Grade One Science

Theme ***Observations of the Environment***

Strand Connection

Energy is observed through movement, heating, cooling, and the needs of living organisms.

Science Inquiry and Applications: *All students must be developing the ability to:*

- Observe and ask questions about the natural environment
- Plan and conduct simple investigations
- Employ simple equipment and tools to gather data and extend the senses
- Use appropriate mathematics with data to construct reasonable explanations
- Communicate about observations, investigations, and explanations
- Review and ask questions about the observations and explanations of others

Topic ***Sun, Energy, and Weather***

This topic focuses on the sun as a source of energy and energy changes that occur to land, air, and water.

Pacing

Earth and Space Science – 4 weeks

- The sun is the principal source of energy.
- The physical properties of water can change.

Content Statement

1. ***The sun is the principal source of energy.***
   a. Sunlight warms Earth's land, air, and water. The amount of exposure to sunlight affects the amount of warming or cooling of air, water, and land.

Learning Targets:

- I can measure how sunlight warms objects (air, water, soil).
- I can use tools to measure temperature (thermometer, touch).
- I can communicate my observations about how sunlight warms objects (air, water, soil).

Content Elaborations

Prior Concepts Related to Sun and Weather

PreK-K: Weather changes every day, weather changes are short and long term, the sun is visible during the day, and the position of the sun can change.

Grade 1 Concepts

Quantitative measurements must be used to observe and document the warming and cooling of air, water, or soil. The length of time an object or material (including water) is exposed to sunlight and its resulting temperature must be observed, as should the amount of time for the object or material to cool down after it is taken out of the sunlight.

Appropriate tools and technology must be used to collect, compare, and document data. Investigation and experimentation must be combined with explanation, questioning, and discussion of the results and findings.

Future Application of Concepts

Grade 2: The relationship between energy and long- and short-term weather is introduced.

	Grades 3-5: Renewable energy, forms of energy (e.g., heat, light, electrical energy), the solar system, and patterns/cycles between the Earth and sun are explored.
Content Vocabulary • air • soil • thermometer • warm/cool	**Academic Vocabulary** • observe • measure • notice • communicate
Formative Assessments • Student responses (written and oral) • Student participation in discussion and activities • Teacher observation	**Summative Assessments** Not applicable at this grade level
Resources • Infrared thermometer • Thermometer • Science journal	**Enrichment Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students write observations, ask questions, and draw pictures in their science journals. Teacher responds to answer questions and suggest further extensions to differentiate and promote higher learning.
Integrations • Students will have access to content-related fiction and nonfiction books, as well as completing writing activities related to the content. • Basic math concepts will also be reinforced through the use of measurement and observations.	**Intervention Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students may also work with a partner during activities planned to be completed individually.

Grade One Science

Theme ***Observations of the Environment***

Strand Connection

Energy is observed through movement, heating, cooling, and the needs of living organisms.

Science Inquiry and Applications: *All students must be developing the ability to:*

- Observe and ask questions about the natural environment
- Plan and conduct simple investigations
- Employ simple equipment and tools to gather data and extend the senses
- Use appropriate mathematics with data to construct reasonable explanations
- Communicate about observations, investigations, and explanations
- Review and ask questions about the observations and explanations of others

Topic ***Sun, Energy, and Weather***

This topic focuses on the sun as a source of energy and energy changes that occur to land, air, and water.

Pacing

Earth and Space Science – 4 weeks

- The sun is the principal source of energy.
- The physical properties of water can change.

Content Statement

2. The physical properties of water can change.

a. These changes occur due to changing energy. Water can change from a liquid to a solid and from a solid to a liquid. Weather observations can be used to examine the property changes of water.

Note: Water as a vapor is not introduced until Grade 2; only solid and liquid water should be discussed at this level. A broader coverage of states of matter is found in Grade 4. This concept builds on the PS Kindergarten strand pertaining to properties (liquids and solids).

