

Curriculum Map: 5th Grade Science

Course: Science5 Sub-topic: General

Grade(s): 5

Course Description: Grade 5 science is aligned to [PA Academic](#) and [Core Standards](#). PA Academic Standards consists of the categories: Nature of Science, Biological, Physical, Life, and Earth, and Space Sciences. PA Core Standards focus on reading and writing in the content areas.

Fifth graders begin the year learning about scientific inquiry. Students will begin using the process skill of observation and to learn to think like scientists. The scientific method is introduced and practiced with a variety of experiments. Throughout the year experiments are incorporated in the science units. With these experiments students use the same processes that scientists use.

The Common Core Standards define literacy expectations in science. Students need to be proficient in reading informational text independently in a variety of content areas. Students will be exposed to a variety of science related Informational Texts throughout the year.

Course Textbooks, Workbooks, Materials Citations: Harcourt Science
Harcourt School Publishers Copyright 2000

Unit: Scientific Inquiry

Timeline: Week 1 to 3

Unit Description: Students will use scientific inquiry to study the world around them and explain things based on what they find out. This unit defines scientific inquiry and explains the process of scientific inquiry.

Students will use the scientific method to perform a variety of controlled experiments based on an observation and conclude with evidence that supports or does not support their hypothesis. Students will identify the independent, dependent, and controlled variables in the experiments.

Unit Essential Questions: How can observations and questions be tested?

Unit Big Ideas: Science Inquiry skills include observing, classifying, inferring, predicting, measuring, computing, estimating, communicating, using space/time relationships, defining operationally, raising questions, formulating hypotheses, testing and experimenting, designing controlled experiments, recognizing variables, manipulating variables, interpreting data, formulating models, designing models, and producing solutions.

Unit Materials: Student Lab Journal

Experiments:

Where did the Water Go?

Hand boilers

Energy Ball/Circuits

Evaporation

Milk Explosion

Decomposition

Pinto Beans

Gummi Bear

Unit Lab Notes Completed
Assignments: Lab Quiz

Unit Key Terminology & Definitions: Scientific Method
Observation
Question
Hypothesis
Procedure
Results
Data
Conclusion
Independent Variable
Dependent Variable
Controls/Constants
Control Group
Graph

STANDARDS: STANDARDS

STATE: PA Core Standards (2014)

[CC.3.5.6-8.C \(Advanced\)](#) Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

[CC.3.5.6-8.G \(Advanced\)](#) Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

[CC.3.5.11-12.C \(Advanced\)](#) Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

STATE: Pennsylvania State Anchors (2010)

[S5.A.1 \(Advanced\)](#) Explain, interpret, and apply scientific, environmental, or technological knowledge presented in a variety of formats (visuals, scenarios, graphs).

[S5.A.1.1.1 \(Advanced\)](#) Explain how certain questions can be answered through scientific inquiry and/or technological design (e.g., investigate to find out if all clay or foil boats designs react the same when filled with paperclips).

[S5.A.1.1.2 \(Advanced\)](#) Explain how observations and/or experimental results are used to support inferences and claims about an investigation or relationship (e.g., make a claim based on information on a graph).

[S5.A.1.1.3 \(Advanced\)](#) Describe how explanations, predictions, and models are developed using evidence.

[S5.A.2 \(Advanced\)](#) Processes, Procedures, and Tools of Scientific Investigations

[S5.A.2.1.1 \(Advanced\)](#) Design a simple, controlled experiment (fair test) identifying the independent and dependent variables, how the

dependent variable will be measured and which variables will be held constant

(e.g., relate the effect of variables [mass, release height, length of string] to number of swings of a pendulum, investigate the relationships between variables in paper airplane designs).

[S5.A.2.1.2 \(Advanced\)](#)

Describe relationships between variables through interpretation of data and observations (i.e., make predictions for the outcome of a controlled experiment using data tables and graphs).

