

Young Scholars of Western Pennsylvania Charter School

4th Science Fusion YSWPCS

- Unit

Unit 1 Studying Science

Lesson

Lesson 1: What Do Scientists Do?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S4.A.1.1.1; S4.A.1.3.1; S4.A.1.3.2; S4.A.1.3.3; S4.A.1.3.5; S4.A.2.1.1; S4.A.2.1.2

Science Content

- Describe that science focuses on the natural world only.
- Explain that scientists make observations, ask questions, conduct investigations, and produce evidence that guides scientific thought and theory
- Communicate that scientists conduct multiple types of investigations (traditional experiments involving fair testing, inventing, documenting, trial and error, etc.)
- Recognize that scientific knowledge requires evidence.

Vocabulary

scientist, observation, hypothesis, science, investigation

Assessment(s)

Brain Check
Informal Comprehension Questions

Duration

Unit 1 - 14 Days

Interdisciplinary Connections

Art: Investigate mixing colors
Math: Draw diagrams representing the fraction of class that voted for a particular food
Health and Physical Education: Investigate physical activity levels
Social Studies: Research scientists from Pennsylvania

• Unit

Lesson

Lesson 2: What Skills Do Scientists Use?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S4.A.1.1.1; S4.A.2.1.1; S4.A.2.1.2; S4.A.2.1.4; S4.A.3.2.2; S4.A.3.2.3; S4.A.3.3.1; S4.A.3.3.2

Science Content

- Explain that inquiry skills are used in daily life.
- Identify examples of skills used to carry out common tasks.

Vocabulary

inference

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Social Studies: Locate and label sites of scientific interest on a state map

Math: Find elapsed time in years

Art: Construct mobiles of science skills

Writing: Create a how-to-think-like-a-scientist manual

- Unit

Lesson

Lesson 3: How Do Scientists Collect and Use Data?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S4.A.1.3.1; S4.A.1.3.2; S4.A.1.3.3; S4.A.2.1.2; S4.A.2.1.3; S4.A.2.2.1; S4.A.3.2.3; S4.A.3.3.2

Science Content

- Determine that scientists often conduct research as part of an investigation
- Identify different tools that scientists use to study objects and properties
- Communicate that data gathered are based on measurement and observation, not inferences
- Record data in appropriate tables and charts based on the purpose of the data
- Describe that measurements and recording methods need to be accurate because data are used as evidence for scientific explanation.

Vocabulary

data, microscope, pan balance, spring scale

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Language Arts: Write a recipe for your favorite food

Math: Measure perimeter

Social Studies: Research and compare climates of various states

Health and Physical Education: Investigate throwing balls

- Unit

Lesson

*Lesson 4: Why Do Scientists Compare Results?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment

(tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S4.A.1.3.1; S4.A.1.3.2; S4.A.1.3.3; S4.A.2.1.2; S4.A.2.1.3; S4.A.2.2.1; S4.A.3.2.3; S4.A.3.3.2

Science Content

- Measure an object using several different types of tools (standard and non-standard units of measurement) and compare the results with other groups of students
- Communicate the importance of accuracy in measurements and reasons why differences may occur

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

Lesson 5: What Kinds of Models Do Scientists Use?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S4.A.3.2.2

Science Content

- Communicate that scientists use different types of models depending upon the subject they are studying.
- Identify differences between examples of models, such as a picture, replica, and animation.
- Determine that technology has helped scientists make more accurate models.

Vocabulary

model, two-dimensional model, three-dimensional model, computer model

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Art: Model a human body in action

Language Arts: Draw a map and write directions

Health and Physical Education: Model the human body

Math: Make nets

- Unit

Lesson

*Lesson 6: How Can You Model a School?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S4.A.3.2.2

Science Content

- Measure the classroom using metric tools such as tape measures and meter sticks.
- Construct a model of the classroom
- Compare the models made and note differences, based on spatial awareness or measurements made

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Unit 2: The Engineering Process

Lesson

Lesson 1: What Is an Engineering Design?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S4.A.2.1.2

Science Content

- Describe how to use the design process to create a solution to a problem.

Vocabulary

engineering, design, prototype

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Unit 2 - 10 Days

Interdisciplinary Connections

Math: Scale down a drawing

Art: Draw plans for the prototype of a product

Writing: Write a letter to the manufacturer of a product describing how they think the product could be improved

Social Studies: Research the development of television

- Unit

Lesson

*Lesson 2: How Can You Design a Solution to a Problem?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S4.A.2.1.2

Science Content

- Design an apparatus that gently absorbs the force of motion.
- Build and test prototypes based on their designs.