Learning Targets:

- I can identify water in different forms (hail, sleet, rain, mist, snow).
- I can describe that water changes from a liquid to a solid and from a solid to a liquid.
- I can use maps to locate bodies of water.
  - ~ SS: Maps can be used to identify places. Places are distinctive because of their physical characteristics.
- I can use appropriate tools to test and measure water's weight, texture, temperature, and size.

Content Elaborations

Prior Concepts Related to Water

PreK-K: Water can be observed in many different forms; precipitation (rain, sleet, hail, or snow) is a component of weather that can be measured.

Grade 1 Concepts

Water can be observed in lakes, ponds, streams, wetlands, the ocean, and through weather events. Freezing and melting of water are investigated through measurements and observations using technology, in the classroom, or in a natural setting. Examining maps (virtual or 2-D) of Ohio, world maps, or globes can illustrate the amount of Earth's surface that is covered in water and why it is important to learn about water. Water also can be observed in the air as clouds, steam, or fog, but this comment should be limited to observation only at this grade level (see Note).

Investigations (inside or outside) and experimentation must be used to demonstrate the changing properties of water. Use appropriate tools to test and measure water's weight, texture, temperature, or size (e.g., compare

	measurements of water before and after freezing, examine the texture of snow or ice crystals using a hand lens) to document the physical properties. ***Future Application of Concepts*** Grade 2: Water as a vapor is introduced (water is present in the atmosphere). Grades 3-5: Water is identified as a nonliving resource that can be used for energy; common states of matter include liquids, solids, and gases; Earth's surface has been changed by processes involving water; and where water is found on Earth.
Content Vocabulary • cloud • freezing • lake • liquid • melting • ocean • pond • size • solid • stream • temperature • texture • wetland	**Academic Vocabulary** • appropriate • locate • describe • predict
Formative Assessments • Student responses (written and oral) • Student participation in discussion and activities • Teacher observation	**Summative Assessments** Not applicable at this grade level
Resources • Balance • Hand lens • Kitchen scale • Ruler • Thermometer	**Enrichment Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students write observations, ask questions, and draw pictures in their science journals. Teacher responds to answer questions and suggest further extensions to differentiate and promote higher learning.

Integrations	Intervention Strategies
• Students will have access to content-related fiction and nonfiction books, as well as completing writing activities related to the content. • Basic math concepts will also be reinforced through the use of measurement and observations.	• Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students may also work with a partner during activities planned to be completed individually.

Grade One Science

Theme ***Observations of the Environment***

Strand Connection

Energy is observed through movement, heating, cooling, and the needs of living organisms.

Science Inquiry and Applications: *All students must be developing the ability to:*

- Observe and ask questions about the natural environment
- Plan and conduct simple investigations
- Employ simple equipment and tools to gather data and extend the senses
- Use appropriate mathematics with data to construct reasonable explanations
- Communicate about observations, investigations, and explanations
- Review and ask questions about the observations and explanations of others

Topic ***Basic Needs of Living Things***

This topic focuses on the physical needs of living things in Ohio. Energy from the sun or food, nutrients, water, shelter, and air are some of the physical needs of living things.

Pacing

Life Science (Plants and Animals) – 6 weeks

- Living things survive only in environments that meet their needs.
- Living things have basic needs, which are met by obtaining materials from the physical environment.

Content Statement

3. Living things have basic needs which are met by obtaining materials from the physical environment.

a. Living things require energy, water, and a particular range of temperatures in their environments.
b. Plants get energy from sunlight. Animals get energy from plants and other animals.
c. Living things acquire resources from the living and nonliving components of the environment.

Learning Targets:

- I can explain that living things have basic needs in order to survive.
- I can explore how the environment meets the basic needs of living things.
- I can tell that plants get energy from the sun.
- I can tell that animals get energy from plants and other animals.
- I can demonstrate how to take care of living things.
- I can compare different types of living things that are in Ohio.