(* standards consolidated from Topic level)

Topic: Scientific Method

STANDARDS

STATE: PA Core Standards (2014)

[CC.3.5.6-8.C \(Advanced\)](#) Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

[CC.3.5.6-8.G \(Advanced\)](#) Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

[CC.3.5.11-12.C \(Advanced\)](#) Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

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[S5.A.1.1.3 \(Advanced\)](#) Describe how explanations, predictions, and models are developed using evidence.

[S5.A.2 \(Advanced\)](#) Processes, Procedures, and Tools of Scientific Investigations

Topic: Identify Variables

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.A.2.1.1 \(Advanced\)](#) Design a simple, controlled experiment (fair test) identifying the independent and dependent variables, how the dependent variable will be measured and which variables will be held constant

(e.g., relate the effect of variables [mass, release height, length of string] to number of swings of a pendulum, investigate the relationships between variables in paper airplane designs).

[S5.A.2.1.2 \(Advanced\)](#) Describe relationships between variables through interpretation of data and observations (i.e., make predictions for the outcome of a controlled experiment using data tables and graphs).

Unit: Life Cycles

Timeline: Week 4 to 6

Unit

Description: This unit will focus on 4 different animal life cycles and the life cycle of a plant.

Unit Essential Questions:

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

Unit Big Ideas: Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.

Unit Materials: Chromebooks

Google Slideshow on Life Cycles

Hands-on materials include: Monarch Butterfly eggs to watch complete metamorphosis, mealworms to watch complete metamorphosis.

Student science notebooks

Videos: Generation Genius, ladybug video, grasshopper video

Life Cycle Booklet from Science A-Z

Life Cycle worksheets: Reading informational text and cut, color, paste activity.

Unit Assignments: Science Notebook- students record daily observations of Monarch Butterfly metamorphosis.
Student notes from Google Slideshow
Informational reading with color, cut and paste activity
End of unit assessment

Unit Key Terminology & Definitions: Simple Life Cycle
Complicated life Cycle
Complete Metamorphosis
Larva
Pupa
Incomplete Metamorphosis
Nymph

STANDARDS: STANDARDS
STATE: Pennsylvania State Anchors (2010)
[S5.B.2 \(Advanced\)](#) Continuity of Life

Topic: Simple Life Cycle
STANDARDS
STATE: Pennsylvania State Anchors (2010)
[S5.B.2 \(Advanced\)](#) Continuity of Life

Topic: Complicated Life Cycle
STANDARDS
STATE: Pennsylvania State Anchors (2010)
[S5.B.2 \(Advanced\)](#) Continuity of Life

Topic: Complete Metamorphosis
STANDARDS
STATE: Pennsylvania State Anchors (2010)

Topic: Incomplete Metamorphosis

STANDARDS

STATE: [Pennsylvania State Anchors \(2010\)](#)

[S5.B.2 \(Advanced\)](#) Continuity of Life

Topic: Plant Life Cycles

STANDARDS

STATE: [Pennsylvania State Anchors \(2010\)](#)

[S5.B.2 \(Advanced\)](#) Continuity of Life

Unit: Cells

Timeline: Week 7 to 9

Unit

Description: This unit will focus on plant and animal cells' organelles and the function of each organelle.

Unit Essential

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

Unit Big Ideas: All organisms are made of cells and can be characterized by common aspects of their structure and functioning.

Unit Materials: Book: One cell to Many Cells

Cell Google Slideshow

Plant and animal cell large diagrams for labeling

Plant and animal cell models

Videos: Intro. to cells, Generation Genius, Cell Rap, Our body is Made of Cells, Generation Genius

Student cell notes

Cell worksheets

Nearpod

Chromebooks

Unit

Assignments:

Cell models

Cell notes

Cell worksheets

End of unit assessment

Unit Key

Terminology & Definitions:

Cell

nucleus

chromosomes

mitochondria

vacuole
cytoplasm
cell membrane
cell wall

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.B.1 \(Advanced\)](#) Structure and Function of Organisms

[S5.B.1.1 \(Advanced\)](#) Describe how the cell is the basic unit of structure and function for all living things.

[S5.B.1.1.1 \(Advanced\)](#) Recognize that all organisms are composed of cells.