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

Lesson 3: What Is Technology?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S.4.A.1.1.2

Science Content

- Identify examples of tools that help people produce, shape, or build things
- Identify needs that technology helps us meet
- Identify technological products, processes, and systems
- Describe how technology has changed your community
- Identify the benefits and risks of using technology

Vocabulary

tool, technology

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Art: Illustrate how technology evolves

Writing: Letter to an imaginary friend in the future, describing the use of technology in their everyday life

Social Studies: Research and write a two- or three-paragraph description of how the government has embraced technological advances to help it carry out its duties

Health and Physical Education: Gymnasiums then and now

- Unit

Lesson

*Lesson 4: How Do We Use Technology?

Standard(s)

3.1.4.A.9: Distinguish between scientific fact and opinion. Ask questions about objects, organisms, and events. Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

Eligible Content

S4.A.1.1.2

Science Content

- Identify design criteria
- Evaluate solutions to a problem
- Test a model using a unit of measurement

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Unit 3: Plants and Animals

Lesson

Lesson 1: What Are Some Plant Structures?

Standard(s)

3.1.4.A.1: Classify plants and animals according to the physical characteristics that they share

3.1.4.B.5: PATTERNS Identify observable patterns in the physical characteristics of plants or groups of animals

Eligible Content

S4.B.1.1.3; S4.B.1.1.4; S4.B.2.2.1

Science Content

- Describe the structures of typical plants
- Describe the process of photosynthesis

Vocabulary

root, stem, leaf, photosynthesis, chlorophyll

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Unit 3 - 16 Days

Interdisciplinary Connections

Art: Make an artistic piece that depicts a plant

Writing: Write an account of a day in their life in which an essential plant did not exist

Health and Physical Education: Classify food by plant structures

Social Studies: Research how chlorophyll causes leaves to change colors

- Unit

Lesson

Lesson 2: How Do Plants Reproduce?

Standard(s)

3.1.4.A.1: Classify plants and animals according to the physical characteristics that they share

3.1.4.B.2: Recognize that reproduction is necessary for the continuation of life.

Eligible Content

S4.B.1.1.1; S4.B.1.1.4

Science Content

- Recognize that all seed-plant life cycles include germination, maturity, reproduction, and death
- Identify the stages in the life cycle of a flowering plant
- Identify the stages in the life cycle of a nonflowering, seed-bearing plant (such as a conifer)
- Describe the role of pollination in the sexual reproduction of seed plants
- Describe ways that plants are pollinated
- Describe reproduction in seedless plants

Vocabulary

germination, maturity, fertilization, pollination, spore

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Math: Take height data of a plant and construct a line plot

Art: Produce a drawing or a map of a planned garden

Social Studies: Research state flower and tree and provide information about life cycle and pollination

Writing: Write a poem about their favorite plant

- Unit

Lesson

*Lesson 3: How Can We Observe a Plant's Life Cycle?

Standard(s)

3.1.4.A.3: Identify differences in the life cycles of plants and animals.

3.1.4.A.8: MODELS Construct and interpret models and diagrams of various animal and plant life cycles

Eligible Content

S4.A.1.3.1; S4.A.2.2.1; S4.A.3.3.1; S4.B.1.1.5

Science Content

- Compare the rate of germination of different types of seeds.
- Observe a developing plant embryo.

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

Lesson 4: How Do Animals Reproduce?

Standard(s)

3.1.4.A.1: Classify plants and animals according to the physical characteristics that they share

3.1.4.A.3: Identify differences in the life cycles of plants and animals.

3.1.4.A.8: MODELS Construct and interpret models and diagrams of various animal and plant life cycles

3.1.4.B.1: Describe features that are observable in both parents and their offspring.

3.1.4.B.2: Recognize that reproduction is necessary for the continuation of life.

Eligible Content

S4.B.1.1.1; S4.B.1.1.5

Science Content

- Understand that some animals are born live, whereas other animals hatch from eggs.
- Understand that some animals go through metamorphosis as part of their life cycle
- Compare and contrast complete metamorphosis and incomplete metamorphosis, and provide examples of animals that undergo each type

Vocabulary

complete metamorphosis, incomplete metamorphosis, nymph

Assessment(s)

Brain Check
Informal Comprehension Questions

Duration

Interdisciplinary Connections

Art: Draw a self portrait (40 years old)
Math: Solve a word problem involving height
Health: Make life-stage care manuals
Writing: Biography of a famous person

- Unit

Lesson

Lesson 5: How Are Living Things Adapted to Their Environment?

