SCALE Identify basic landforms using models and simple maps. CONSTANCY/ CHANGE Identify simple changes in the earth system as air, water, soil and rock interact. SCALE Explain how basic weather elements are measured.

**Understand** - What do learners need to **understand**? What is the **big idea**? *List broad concepts or “big ideas” in a statement of enduring understanding.*

- Identify Basic landforms
- Identify Layers of the earth
- What causes the changes in the earth’s surface?
- Properties of rocks, soils, water and gases
- What is a fossil? Where did they come from?

**Learning Outcome** - What do learners need to be able to **accomplish** by the unit’s end? *List skills and competencies, NOT learning activities.*

- Describe basic landforms. Identify the layers of the earth. Recognize that the surface of the earth changes due to slow processes and rapid processes.
- Identify basic properties and uses of Earth’s materials including rocks, soils, water, and gases of the atmosphere.
- Recognize that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time.
- MODELS/SCALE Identify basic landforms using models and simple maps. CONSTANCY/ CHANGE Identify simple changes in the earth system as air, water, soil and rock interact. SCALE Explain how basic weather elements are measured.

**Literature:**

**Software/Resources:**

Scott Foresman PA - Social Studies book Unit 1 Chapter 1 and Unit 2 Chapter 3

**Pequea Valley School District**  
**Science**

**Unit: Weather**

**Course: Science**

**Grade: 4**

**Planning the Focus Based on the Desired Result**  
**What do you want all students to know, understand and do by the end of the unit?**

**Unit Essential Question(s):**

Unit EQ: How and why is Earth constantly changing?

Lesson EQ's:

What is weather?

How do you measure the weather?

What are the tools used to collect weather data?

What predictions can we make from the weather data?

**Keystone Eligible Content/PA Core Standard**

**3.2.3.B3** - Explore temperature changes that result from the addition or removal of heat.

**3.2.4.A1** - Identify and classify objects based on their observable and measurable physical properties. Compare and contrast solids, liquids, and gases based on their properties.

**3.2.4.A2** - Demonstrate that materials are composed of parts that are too small to be seen without magnification.

**3.3.4.A2** - Identify basic properties and uses of Earth's materials including rocks, soils, water, and gases of the atmosphere

**3.3.3.A4** - Connect the various forms of precipitation to the weather in a particular place and time.

**3.3.4.A4** - Recognize Earth's different water resources, including both fresh and saltwater. Describe phase changes in the forms of water on Earth.

**3.3.3.A5** - Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time

**3.3.4.A5** - Describe basic weather elements. Identify weather patterns over time.

**3.3.4.A6** - MODELS/SCALE Identify basic landforms using models and simple maps. CONSTANCY/ CHANGE Identify simple changes in the earth system as air, water, soil and rock interact. SCALE Explain how basic weather elements are measured.

**Pacing:** Approximate number of class sessions per unit

- 3- 4 weeks

**Tier 3 Vocabulary** (Content specific vocabulary)

- Atmosphere
- Weather
- Data
- Climate

- Conditions
- Meteorologist
- Barometer
- Anemometer
- Wind vane
- Rain Gauge
- Thermometer
- Celsius
- Fahrenheit
- Cloud types - Cumulus, Stratus, Cirrus, Cumulonimbus
- Water cycle

**Know** - What do learners need to **know** in order to be able to do and understand? *List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.*

- Scientists record patterns of the weather across different times and areas of the weather so that they can make predictions about what kind of weather might happen next.
- Climate describes a range of an area’s typical weather conditions and the extent to which those conditions vary over a period of many years.
- Scientists use various tools to collect data.
- Understand and label the parts of the water cycle.

**Understand** - What do learners need to **understand**? What is the **big idea**? *List broad concepts or “big ideas” in a statement of enduring understanding.*

- Scientists record patterns of the weather across different times and areas of the weather so that they can make predictions about what kind of weather might happen next.
- Climate describes a range of an area’s typical weather conditions and the extent to which those conditions vary over a period of many years.
- Scientists use various tools to collect data.
- Understand and label the parts of the water cycle.

**Learning Outcome** - What do learners need to be able to **accomplish** by the unit’s end? *List skills and competencies, NOT learning activities.*

- Organize simple weather data sets to record local weather data and identify day-to-day variations, as well as, long-term patterns of weather.
- Record and communicate information to describe climates in different regions of the world.
- Display simple data sets in tables and graphs to display previous weather conditions to make predictions for future seasons.
- Research and present information about other weather types; how they are formed, the effects on people and environments and tools used to predict these events.

**Literature:**

Weather Unit by Delta

PSSA Finish Line 4th grade Science; Continental Press

Ladders to Success Science Level C; Triumph Learning

National Geographic readers on Extreme weather: Floods, Hurricanes, Tornadoes, and Droughts

**Software/Resources:**