[S5.B.1.1.2 \(Advanced\)](#) Explain the concept of the cell as the basic structural unit of all living things.

[S5.B.1.1.3 \(Advanced\)](#) Compare the structure and function of basic cell parts in organisms (i.e., plants and animals).

Topic: Plant and Animal Cell Organelles

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.B.1.1 \(Advanced\)](#) Describe how the cell is the basic unit of structure and function for all living things.

[S5.B.1.1.1 \(Advanced\)](#) Recognize that all organisms are composed of cells.

[S5.B.1.1.2 \(Advanced\)](#) Explain the concept of the cell as the basic structural unit of all living things.

[S5.B.1.1.3 \(Advanced\)](#) Compare the structure and function of basic cell parts in organisms (i.e., plants and animals).

Unit: Genetics and Heredity

Timeline: Week 11 to 12

Unit

Description: This unit will focus on the inherited and acquired traits of animals and plants.

Unit Essential Questions: How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?

Unit Big Ideas: Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to, their parents.

Unit Materials: Google Slideshow on Heredity and Traits / Visuals

Heredity and Traits notes

Videos: Generation Genius

Google Forms - Tasks 1-5

Unit

Assignments:

Students notes

Family Questionnaire

Heredity and Traits worksheets

Traits matching activity: Inherited or acquired

Interactive Google Slideshow

Unit Key Heredity

Terminology & Definitions: Genes

Inherited Traits

Acquired Traits

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.B.2.1 \(Advanced\)](#) Explain how certain inherited traits and/or behaviors allow some organisms to survive and reproduce more successfully than others.

[S5.B.2.1.1 \(Advanced\)](#) Differentiate between inherited and acquired traits (e.g., scars, injuries).

(* standards consolidated from Topic level)

Topic: Acquired and Inherited Traits

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.B.2.1 \(Advanced\)](#) Explain how certain inherited traits and/or behaviors allow some organisms to survive and reproduce more successfully than others.

[S5.B.2.1.1 \(Advanced\)](#) Differentiate between inherited and acquired traits (e.g., scars, injuries).

Unit: Animal Adaptations

Timeline: Week 14 to 16

Unit Description: This unit will focus on structural and behavioral adaptations of animals and plants.

Unit Essential Questions: How and why do organisms interact with their environment and what are the effects of these interactions?

How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?

Unit Big Ideas: Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.

Unit Materials: Readworks: "Big Cats"

Google Slideshow

Student notes

Animal adaptation center activities

Videos: Generation Genius, National Geographic videos. PBS Learning Media

Animal adaptation worksheets

Google Forms: Tasks 1-5

Unit Assignments: Readworks: Big Cats comprehension, hi-lighting structural and behavioral adaptations in the text

Animal/plant Adaptations Centers Completion

Student Google Slideshow of an animal and its adaptations

Google Forms: Tasks 1-5

End of unit assessment

Unit Key Terminology & Definitions: Structural Adaptations
Behavioral Adaptations

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.B.2.1.2 \(Advanced\)](#) Explain how inherited traits help organisms survive and reproduce in different environments.

[S5.B.2.1.3 \(Advanced\)](#) Explain how certain behaviors help organisms survive and reproduce in different environments.

(* standards consolidated from Topic level)

Topic: Behavioral and Structural

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.B.2.1.2 \(Advanced\)](#) Explain how inherited traits help organisms survive and reproduce in different environments.

[S5.B.2.1.3 \(Advanced\)](#) Explain how certain behaviors help organisms survive and reproduce in different environments.

Unit: Natural Selection

Timeline: Week 52

Unit Description: This unit will focus on the survival of animals and plants and explain the process whereby organisms better adapted to their environment tend to survive and produce more offspring.

Unit Essential Questions: How and why do organisms interact with their environment and what are the effects of these interactions?

Unit Big Ideas: Biological evolution explains both the unity and diversity of species and provides a unifying principle for the history and diversity of life on Earth.