Standard(s)

3.1.4.A.2: Describe the different resources that plants and animals need to live
3.1.4.A.5: Describe common functions living things share to help them function in a specific environment
3.1.4.B.1: Describe features that are observable in both parents and their offspring.
3.1.4.B.5: PATTERNS Identify observable patterns in the physical characteristics of plants or groups of animals
3.1.4.C.2: Describe plant and animal adaptations that are important to survival

Eligible Content

S4.B.2.1.1; S4.B.2.1.2; S4.B.3.2.1; S4.B.3.2.3

Science Content

- o Define and explain the terms environment and adaptation.
- o Define and explain physical and behavioral adaptations
- o Recognize physical and behavioral adaptations in plants and animals.

Vocabulary

environment, adaptation, physical adaptation, behavioral adaptation, instinct

Assessment(s)

Brain Check
Informal Comprehension Questions

Duration

Interdisciplinary Connections

Art: Draw a comic book story about a superhero who has an adaptation that an animal has and how they use it to help people

Math: Measuring length

Writing: Write a detailed description of a specific environment is like and what kinds of plants and animals live there

Health: Discuss human adaptations and basic needs

• Unit

Lesson

*Lesson 6: Why Do Bird Beaks Differ?

Standard(s)

3.1.4.A.2: Describe the different resources that plants and animals need to live

Eligible Content

S4.A.2.1.1; S4.A.2.1.2; S4.B.2.1.2

Science Content

- Describe the variations that can be observed in different types of bird beaks
- Identify which tool works best for which food
- Relate different bird beaks with different types of food
- Explain why some birds are better suited to a certain habitat than other birds are

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

- Unit

Unit 4: Energy and Ecosystems

Lesson

Lesson 1: What Are Populations, Habitats, and Niches?

Standard(s)

3.1.4.A.2: Describe the different resources that plants and animals need to live.

3.1.4.A.5: Describe common functions living things share to help them function in a specific environment

3.1.4.A.8: MODELS Construct and interpret models and diagrams of various animal and plant life cycles

3.1.4.C.1: Identify different characteristics of plants and animals that help some populations survive and reproduce in greater numbers. Describe how environmental changes can cause extinction in plants and animals.

Eligible Content

S4.B.3.1.1; S4.B.3.2.1

Science Content

- Distinguish between habitat and niche.
- Distinguish between population and community
- Explain the organization of populations, communities, and ecosystems
- Describe an organism's niche at various stages of its life cycle

Vocabulary

ecosystem, community, population, habitat, niche, producer, consumer, decomposer

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Unit 4 - 16 Days

Interdisciplinary Connections

Math: Solve a word problem involving weight

Art: Make a nature guide and map

Social Studies: Ecosystems around the world - sticky notes on a map

Writing: Newspaper-style article describing an incident in which a producer was eaten by a consumer, who in turn was eaten by another consumer

- Unit

Lesson

Lesson 2: What Are Food Chains?

Standard(s)

3.1.4.A.8: MODELS Construct and interpret models and diagrams of various animal and plant life cycles.

3.1.4.C.1: Identify different characteristics of plants and animals that help some populations survive and reproduce in greater numbers. Describe how environmental changes can cause extinction in plants and animals.

Eligible Content

S4.A.1.3.4; S4.A.3.1.2; S4.A.3.2.1; S4.B.3.1.2

Science Content

- Demonstrate that a food chain shows how energy moves from producers to consumers
- Recognize that energy for most food chains begins with energy from the sun
- Distinguish between herbivores, carnivores, and omnivores
- Recognize that organisms higher in the food chain are affected by changes in the number of organisms lower in the food chain
- Explain why all animals depend on producers such as plants

Vocabulary

food chain, carnivore, food web, herbivore, omnivore

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Art: Paper food chains

Math: Research running speeds of at least five predators and five prey. Then make a table comparing the running speeds

Writing: Fact cards of food web organisms

Health: Research biomagnification

- Unit

Lesson

*Lesson 3: How Can We Model a Food Web?

Standard(s)

3.1.4.A.8: MODELS Construct and interpret models and diagrams of various animal and plant life cycles.

Eligible Content

S4.A.3.2.1; S4.A.3.2.2; S4.A.3.2.3; S4.B.3.1.2

Science Content

- Investigate food webs
- Model a food web

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

Lesson 4: What Are Natural Resources?

Standard(s)

3.1.4.A.2: Describe the different resources that plants and animals need to live.

