

Grade(s): 3

Unit: The Scientific Method & Physics

Subject: Science

Timeline: Week 1 to 12

Purpose:

To Introduce the scientific method to students and provide opportunities for them to learn and apply the scientific method to the physical sciences including physics, chemistry, sound and light.

Stage One - Desired Results

Enduring Understandings:What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."

- Patterns exist in the universe
- Structure determines function
- Systems interact and influence each other
- Forces influence matter and its actions
- Energy and matter exists in different forms with multiple uses
- Scientists use specific methods, design processes and tools and technology to solve problems and collect information

Essential Questions:What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

- Why do things move the way they do?
- If you wanted to teach yourself something new, how would you try to learn it?
- How can studying patterns and making predictions help a scientist?
- What properties make a solid a solid, a liquid a liquid, and gas a gas?

Learning Targets:

- I can list the steps of the scientific method, and explain what each one means.
- I can use all of the steps of the scientific method to reach a conclusion.
- I can predict a result, conduct an investigation, and reflect on my hypothesis.
- I can provide evidence to support my thinking.
- I can observe when the energy of an object in motion transfers to another object.
- I can provide a force to an object and explain why it will move or not move.
- I can predict what will happen to an object when a force is applied to it.
- I can explain how vibrations of objects and the air around them creates sound.
- I can explain that light travels in a straight line and can reflect off of surfaces.

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.2.3.A1 \(Advanced\)](#) Differentiate between properties of objects such as size, shape, and weight and properties of materials that make up the objects such as color, texture, and hardness. Differentiate between the three states of matter, classifying a substance as a solid, liquid, or gas.

[3.2.3.A2 \(Advanced\)](#) Recognize that all objects and materials in the world are made of matter.

[3.2.4.A1 \(Advanced\)](#) Identify and classify objects based on their observable and measurable physical properties. Compare and contrast solids, liquids, and gases based on their properties.

- [3.2.3.B1 \(Advanced\)](#) Explain how movement can be described in many ways.
- [3.2.3.B2 \(Advanced\)](#) Explore energy's ability to cause motion or create change. Explore how energy can be found in moving objects, light, sound, and heat.
- [3.2.3.B5 \(Advanced\)](#) Recognize that light travels in a straight line until it strikes an object or travels from one material to another.
- [3.2.4.B1 \(Advanced\)](#) Describe objects in the world using the five senses.
- [3.2.4.B5 \(Advanced\)](#) Demonstrate how vibrating objects make sound and sound can make things vibrate. Demonstrate how light can be reflected, refracted, or absorbed by an object.

NATIONAL: NGSS - US Next Generation Science Standards (April 2013)

- [3-PS2-1 \(Advanced\)](#) Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- [3-PS2-2 \(Advanced\)](#) Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- [4-PS3-1 \(Advanced\)](#) Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- [4-PS3-2 \(Advanced\)](#) Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- [4-PS3-3 \(Advanced\)](#) Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- [4-PS4-1 \(Advanced\)](#) Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
- [4-PS4-2 \(Advanced\)](#) Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
- [4-PS4-3 \(Advanced\)](#) Generate and compare multiple solutions that use patterns to transfer information.*

Unit: Earth Systems

Subject: Science

Timeline: Week 13 to 24

Purpose:

The students can identify earth features and recognize changes that occur due to weather and natural processes (rapid/slow).

Stage One - Desired Results

Enduring Understandings:What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."

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Essential Questions:What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

- How does the earth change and does it change permanently?
- When a change occurs to the Earth's surface, how could it affect living things?
- Why are there different types of weather around the Earth?

Learning Targets:

- I can analyze data to predict weather patterns for a particular season.
- I can collect data about weather and record my findings in a table.
- I can explain how the angle of the sun's rays affect an area's weather system.
- I can name and describe the layers of the earth (Crust, Mantle, Outer Core, Inner Core)
- I can describe ways that the Earth's surface can change over time.
- I can explain the processes that cause earthquakes, volcanic eruptions, and tsunamis.
- I can compare and contrast slow and fast changes to the Earth's surface.
- I can represent erosion through drawings/models and describe source(s) that may have caused the erosion.
- I describe the components of soil, and how soil is made over time. (Decomposed organic materials, and weathered rock)
- I can explain that rocks are made of different minerals and those minerals can be observed and tested.

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.3.3.A1 \(Advanced\)](#) Explain and give examples of the ways in which soil is formed.

[3.3.3.A2 \(Advanced\)](#) Identify the physical properties of minerals and demonstrate how minerals can be tested for these different physical properties.

[3.3.3.A4 \(Advanced\)](#) Connect the various forms of precipitation to the weather in a particular place and time.

[3.3.3.A5 \(Advanced\)](#) Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.

[3.3.4.A1 \(Advanced\)](#) 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 \(Advanced\)](#) Identify basic properties and uses of Earth's materials including rocks, soils, water, and gases of the atmosphere.

[3.3.4.A4 \(Advanced\)](#) Recognize Earth's different water resources, including both fresh and saltwater. Describe phase changes in the forms of water on Earth.

[3.3.4.A5 \(Advanced\)](#) Describe basic weather elements. Identify weather patterns over time.