Content Elaborations

Prior Concepts Related to Interactions Within Habitats

PreK-K: Use macroscopic ways to identify living things. Living things have physical traits which enable them to live in different environments.

Grade 1 Concepts

Earth has many different environmental conditions that support living things. The emphasis of this content statement is that living things meet their basic needs for survival by obtaining necessary materials from the environment. This includes, but is not limited to, temperature range, amount of water, amount of sunlight, and available food sources. The environment includes both living (plants and animals) and nonliving (e.g., water, air, sunlight, nutrients) things.

Living things get the energy they require to respond, grow, and reproduce from the environment. Observing energy being used in everyday situations can help promote understanding that living things get resources from the physical environment. A detailed discussion of energy is not appropriate at

	this grade level (see section heading E). Energy is not scientifically explained until Grade 3. When studying living things, ethical treatment of animals and safety must be employed. Respect for and proper treatment of living things must be modeled. For example, shaking a container, rapping on insect bottles, unclean cages or aquariums, leaving living things in the hot sun, or exposure to extreme temperatures (hot or cold) must be avoided. The National Science Teachers Association (NSTA) has a position paper to provide guidance in the ethical use and treatment of animals in the classroom at http://www.nsta.org/about/positions/animals.aspx. Investigations about the types of living things that live in specific environments can be done virtually or in nature. ***Future Application of Concepts*** Grade 2: How living things impact the environment and how the environment impacts living things will be examined. Grades 3-5: Life cycles of plants and animals will be explored. Grades 6-8: Changes in environmental conditions can affect how beneficial a trait will be for survival and reproductive success of an individual or an entire species.
Content Vocabulary • basic needs • energy • environment • living • nonliving • plants	**Academic Vocabulary** • compare • demonstrate • explore • explain
Formative Assessments • Student responses (written and oral) • Student participation in discussion and activities • Teacher observation	**Summative Assessments** Not applicable at this grade level
Resources • Bird feeder	**Enrichment Strategies** • Content related materials available for daily exploration during centers

• Bird food • Materials for creating a bird feeder (pine cones, bagels, soy butter, cream cheese, vegetable shortening) • Seeds for planting (lima beans, peas, marigolds) • Soil	and/or free choice when other work is completed. • Students write observations, ask questions, and draw pictures in their science journals. Teacher responds to answer questions and suggest further extensions to differentiate and promote higher learning.
Integrations • Students will have access to content-related fiction and nonfiction books, as well as completing writing activities related to the content. • Basic math concepts will also be reinforced through the use of measurement and observations.	**Intervention Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students may also work with a partner during activities planned to be completed individually.

Grade One Science

Theme ***Observations of the Environment***

Strand Connection

Energy is observed through movement, heating, cooling, and the needs of living organisms.

Science Inquiry and Applications: *All students must be developing the ability to:*

- Observe and ask questions about the natural environment
- Plan and conduct simple investigations
- Employ simple equipment and tools to gather data and extend the senses
- Use appropriate mathematics with data to construct reasonable explanations
- Communicate about observations, investigations, and explanations
- Review and ask questions about the observations and explanations of others

Topic ***Basic Needs of Living Things***

This topic focuses on the physical needs of living things in Ohio. Energy from the sun or food, nutrients, water, shelter, and air are some of the physical needs of living things.

Pacing

Life Science (Plants and Animals) – 6 weeks

- Living things survive only in environments that meet their needs.
- Living things have basic needs, which are met by obtaining materials from the physical environment.

Content Statement

4. Living things survive only in environments that meet their needs.

a. Resources are necessary to meet the needs of an individual and populations of individuals. Living things interact with their physical environments as they meet those needs.

b. Effects of seasonal changes within the local environment directly impact the availability of resources.

Learning Targets:

- I can discuss ways that animals get food, water, and shelter during seasonal changes in order to survive.
- I can discuss how room to grow, temperature, light, water, air, nutrients, and seasonal grow time can change the survival of a plant.