3.1.4.C.1: Identify different characteristics of plants and animals that help some populations survive and reproduce in greater numbers. Describe how environmental changes can cause extinction in plants and animals.

3.3.4.A.2: Identify basic properties and uses of Earth's materials including rocks, soils, water, and gases of the atmosphere

Eligible Content

S4.B.3.1.1

Science Content

- Define and explain the term natural resource
- Explain the importance of natural resources such as water, animals, and plants
- Explain the importance of rocks, minerals, and ores
- Explain the importance of energy sources
- Explain the importance of forests, soil, and land

Vocabulary

natural resources, renewable resources, nonrenewable resources

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Art: Recycled art

Writing: Write a poem about their favorite natural resources

Social Studies: Select a natural resource that has influenced an aspect of a culture they like and write about it

Health: List steps that community can take to keep their water supply clean

- Unit

Lesson

Lesson 5: How Do People Impact Ecosystems?

Standard(s)

3.1.4.C.1: Identify different characteristics of plants and animals that help some populations survive and reproduce in greater numbers. Describe how environmental changes can cause extinction in plants and animals.

Eligible Content

S4.A.1.1.2; S4.A.1.3.4; S4.A.1.3.5; S4.B.3.3.5

Science Content

- Define pollution and conservation
- Describe how human activity affects ecosystems

Vocabulary

pollution, conservation, endangered species

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Health: Describe air quality index for their area

Art: Create a quilt with natural plant dyes

Writing: Write about how controlled burning is used in forests or other land areas.

- Unit

Lesson

*Lesson 6: How Do People Affect Their Environment?

Standard(s)

Eligible Content

S4.A.1.1.2; S4.A.1.3.4; S4.A.1.3.5; S4.B.3.3.5

Science Content

- Observe and compare the rate of decay of different materials

- Record numerical data in a data table and descriptive data in sketches
- Understand that some environmental changes are beneficial and some are harmful
- Understand the impact that trash can have on the environment

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Unit 5: Weather

Lesson

Lesson 1: What is the Water Cycle?

Standard(s)

3.3.4.A.4: Recognize Earth's different water resources, including both fresh and saltwater. Describe phase changes in the forms of water on Earth

Eligible Content

S4.A.3.1.1; S4.A.3.2.1; S4.A.3.2.2; S4.A.3.3.1; S4.D.1.1.2; S4.D.1.3.2; S4.D.1.3.4

Science Content

- Describe the water cycle and the role that evaporation, condensation, and precipitation play in it
- Explain how the sun provides the energy for the water cycle
- Explain how the oceans and other bodies of water interact through the water cycle
- Describe the path of precipitation from cloud to ground to runoff to groundwater

Vocabulary

water cycle, evaporation, atmosphere, condensation, precipitation, runoff, groundwater

Assessment(s)

Brain Check
Informal Comprehension Questions

Duration

Unit 5 - 12 Days

Interdisciplinary Connections

Math: Find groundwater travel time
Social Studies: Students role-play a meeting in which participants must decide how to share water from an aquifer
Art: Make scale drawings of dust particles, cloud droplets, and raindrops
Health and Physical Education: Write a report on the importance of clean water to living things

- Unit

Lesson

Lesson 2: What Are Types of Weather?

Standard(s)

3.3.4.A.5: Describe basic weather elements. Identify weather patterns over time.

Eligible Content

S4.A.1.3.1; S4.A.1.3.3; S4.A.2.1.3; S4.A.2.2.1; S4.A.3.3.1; S4.D.2.1.1; S4.D.2.1.2; S4.D.2.1.3

Science Content

- o Describe the composition of the atmosphere.
- o Identify factors that make up weather.
- o Explain how weather conditions are measured.
- o Explain how different types of precipitation form.
- o Describe some forms of severe weather.

Vocabulary

weather, humidity, air pressure

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Music: Identify lyrics connected to weather

Math: Chart cloud patterns to predict weather

Writing: Research a career in Meteorology

Art: Design an informative bulletin board to explain the types of information gathered for weather forecasts

• Unit

Lesson

Lesson 3: How is Weather Predicted?

Standard(s)

3.3.4.A.5: Describe basic weather elements. Identify weather patterns over time.

Eligible Content

S4.A.1.3.1; S4.A.1.3.3; S4.A.2.1.3; S4.A.2.2.1; S4.A.3.3.1; S4.D.2.1.1; S4.D.2.1.2; S4.D.2.1.3

Science Content

- Explain how air masses form
- Explain how fronts affect weather
- Explain how meteorologists obtain and analyze weather data
- Describe types of severe weather, such as hurricanes.