Unit Materials: Student notes

Chromebooks for research

Survival of the fittest activity

Natural Selection worksheet

Videos: Generation Genius

Unit Assignments: Worksheet
End of unit assessment

Unit Key Terminology & Definitions: Natural Selection

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.B.2.1.4](#)
(Advanced)

Identify changes in environmental conditions that can affect the survival of populations and entire species.

This Curriculum Map Unit has no Topics to display

Unit: Ecology

Timeline: Week 18 to 20

Unit

This unit will focus on what makes up an ecosystem and how the parts interact with each other to make the ecosystem thrive.

Description:**Unit Essential**

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

Questions:

How and why do organisms interact with their environment and what are the effects of these interactions?

How do Earth's processes and human activities affect each other?

Unit Big Ideas: All organisms are made of cells and can be characterized by common aspects of their structure and functioning.

Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.

Unit Materials: Ecosystem Google Slideshow

Edpuzzle

Student notes

Google Forms

Ecosystem Diagrams

Ecosystem Worksheets

Book: Diary of a Worm

Video: Generations Genius, National Geographic, PBS Learning Media

Google Forms Tasks 1-5

Unit

Student notes

Assignments:

Ecosystem Diagrams: Labeling

Edpuzzle

Student Ecosystem Google Slideshow

Ecosystem Worksheets

Google Forms Tasks 1-5

End of unit assessment

Unit Key

Individual

Terminology & Definitions:

population
community
ecosystem
abiotic
biotic
food chain
food web
energy pyramid
producer
consumer
herbivore
carnivore
omnivore
decomposer
renewable resources
nonrenewable resources
fossil fuels
Human impact

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

- [S5.A.3.2.1 \(Advanced\)](#) Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed).
- [S5.B.3.1 \(Advanced\)](#) Describe the relationships between organisms in different ecosystems.
- [S5.B.3.1.1 \(Advanced\)](#) Describe the roles of producers, consumers, and decomposers within a local ecosystem.
- [S5.B.3.1.2 \(Advanced\)](#) Describe the relationships between organisms in different food webs.
- [S5.B.3.2 \(Advanced\)](#) Explain how renewable and nonrenewable resources provide for human needs.
- [S5.B.3.2.1 \(Advanced\)](#) Identify fossil fuels and alternative fuels used by humans.

(* standards consolidated from Topic level)

Topic: What is an Ecosystem?

STANDARDS

STATE: Pennsylvania State Anchors (2010)

- [S5.A.3.2.1 \(Advanced\)](#) Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed).
- [S5.B.3.1 \(Advanced\)](#) Describe the relationships between organisms in different ecosystems.

Topic: Producers, Consumers, and Decomposers

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.B.3.1.1 \(Advanced\)](#)

Describe the roles of producers, consumers, and decomposers within a local ecosystem.

Topic: Food Chains and Food Webs

STANDARDS

STATE: [Pennsylvania State Anchors \(2010\)](#)

[S5.B.3.1.2 \(Advanced\)](#)

Describe the relationships between organisms in different food webs.

Topic: Renewable and Nonrenewable Resources

Minutes for Topic: 50

STANDARDS

STATE: [Pennsylvania State Anchors \(2010\)](#)

[S5.B.3.2 \(Advanced\)](#)

Explain how renewable and nonrenewable resources provide for human needs.

[S5.B.3.2.1 \(Advanced\)](#)

Identify fossil fuels and alternative fuels used by humans.

Topic: Energy Flow

Minutes for Topic: 50

Unit: Matter

Timeline: Week 21 to 22

Unit

This unit will focus on the the concept that everythign is made up of matter. This unit will

Description:

include identifying the 3 states of matter (4 including plasma) and how the particles (atoms) behave in different states and changing from state to state.

Unit Essential

Questions:

How can one explain the structure, properties, and interactions of matter?

Unit Big Ideas:

Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.