Content Elaborations

Prior Concepts Related to Interactions Within Habitats

PreK-K: Use macroscopic ways to identify living things. Living things have physical traits which enable them to live in different environments.

Grade 1 Concepts

Plants and animals require resources from the environment. The focus at this grade level is on macroscopic interactions and needs of common living things (plants and animals).

Animals require basic habitat components, including food, water, cover, and space. The amount and distribution of the basic components will influence the types of animals that can survive in an area. Food sources might include insects, plants, seeds, or other animals. Water sources may be as small as drops of dew found on grass or as large as a lake or river. Animals need cover for many life functions, including nesting, escaping from predators, seeking shelter from the elements on a cold winter day, and resting. Animals also need space in which to perform necessary activities such as feeding or raising young.

	Seasonal changes affect the resources available to living things (e.g., grasses are not as available in winter as they are in summer). The needs of plants include room to grow, temperature range, light, water, air, nutrients, and time (growing season). The amount and distribution of these will influence the types of plants that can survive in an area. Observations of seasonal changes in temperature, liquid water availability, wind, and light must be applied to the effect of seasonal changes on local plants. ***Future Application of Concepts*** Grade 2: This concept expands to include interactions between organisms and the physical environment in which the organisms or the physical environment are changed. Grades 3-5: The fact that organisms have life cycles that are part of their adaptations for survival in their natural environment builds upon this concept. Grades 6-8: In any particular biome, the number, growth, and survival of organisms and populations depend on biotic and abiotic factors.
Content Vocabulary • nutrients • seasonal changes • shelter • space (room to grow) • survival/survive • temperature	**Academic Vocabulary** • discuss • cause • purpose • explore
Formative Assessments • Student responses (written and oral) • Student participation in discussion and activities • Teacher observation	**Summative Assessments** Not applicable at this grade level
Resources • Lima beans • Plastic bags • Paper towel • Water	**Enrichment Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students write observations, ask questions, and draw pictures in their science journals. Teacher responds to answer questions and suggest further extensions to differentiate and promote higher learning.

• Light space/dark space • Soil	
Integrations • Students will have access to content-related fiction and nonfiction books, as well as completing writing activities related to the content. • Basic math concepts will also be reinforced through the use of measurement and observations.	**Intervention Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students may also work with a partner during activities planned to be completed individually.

Grade One Science

Theme ***Observations of the Environment***

Strand Connection

Energy is observed through movement, heating, cooling, and the needs of living organisms.

Science Inquiry and Applications: *All students must be developing the ability to:*

- Observe and ask questions about the natural environment
- Plan and conduct simple investigations
- Employ simple equipment and tools to gather data and extend the senses
- Use appropriate mathematics with data to construct reasonable explanations
- Communicate about observations, investigations, and explanations
- Review and ask questions about the observations and explanations of others

Topic ***Motion and Materials***

This topic focuses on the changes in properties that occur in objects and materials. Changes of position of an object are a result of pushing or pulling.

Pacing

Physical Science – 2 weeks

- Properties of objects and materials can change.
- Objects can be moved in a variety of ways, such as straight, zigzag, circular, and back and forth.

Content Statement

5. Properties of objects and materials can change.

a. Objects and materials change when exposed to various conditions, such as heating or freezing. Not all materials change in the same way.

Note 1: Changes in temperature are a result of changes in energy.

Note 2: Water changing from liquid to solid and from solid to liquid is found in ESS Grade 1.

Learning Targets:

- I can observe that materials can change color and shape.
- I can investigate the ways a material works by adding or taking away parts.

Content Elaborations

Prior Concepts Related to Properties of Objects and Materials

PreK-K: Objects are things that can be seen or felt. Properties can be observed using tools or one's senses and can be used to sort objects. Comparisons of objects are made as a precursor to measurement.

Grade 1 Concepts

Materials can be exposed to conditions that change some of their properties, but not all materials respond the same way. The properties of a material can change as it interacts with other materials. Heating and cooling changes some, but not all, properties of materials.