Vocabulary

air mass, front

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Art: Make a poster that contrasts cold fronts and warm fronts

Math: Determine average temperature and precipitation for the four seasons of last year

Writing: Write a weather forecast

Health: Make a family preparedness plan brochure

• Unit

Lesson

*Lesson 4: How Can We Observe Weather Patterns?

Standard(s)

3.3.4.A.5: Describe basic weather elements. Identify weather patterns over time.

Eligible Content

S4.A.1.3.1; S4.A.1.3.3; S4.A.2.1.3; S4.A.2.2.1; S4.A.3.3.1; S4.D.2.1.1; S4.D.2.1.2; S4.D.2.1.3

Science Content

- Measure and record weather conditions using weather tools
- Use evidence from weather observations to make weather predictions
- Analyze weather data
- Verify observations made by others

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

• Unit

Unit 6: Earth and Space

Lesson

Lesson 1: How Do the Sun, Earth, and Moon Interact?

Standard(s)

3.3.4.B.2: SCALES Know the basic characteristics and uses of telescopes. PATTERNS/PHASES Identify major lunar phases. PATTERNS Explain time (days, seasons) using solar system motions.

Eligible Content

S4.A.1.3.1; S4.A.1.3.3; S4.A.3.2.1; S4.A.3.2.2; S4.A.3.3.1; S4.A.3.3.2; S4.D.3.1.1; S4.D.3.1.2; S4.D.3.1.3

Science Content

- Describe the motions of Earth, the moon, and the sun in space
- Explain how the rotation of Earth causes day and night
- Recognize that the seasons result from the tilt and orbit of Earth around the sun
- Identify historical contributions to the understanding of the Earth-moon-sun system

Vocabulary

rotate, axis, orbit, constellation

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Unit 6 - 14 Days

Interdisciplinary Connections

Art: Draw scenes of the seasons

Math: Make a time line that shows the major scientific events that contributed to acceptance of a sun-centered solar system

Social Studies: Draw activities at different times of day around the world

Writing: Make a sky calendar

• Unit

Lesson

Lesson 2: What Are Moon Phases?

Standard(s)

3.3.4.B.2: SCALES Know the basic characteristics and uses of telescopes. PATTERNS/PHASES Identify major lunar phases. PATTERNS Explain time (days, seasons) using solar system motions.

Eligible Content

S4.A.3.2.2; S4.A.3.2.3; S4.A.3.3.1; S4.A.3.3.2; S4.D.3.1.1; S4.D.3.1.2

Science Content

- o Identify and predict changes in the appearance of the moon

Vocabulary

moon phases

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Language Arts: Names of the moon according to the Algonquian tribe of New England

Social Studies: Research ancient calendars

Art: Create and illustrate a lunar calendar with 12 animals or symbols

Language Arts: Native American moon stories

- Unit

Lesson

*Lesson 3: How Does the Moon Move Around the Earth?

Standard(s)

3.3.4.B.2: SCALES Know the basic characteristics and uses of telescopes. PATTERNS/PHASES Identify major lunar phases. PATTERNS Explain time (days, seasons) using solar system motions.

Eligible Content

S4.A.3.2.2; S4.A.3.2.3; S4.A.3.3.1; S4.A.3.3.2; S4.D.3.1.1; S4.D.3.1.2

Science Content

- Observe and sketch apparent changes in the shape of the moon
- Predict when and how the shape of the moon appears to change

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

• Unit

Lesson

Lesson 4: What Are the Planets in Our Solar System?

Standard(s)

3.3.4.B.1: 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 billion stars.

Eligible Content

S4.A.3.2.1; S4.A.3.2.2; S4.A.3.2.3

Science Content

- Identify the major components of the solar system
- Describe characteristics of planets in the solar system
- Compare and contrast the inner and outer planets

Vocabulary

solar system, planet

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Social Studies: Research planet names

Math: Make a venn diagram that compares and contrasts the features of the inner and outer planets

Writing: Write a science fiction story about the first crewed mission to one of the planets

Writing: Report on extremophiles

- Unit

Lesson

*Lesson 5: How Can We Model the Sun and Planets?

Standard(s)

3.3.4.B.1: 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 billion stars.

Eligible Content

S4.A.3.2.1; S4.A.3.2.2; S4.A.3.2.3

Science Content

- Model the size of the sun and planets in the solar system
- Compare and contrast the size of the sun and the inner and outer planets

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Unit 7: Properties of Matter

Lesson

Lesson 1: What Are Physical Properties of Matter?