Unit Materials: Matter Google Slideshow

Student Notes

Manipulatives/visuals of key terms

Videos: Generation Genius

Matter Booklet from Science A-Z

Google Forms Tasks 1-5

Unit

Assignments:

Student notes/Matter Term Folder

Matter Booklet Quiz

Matter Worksheets

End of unit assessment

Unit Key

Terminology & Definitions:

Matter

Solid

Liquid

Gas
Particles
Physical Properties
Chemical change
Physical change
Mass
Volume
Temperature
Condensation
Evaporation
Hardness
Streak tests
Mass
Moh's scale
Porosity Properties
Solubility
Conservation of mass
Mixtures
Compounds
Solutions

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.1 \(Advanced\)](#) Structure, Properties, and Interaction of Matter and Energy

[S5.C.1.1 \(Advanced\)](#) Describe the observable physical properties of matter.

[S5.C.1.1.1 \(Advanced\)](#) Identify characteristic properties of matter that are independent of mass and volume.

[S5.C.1.2 \(Advanced\)](#) Describe that matter can undergo chemical and physical changes.

[S5.C.1.2.1 \(Advanced\)](#) Describe how water changes from one state to another.

[S5.C.1.2.2 \(Advanced\)](#) Identify differences between chemical and physical changes of matter.

(* standards consolidated from Topic level)

Topic: What is matter? 3 states of matter and their properties

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.1 \(Advanced\)](#) Structure, Properties, and Interaction of Matter and Energy

Topic: Changing from state to state

Minutes for Topic: 50

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.1.2 \(Advanced\)](#) Describe that matter can undergo chemical and physical changes.

[S5.C.1.2.1 \(Advanced\)](#) Describe how water changes from one state to another.

Topic: Observable Physical Properties of Matter

Minutes for Topic: 50

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.1.1 \(Advanced\)](#)

Describe the observable physical properties of matter.

[S5.C.1.1.1 \(Advanced\)](#)

Identify characteristic properties of matter that are independent of mass and volume.

Topic: Chemical and Physical Changes of Matter

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.1.2.2 \(Advanced\)](#)

Identify differences between chemical and physical changes of matter.

Unit: Energy

Timeline: Week 23 to 24

Unit

This unit will focus on the different forms of energy, how energy is transformed from one

Description:

form to another, and how energy is never lost.

Unit Essential

Questions:

How is energy transferred and conserved?

Unit Big Ideas:

Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.

Unit Materials: Energy Google Slideshow

Student notes

Hands-on materials/models

Energy worksheets

Videos: Generation Genius

Unit

Assignments:

Student notes

Student Worksheets

Hands-on activities/experiments

Energy Robot Activity

Student videos

End of unit assessment

Unit Key

Terminology &

Definitions:

Energy

Electrical

Mechanical

Chemical

heat

light

sound

energy transformation

conservation

kinetic

potential

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.2.1 \(Advanced\)](#) Describe basic energy types and sources, and how energy can be changed from one form to another.

[S5.C.2.1.1 \(Advanced\)](#) Describe how energy exists in many forms (e.g., electrical, mechanical, chemical, heat, light, sound) and can be transformed within a system.

[S5.C.2.1.3 \(Advanced\)](#) Distinguish between kinetic and potential energy.

[S5.C.2.1.4 \(Advanced\)](#) Explain how energy is conserved.

(* standards consolidated from Topic level)

Topic: Types of Energy

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.2.1 \(Advanced\)](#) Describe basic energy types and sources, and how energy can be changed from one form to another.

Topic: Energy Transformation

Minutes for Topic: 50

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.2.1 \(Advanced\)](#) Describe basic energy types and sources, and how energy can be changed from one form to another.

[S5.C.2.1.1 \(Advanced\)](#) Describe how energy exists in many forms (e.g., electrical, mechanical, chemical, heat, light, sound) and can be transformed within a system.

Topic: Kinetic and Potential Energy

Minutes for Topic: 50

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.2.1.3 \(Advanced\)](#) Distinguish between kinetic and potential energy.

Topic: Conservation of Energy

Minutes for Topic: 50

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.C.2.1.4 \(Advanced\)](#) Explain how energy is conserved.

Unit: Earth's Features and the Processes that Change It

Timeline: Week 26 to 27

Unit Description: This unit will focus on the constructive and destructive forces that formed our earth's features and is still making an impact on our earth.