[3.3.4.A6 \(Advanced\)](#) 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.

NATIONAL: NGSS - US Next Generation Science Standards (April 2013)

[3-ESS2-1 \(Advanced\)](#) Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

[3-ESS2-2 \(Advanced\)](#) Obtain and combine information to describe climates in different regions of the world.

[3-ESS3-1 \(Advanced\)](#) Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.*

[4-ESS1-1 \(Advanced\)](#) Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.

[4-ESS2-1 \(Advanced\)](#) Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

[4-ESS3-2 \(Advanced\)](#) Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.*

Unit: Biology

Subject: Science

Timeline: Week 25 to 30

Purpose:

Students will understand how living things function in their environments, develop adaptations and behaviors to increase chances of survival, and determine how humans impact other living things around them.

Stage One - Desired Results

Enduring Understandings:What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."

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Essential Questions:What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

- Why might a living thing change it's behavior?
- Why do animals or plants survive well in certain environments but would not in other environments?
- What are the things that living organisms need to survive?

Learning Targets:

- I can recognize that all living things go through the life cycle.
- I can explain what plants and animals basic needs are, and what will happen if a plant or animal does not get it's basic needs.
- I can explain what an adaptation is, and recognize a plant or animal's adaptations.
- I can describe a plant or animal's environment, and explain how a plant or animal has adapted to that environment
- I can develop models of habitats, and analyze how changes to the habitat affects plants or animals.
- I can classify plants or animals by analyzing their physical characteristics.
- I can support with evidence that plants and animals use seasonal behaviors to increase their chance of survival.

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.1.3.A1 \(Advanced\)](#) Describe characteristics of living things that help to identify and classify them.

[3.1.3.A2 \(Advanced\)](#) Describe the basic needs of living things and their dependence on light, food, air, water, and shelter.

[3.1.4.A1 \(Advanced\)](#) Classify plants and animals according to the physical characteristics that they share.

[3.1.4.A5 \(Advanced\)](#) Describe common functions living things share to help them function in a specific environment.

[3.1.3.B1 \(Advanced\)](#) Understand that plants and animals closely resemble their parents.

[3.1.4.B2 \(Advanced\)](#) Recognize that reproduction is necessary for the continuation of

life.

[3.1.3.C1 \(Advanced\)](#) Recognize that plants survive through adaptations, such as stem growth towards light and root growth downward in response to gravity. Recognize that many plants and animals can survive harsh environments because of seasonal behaviors (e.g. hibernation, migration, trees shedding leaves).

[3.1.4.C2 \(Advanced\)](#) Describe plant and animal adaptations that are important to survival.

NATIONAL: NGSS - US Next Generation Science Standards (April 2013)

[3-LS1-1 \(Advanced\)](#) Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

[3-LS3-1 \(Advanced\)](#) Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

[3-LS3-2 \(Advanced\)](#) Use evidence to support the explanation that traits can be influenced by the environment.

[3-LS4-2 \(Advanced\)](#) Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

[3-LS4-3 \(Advanced\)](#) Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

[3-LS4-4 \(Advanced\)](#) Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.*

Unit: Ecology

Subject: Science

Timeline: Week 31 to 36

Purpose:

Students will understand that wetlands are complex ecosystems with varieties of plant and animal life that depend on each other, and other resources in order to live.

Stage One - Desired Results

Enduring Understandings:What will students understand (about what big ideas) as a result of the unit? "Students will understand that..."

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Essential Questions:What arguable, recurring, and thought-provoking questions will guide inquiry and point toward the big ideas of the unit?

- How can a change in a biome affect the ecosystems and habitats of organisms?
- Would you agree with the statement that there is only one watershed in the world?
- Why are there different kinds of bodies of water?

Learning Targets:

- I can tell someone what a watershed is.
- I can explain what makes bodies of water different (Lakes, Ponds, Streams, Rivers (lentic/lotic).
- I can identify plants and animals that live in watersheds.
- I can explain how the plants and animals in watersheds depend on each other (food, shelter)
- I can explain that an ecosystem is living/non-living organisms interacting within a biome.
- I can correctly identify if an animal is a producer, consumer or decomposer.
- I can predict how an ecosystem may be affected if there is a change.

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[4.1.3.A \(Advanced\)](#) Differentiate between the living and nonliving components in an environment.

[4.1.3.D \(Advanced\)](#) Identify organisms that are dependent on one another in a given ecosystem.

[4.2.3.A \(Advanced\)](#) Define the term watershed.

[4.2.3.B \(Advanced\)](#) Identify plants and animals found in a wetland.

[4.2.3.C \(Advanced\)](#) Identify plants and animals that live in lakes, ponds, streams, and wetlands.

[4.2.4.B \(Advanced\)](#) Describe the characteristics of different types of wetlands.

NATIONAL: NGSS - US Next Generation Science Standards (April 2013)

[3-LS3-1 \(Advanced\)](#) Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

[3-LS4-3 \(Advanced\)](#) Construct an argument with evidence that in a particular habitat

some organisms can survive well, some survive less well, and some cannot survive at all.

[3-LS4-4 \(Advanced\)](#) Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.*