Standard(s)

3.2.4.A.1: Identify and classify objects based on their observable and measurable physical properties. Compare and contrast solids, liquids, and gases based on their properties.

Eligible Content

S4.A.1.3.2; S4.C.1.1.1; S4.C.1.1.2

Science Content

- Explain how physical properties can be used to identify matter.
- Define matter, mass, density, and volume.
- Compare objects by their physical properties.

Vocabulary

matter, mass, physical property, volume, density

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Unit 7 - 12 Days

Interdisciplinary Connections

Art: Make a magazine ad

Music: Write a song about physical properties of an item

Writing: Write a sales letter describing physical properties of an item

Health: Make a menu for a meal that uses foods with many different physical properties

- Unit

Lesson

*Lesson 2: How Are Physical Properties Observed?

Standard(s)

3.2.4.A.1: Identify and classify objects based on their observable and measurable physical properties. Compare and contrast solids, liquids, and gases based on their properties.

Eligible Content

S4.A.1.3.2; S4.C.1.1.1; S4.C.1.1.2

Science Content

- Classify a group of objects by their observable properties
- Use standard measurements to quantify observable properties of an object

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

*Lesson 3: What is Conservation of Mass?

Standard(s)

3.2.4.A.3: Demonstrate the conservation of mass during physical changes such as melting or freezing.

Eligible Content

S4.A.1.3.2; S4.C.1.1.1; S4.C.1.1.2

Science Content

- Use a balance to illustrate the law of conservation of mass (two identical objects on either end of the balance: one is whole, the other is dismantled)

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

Lesson 4: What Are the States of Water?

Standard(s)

3.2.4.A.1: 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.A.5: MODELS Use models to demonstrate the physical change as water goes from liquid to ice and from liquid to vapor

Eligible Content

S4.A.3.3.1; S4.C.1.1.1; S4.D.1.3.2

Science Content

- Describe the three states of water
- Explain how heating and cooling change the states of matter
- Explain that matter isn't lost or gained as it changes states

Vocabulary

states of matter, solid, liquid, gas, change of state, evaporation, condensation

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Health and Physical Education: Perform a dance that represents particles going through one or more changes of state

Writing: Write a one-page narrative of what happens to a particle during the change of state, from the viewpoint of the particle

Art: Draw a visual showing how water changes forms

Social Studies: Find out about humidity and evaporation

- Unit

Unit 8: Changes in Matter

Lesson

Lesson 1: What Are Some Physical Changes?

Standard(s)

3.2.4.A.5: MODELS Use models to demonstrate the physical change as water goes from liquid to ice and from liquid to vapor

Eligible Content

S4.A.1.3.1; S4.A.1.3.3; S4.C.1.1.1; S4.C.1.1.2

Science Content

- Recognize that during a physical change, the composition of a substance does not change.
- Identify examples of physical changes

Vocabulary

physical change, mixture, solution

Assessment(s)

Brain Check
Informal Comprehension Questions

Duration

Unit 8 - 12 Days

Interdisciplinary Connections

Social Studies: Research five ways steel is used in everyday life
Art: Deduce physical changes in sculpture
Writing: Write about panning for gold
Health: Learn about blood

- Unit

Lesson

*Lesson 2: How Can We Make a Solution?

Standard(s)

3.2.4.A.4: Recognize that combining two or more substances may make new materials with different properties

Eligible Content

S4.A.1.3.1; S4.A.1.3.3; S4.C.1.1.1; S4.C.1.1.2

Science Content

- Distinguish between a mixture and a solution.
- Measure physical properties of matter.

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

Lesson 3: What Are Some Chemical Changes?

Standard(s)

3.2.4.A.4: Recognize that combining two or more substances may make new materials with different properties

Eligible Content

S4.A.1.3.1; S4.A.1.3.3; S4.C.2.1.1

Science Content

- Recognize that after a chemical change, new substances form with different characteristics.
- Explain conservation of mass
- Describe examples of chemical changes
- Explain how chemical changes differ from physical changes

Vocabulary

chemical property, chemical change, chemical reaction

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Art: Make a poster about the Statue of Liberty and the chemical reaction that changed the color

Writing: Write captions for pictures showing chemical reactions

Social Studies: Reactions used for heat and light

Music: Write a song about chemical changes

• Unit

Lesson

*Lesson 4: How Can You Tell When a New Substance Forms?