Unit Essential Questions: How and why is Earth constantly changing?

Unit Big Ideas: The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.

Unit Materials: Google Slideshow

Student notes

Pangea puzzle activity

Tectonic Plates diagram

Hands-on experiment: erosion demonstration

Video: Generation Genius

Worksheets

Unit Assignments: Student notes

Student worksheets

Research project on a Destructive Event

End of unit assessment

Unit Key Terminology & Definitions: Constructive Forces

Destructive Forces

erosion

deposition

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.D.1.1 \(Advanced\)](#) Describe constructive and destructive natural processes that form different geologic structures and resources.

[S5.D.1.1.1 \(Advanced\)](#) Differentiate between abrupt changes in Earth's surface (e.g., earthquakes, volcanoes, meteor impacts, landslides) and gradual changes in Earth's surface (e.g., lifting up of mountains, wearing away by erosion).

[S5.D.1.1.2 \(Advanced\)](#) Explain how geological processes observed today (e.g., erosion, changes in the composition of the atmosphere, volcanic eruptions, earthquakes) are similar to those in the past.

(* standards consolidated from Topic level)

Topic: Destructive Forces

Minutes for Topic: 125

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.D.1.1 \(Advanced\)](#) Describe constructive and destructive natural processes that form different geologic structures and resources.

[S5.D.1.1.1 \(Advanced\)](#) Differentiate between abrupt changes in Earth's surface (e.g., earthquakes,

[S5.D.1.1.2 \(Advanced\)](#)

volcanoes, meteor impacts, landslides) and gradual changes in Earth's surface (e.g., lifting up of mountains, wearing away by erosion).

Explain how geological processes observed today (e.g., erosion, changes in the composition of the atmosphere, volcanic eruptions, earthquakes) are similar to those in the past.

Topic: Constructive Forces

Minutes for Topic: 125

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.D.1.1 \(Advanced\)](#)

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

[S5.D.1.1.1 \(Advanced\)](#)

Differentiate between abrupt changes in Earth's surface (e.g., earthquakes, volcanoes, meteor impacts, landslides) and gradual changes in Earth's surface (e.g., lifting up of mountains, wearing away by erosion).

[S5.D.1.1.2 \(Advanced\)](#)

Explain how geological processes observed today (e.g., erosion, changes in the composition of the atmosphere, volcanic eruptions, earthquakes) are similar to those in the past.

Unit: Earth's Place in the Universe

Timeline: Week 29 to 30

Unit Description: This unit will focus on the interactions between the earth, sun, and moon.

Unit Essential Questions:

What is the universe, and what is Earth's place in it?

Unit Big Ideas: The universe is composed of a variety of different objects, which are organized into systems each of, which develops according to accepted physical processes and laws.

Unit Materials: Earth and sun model

Hands-on activity for revolution and rotation

Hands-on activity for shadows

Hands-on activity for relative distance

Hands-on activity for star brightness

Google Slideshow

Student Notes

Student worksheets

Mystery Doug-Video and Constellation box

Generation Genius Video

End of unit Assessment

Unit Assignments: Student Notes

Hands-on activities completion

Worksheets

Diagrams of patterns: revolution, rotation, shadows

Unit Key Terminology & Definitions:

- Relative distance
- Earth
- Stars
- Sun
- Apparent brightness
- Data
- Graphical display
- Patterns
- Representation
- Shadows
- Revolution
- Rotation
- Orbit
- Constellations

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

- [S5.A.3 \(Advanced\)](#) Systems, Models, and Patterns
- [S5.A.3.1.1 \(Advanced\)](#) Make predictions based on patterns in natural systems (e.g., phases of the Moon, time [day, month, and year], weather, seasons).
- [S5.A.3.2.1 \(Advanced\)](#) Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed).
- [S5.D.3.1 \(Advanced\)](#) Explain the relationships between objects in our solar system.
- [S5.D.3.1.1 \(Advanced\)](#) Describe the patterns of Earth’s rotation and revolution in relation to the Sun and Moon (i.e., solar eclipse, phases of the Moon, and time).

(* standards consolidated from Topic level)

Topic: Revolution and Rotation

STANDARDS

STATE: Pennsylvania State Anchors (2010)

- [S5.A.3.1.1 \(Advanced\)](#) Make predictions based on patterns in natural systems (e.g., phases of the Moon, time [day, month, and year], weather, seasons).
- [S5.D.3.1 \(Advanced\)](#) Explain the relationships between objects in our solar system.

Topic: Patterns: Day and Night

STANDARDS

STATE: Pennsylvania State Anchors (2010)

- [S5.A.3 \(Advanced\)](#) Systems, Models, and Patterns
- [S5.A.3.1.1 \(Advanced\)](#) Make predictions based on patterns in natural systems (e.g., phases of the Moon, time [day, month, and year], weather, seasons).
- [S5.A.3.2.1 \(Advanced\)](#) Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed).

[S5.D.3.1.1 \(Advanced\)](#) Describe the patterns of Earth's rotation and revolution in relation to the Sun and Moon (i.e., solar eclipse, phases of the Moon, and time).

Topic: Patterns: Seasons

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.A.3.1.1 \(Advanced\)](#) Make predictions based on patterns in natural systems (e.g., phases of the Moon, time [day, month, and year], weather, seasons).

[S5.A.3.2.1 \(Advanced\)](#) Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed).

[S5.D.3.1.1 \(Advanced\)](#) Describe the patterns of Earth's rotation and revolution in relation to the Sun and Moon (i.e., solar eclipse, phases of the Moon, and time).

Topic: Patterns: Shadows

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.A.3.1.1 \(Advanced\)](#) Make predictions based on patterns in natural systems (e.g., phases of the Moon, time [day, month, and year], weather, seasons).

[S5.A.3.2.1 \(Advanced\)](#) Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed).

Topic: Patterns: Constellations

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.A.3.1.1 \(Advanced\)](#) Make predictions based on patterns in natural systems (e.g., phases of the Moon, time [day, month, and year], weather, seasons).

[S5.A.3.2.1 \(Advanced\)](#) Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed).

Unit: Weather, Climate, and Atmospheric Processes

Timeline: Week 32 to 33

Unit Description: This unit will focus the difference between weather and climate. This unit will identify earth's systems that make weather and climate.

Unit Essential Questions: How and why is Earth constantly changing?

Unit Big Ideas: The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.

Unit Materials: Google Slideshow

Student Notes

Worksheets

Water Cycle Demonstration

Water-Distribution activity-Amount of fresh water and salt water. Percentages of freshwater visual display

Video: Generation Genius!

Unit Student notes
Assignments: Weather Log
Worksheet/diagram completion
End of unit assessment

Unit Key Terminology & Definitions: Weather
Climate
Atmosphere
Biosphere
Geosphere
Hydrosphere
Distribution
Water cycle
Evaporation
Precipitation
Condensation
Transpiration
Water system

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.A.3.2.1 \(Advanced\)](#) Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed).

[S5.D.1.2 \(Advanced\)](#) Describe characteristic features of Earth's water systems and their impact on resources.

[S5.D.2.1 \(Advanced\)](#) Differentiate between weather and climate.

[S5.D.2.1.1 \(Advanced\)](#) Explain how the cycling of water into and out of the atmosphere impacts climatic patterns.

(* standards consolidated from Topic level)

Topic: Water Cycle

Minutes for Topic: 50

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.A.3.2.1 \(Advanced\)](#) Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed).

[S5.D.2.1.1 \(Advanced\)](#) Explain how the cycling of water into and out of the atmosphere impacts climatic patterns.

Topic: Earth's Systems

Minutes for Topic: 125

STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S5.D.1.2 \(Advanced\)](#) Describe characteristic features of Earth's water systems and their impact on resources.

Topic: Distribution of Water on Earth

STANDARDS

STATE: Pennsylvania State Anchors (2010)

S5.D.1.2 (Advanced)

Describe characteristic features of Earth’s water systems and their impact on resources.