Standard(s)

3.2.4.A.4: Recognize that combining two or more substances may make new materials with different properties

Eligible Content

S4.A.1.3.1; S4.A.1.3.3; S4.C.2.1.1

Science Content

- Identify changes in an object's properties that signal a chemical change.
- Compare and contrast the appearance of steel wool before and after the formation of rust

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

• Unit

Unit 9: Energy

Lesson

Lesson 1: What Are Some Forms of Energy?

Standard(s)

3.2.4.B.2: Identify types of energy and their ability to be stored and changed from one form to another

3.2.4.B.5: Demonstrate how vibrating objects make sound and sound can make things vibrate. Demonstrate how light can be reflected, refracted or absorbed by an object.

3.2.4.B.6: ENERGY Give examples of how energy can be transformed from one form to another

Eligible Content

S4.C.2.1.1; S4.C.2.1.2; S4.C.2.1.4

Science Content

- Identify energy uses and their sources
- Describe the uses of chemical and mechanical energy and how chemical energy can be changed to other forms of energy
- Differentiate between potential and kinetic energy
- Understand that sound is a form of energy produced through vibrations

Vocabulary

energy, kinetic energy, potential energy, mechanical energy, chemical energy, electrical energy

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Unit 9 - 16 Days

Interdisciplinary Connections

Art: Make a "Forms of Energy" poster
Health: Find out about energy in food
Language Arts: Write a report about local sources of energy
Social Studies: Map sources of energy in the U.S.

- Unit

Lesson

*Lesson 2: Where Does Energy Come From?

Standard(s)

3.2.4.B.2: Identify types of energy and their ability to be stored and changed from one form to another
3.2.4.B.6: ENERGY Give examples of how energy can be transformed from one form to another

Eligible Content

S4.C.2.1.1; S4.C.2.1.2; S4.C.2.1.4

Science Content

- Identify how potential energy is transferred into kinetic energy
- Investigate how energy has the ability to cause motion

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

Lesson 3: What is Heat?

Standard(s)

3.2.4.B.2: Identify types of energy and their ability to be stored and changed from one form to another

3.2.4.B.3: Understand that objects that emit light often emit heat

Eligible Content

S4.C.2.1.1; S4.C.2.1.2

Science Content

- Define temperature and heat
- Describe three ways to transfer heat
- Identify sources of heat

Vocabulary

heat, conduction, convection, radiation

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Writing: Make a lesson plan

Math: Calculate window savings

Health: Orally present about frostbite

Social Studies: Learn about geothermal heat and cooling systems

- Unit

Lesson

*Lesson 4: How is Heat Produced?

Standard(s)

3.2.4.B.3: Understand that objects that emit light often emit heat

Eligible Content

S4.C.2.1.1; S4.C.2.1.2

Science Content

- Observe that an object's temperature increases when it is exposed to a heat source

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

Lesson 5: What Are Conductors and Insulators?

Standard(s)

3.2.4.A.1: Identify and classify objects based on their observable and measurable physical properties. Compare and contrast solids, liquids, and gases based on their properties.

Eligible Content

S4.C.2.1.1; S4.C.2.1.2

Science Content

- Identify materials that conduct heat well.
- Determine which materials can be used to prevent the transfer of energy as heat.

Vocabulary

conductor, insulator

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Art: Heat collage (pictures from magazines)

Social Studies: Research insulation rebates from various forms of government

Health: Research highly insulating clothes

Math: Calculate savings for window replacements

- Unit

Lesson

*Lesson 6: Which Materials Are Conductors?

Standard(s)

3.2.4.A.1: Identify and classify objects based on their observable and measurable physical properties. Compare and contrast solids, liquids, and gases based on their properties.

Eligible Content

S4.C.2.1.1; S4.C.2.1.2

Science Content

- Recognize that some materials conduct heat better than others
- Classify a small group of objects by the observable property: objects that conduct heat well and those that do not

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

• Unit

Unit 10: Electricity

Lesson

Lesson 1: What Is Electricity?

Standard(s)

3.2.4.B.2: Identify types of energy and their ability to be stored and changed from one form to another.

3.2.4.B.3: Understand that objects that emit light often emit heat.

3.2.4.B.6: ENERGY Give examples of how energy can be transformed from one form to another

Eligible Content

S4.C.1.1.1; S4.C.2.1.1; S4.C.2.1.2

Science Content

- o Explain what causes static electricity
- o Describe how charged particles interact with one another
- o Relate electricity to magnetism

Vocabulary

static electricity, electric current

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Unit 10 - 14 Days

Interdisciplinary Connections

Language Arts: Write a brief explanation of what the word derivation has to do with the words electron and electricity

Math: Determine how many times lightning strikes Earth every day

Health: Determining the health effects of lightning

Social Studies: Research the lightning rod

- Unit

Lesson

*Lesson 2: How Do Electric Charges Interact?

Standard(s)

3.2.4.B.2: Identify types of energy and their ability to be stored and changed from one form to another.

3.2.4.B.3: Understand that objects that emit light often emit heat.

3.2.4.B.6: ENERGY Give examples of how energy can be transformed from one form to another

Eligible Content

S4.C.1.1.1; S4.C.2.1.1; S4.C.2.1.2

Science Content

- Describe the interaction between a charged object and an uncharged object
- Describe the interaction between two objects with the same charge
- Demonstrate the ability of a charged object to attract or repel another object, even if the two objects are not touching

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

*Lesson 3: What Is an Electric Circuit?

Standard(s)

3.2.4.B.4: 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

Eligible Content

S4.C.1.1.1; S4.C.2.1.1; S4.C.2.1.2; S4.C.2.1.3

Science Content

- Build a simple series circuit
- Determine that electricity flows through a circuit only when the circuit is closed
- Test materials and identify them as either conductors or insulators of electricity
- Explain that observations can be used as evidence to support a scientific explanation

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A

- Unit

Lesson

Lesson 4: What Are Electric Circuits, Conductors, and Insulators?

Standard(s)

3.2.4.B.4: 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

Eligible Content

S4.C.1.1.1; S4.C.2.1.1; S4.C.2.1.2; S4.C.2.1.3

Science Content

- o Analyze circuits and explain how they work
- o Identify elements in a circuit that transform electrical energy into heat, light, sound, and motion
- o Identify conductors and insulators of electricity

Vocabulary

insulator, conductor, circuit, series circuit, parallel circuit

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Writing: Write a list of safety rules that younger students should remember when using electricity

Math: Using numbers to describe voltages

Language Arts: Discussing word origins

Social Studies: Build a voltaic pile using coins and paper towels

- Unit

Lesson

Lesson 5: How Do We Use Electricity?

Standard(s)

3.2.4.B.2: Identify types of energy and their ability to be stored and changed from one form to another.

3.2.4.B.3: Understand that objects that emit light often emit heat.

3.2.4.B.6: ENERGY Give examples of how energy can be transformed from one form to another

Eligible Content

S4.C.1.1.1; S4.C.2.1.1; S4.C.2.1.2

Science Content

- Identify ways in which electrical energy can be transformed into heat, light, sound, and motion
- Describe how electricity is generated
- Explain why energy conservation is important, and identify some ways to conserve electricity

Vocabulary

electric motor, magnet, electromagnet, generator

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Interdisciplinary Connections

Writing: Write a description of their favorite electrical toy from the present or when they were younger

Math: Find a rule for the amount of paper clips that can be picked up based on the amount of loops of wire

Math: Design an experiment to determine the relationship between the number of wires on the coil of an electromagnet and the number of objects it will pick up

Social Studies: Draw a Faraday motor

- Unit

Unit 11: Motion

Lesson

Lesson 1: What Is Motion?

Standard(s)

3.2.4.B.1: Explain how an object's change in motion can be observed and measured

Eligible Content

S4.A.1.3.1; S4.A.1.3.2; S4.C.3.1.1; S4.C.3.1.2; S4.C.3.1.3

Science Content

- Observe and record changes of position.
- Explain how to measure motion.
- Compare the motion of various objects.
- Describe how velocity and acceleration are related.

Vocabulary

position, motion, speed, velocity, force, acceleration

Assessment(s)

Brain Check

Informal Comprehension Questions

Duration

Unit 11 - 8 Days

Interdisciplinary Connections

Math: Finding average speed of a train

Physical Education: Analyze tug of war

Writing: Write a story for a younger child that explains how to use forces to move an elephant from one part of a zoo to another

Social Studies: Draw an illustrated timeline that shows at least five major advances in speed from 100 CE to the present

- Unit
-

Lesson

*Lesson 2: What Is Speed?

Standard(s)

3.2.4.B.1: Explain how an object's change in motion can be observed and measured

Eligible Content

S4.A.1.3.1; S4.A.1.3.2; S4.C.3.1.1; S4.C.3.1.2; S4.C.3.1.3

Science Content

- Determine the speed of a moving object by measuring the distance it travels and the time required
- Determine how to increase or decrease the speed of the object they are investigating

Vocabulary

N/A

Assessment(s)

Lab Sheet

Duration

Interdisciplinary Connections

N/A