Topic: Weather versus Climate

Minutes for Topic: 50

STANDARDS

STATE: Pennsylvania State Anchors (2010)

S5.D.2.1 (Advanced)

Differentiate between weather and climate.

Unit: Force and Motion

Timeline: Week 34

Unit Description: This unit will focus on different forces. This unit will identify the difference between mass and weight and how the mass of an object affects force and motion .

Unit Essential Questions: How can one explain and predict interactions between objects within systems?

Unit Big Ideas: Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.

Unit Materials: Google Slideshow

Student Notes

Hands-on activitie: Scale for measuring weight and mass gravity/mass demonstrations

Hands-on activitie: mass gravity/mass demonstrations

Hands-on activitie: Inertia experiment

Richard Feynman: The Making of a Scientist

Hands-on Activity-Electromagnets

Hands-on Acitivity: Electric Current- Snap Circuits and Little Bits

Unit Assignments: Student notes

Hands-on activities completion

End of unit assessment

Unit Key Terminology & Definitions: Force
Motion

Mass

Weight

Inertia

Gravitational force

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S5.C.3.1.1 (Advanced)	Differentiate between the mass and weight of an object.
S5.C.3.1.2 (Advanced)	Explain how the mass of an object resists change to motion (inertia).
S5.C.3.2 (Advanced)	Observe and recognize how magnets and electricity produce related forces.
S5.C.3.2.2 (Advanced)	Identify the variables within an electric current (i.e., voltage, current, and resistance).

(* standards consolidated from Topic level)

Topic: Mass and Weight

Minutes for Topic: 50

STANDARDS

STATE: [Pennsylvania State Anchors \(2010\)](#)

[S5.C.3.1.1 \(Advanced\)](#) Differentiate between the mass and weight of an object.

Topic: Inertia

Minutes for Topic: 50

STANDARDS

STATE: [Pennsylvania State Anchors \(2010\)](#)

[S5.C.3.1.2 \(Advanced\)](#) Explain how the mass of an object resists change to motion (inertia).

Topic: Electricity and Magnetic Forces

Minutes for Topic: 50

STANDARDS

STATE: [Pennsylvania State Anchors \(2010\)](#)

[S5.C.3.2 \(Advanced\)](#) Observe and recognize how magnets and electricity produce related forces.

Topic: Electric Currents

Minutes for Topic: 50

STANDARDS

STATE: [Pennsylvania State Anchors \(2010\)](#)

[S5.C.3.2.2 \(Advanced\)](#) Identify the variables within an electric current (i.e., voltage, current, and resistance).

Unit: Engineering Design

Timeline: Week 36

Unit

Description: This unit will focus on the engineering design process. The engineering design engages students in more formalized problem solving. Students define a problem using criteria for success and constraints or limits of possible solutions. Students research and consider multiple possible solutions to a given problem. Generating and testing solutions also becomes more rigorous as the students learn to optimize solutions by revising them several times to obtain the best possible design

Unit Essential Questions: How does the engineering design process relate to problem solving and critical thinking?

What role does creativity have in engineering design?

Why follow a process?

Unit Big Ideas: A process is used to find solutions to problems.

Unit Materials: Tallest Tower Activity: Gumdrops and Toothpicks

Unit Assignments: Activity Completion

Unit Key Terminology & Definitions: Engineering Process
Prototype
Criteria
Constraints

STANDARDS: STANDARDS

NGSS Arranged by Topic - Science (2013)

- [3-5-ETS1-1 \(Advanced\)](#) Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- [3-5-ETS1-2 \(Advanced\)](#) Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- [3-5-ETS1-3 \(Advanced\)](#) Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

(* standards consolidated from Topic level)

Topic: Steps of the Engineering Process

STANDARDS

NGSS Arranged by Topic - Science (2013)

- [3-5-ETS1-1 \(Advanced\)](#) Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- [3-5-ETS1-2 \(Advanced\)](#) Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- [3-5-ETS1-3 \(Advanced\)](#) Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Topic: STEM activities working through the Engineering Process