Some materials can be a liquid or solid at room temperature and may change from one form to the other with a change in the temperature. A liquid may turn into a solid when frozen. A solid may turn into a liquid when heated. The amount of the material in the solid or liquid remains the same. Investigations and experiments (may include virtual investigations) must be conducted to explore property changes of objects and materials.

	Parts of objects have specific properties that allow them to work with other parts to carry out a particular function. Something may not work well or at all if a part of it is missing, broken, worn out, mismatched, or misconnected. Toys that can be assembled from several parts can be investigated when one or more of the parts are missing. Note: Emphasis is placed on observations. Concepts of thermal energy, atoms, and heat transfer are inappropriate at this grade. ***Future Application of Concepts*** Grade 2: Water can change from liquid to vapor in the air and from vapor to liquid (ESS). Grades 3-5: Matter is defined. Measurements of weight and liquid volume are made. Properties of solids, liquids, and gases and phase changes are explored. During any change, including phase changes, the total mass* remains constant. The sum of the mass of the parts of an object is equal to the mass of the entire object. Note: While mass is the scientifically correct term to use in this context, the NAEP 2009 Science Framework (page 27) recommends using the more familiar term "weight" in the elementary grades with the distinction between mass and weight being introduced at the middle school level. In Ohio, students will not be assessed on the differences between mass and weight until Grade 6.
Content Vocabulary • liquid • properties (color and shape) • solid	**Academic Vocabulary** • change • investigate • observe
Formative Assessments • Student responses (written and oral) • Student participation in discussion and activities • Teacher observation	**Summative Assessments** Not applicable at this grade level
Resources • Water • Ice	**Enrichment Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed.

• Color changing materials (cups, shirts, beads, mood rings) • Toys with removable parts (cars, yo-yo)	• Students write observations, ask questions, and draw pictures in their science journals. Teacher responds to answer questions and suggest further extensions to differentiate and promote higher learning.
Integrations • Students will have access to content-related fiction and nonfiction books, as well as completing writing activities related to the content. • Basic math concepts will also be reinforced through the use of measurement and observations.	**Intervention Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students may also work with a partner during activities planned to be completed individually.

Grade One Science

Theme ***Observations of the Environment***

Strand Connection

Energy is observed through movement, heating, cooling, and the needs of living organisms.

Science Inquiry and Applications: *All students must be developing the ability to:*

- Observe and ask questions about the natural environment
- Plan and conduct simple investigations
- Employ simple equipment and tools to gather data and extend the senses
- Use appropriate mathematics with data to construct reasonable explanations
- Communicate about observations, investigations, and explanations
- Review and ask questions about the observations and explanations of others

Topic ***Motion and Materials***

This topic focuses on the changes in properties that occur in objects and materials. Changes of position of an object are a result of pushing or pulling.

Pacing

Physical Science – 2 weeks

- Properties of objects and materials can change.
- Objects can be moved in a variety of ways, such as straight, zigzag, circular, and back and forth.

Content Statement

6. Objects can be moved in a variety of ways, such as straight, zigzag, circular, and back and forth.

a. The position of an object can be described by locating it relative to another object or to the object's surroundings.
b. An object is in motion when its position is changing.
c. The motion of an object can be affected by pushing or pulling. A push or pull is a force that can make an object move faster, slower, or go in a different direction.

Note: Changes in motion are a result of changes in energy.

Learning Targets:

- I can identify the position of an object (in front, behind, above, below).
- I can move objects in a straight line, a circle, back and forth, or in zigzag patterns.
- I can demonstrate how objects can be moved faster, slower, or change direction by pushing or pulling the object.

Content Elaborations

Prior Concepts Related to Motion

PreK-K: Vibrating objects can cause sound.

Grade 1 Concepts

The position of an object is described by comparing its location relative to another object (e.g., in front, behind, above, below). Objects can be moved and their positions are changed.

Objects can move in a straight line (like a dropped coin falling to the ground) or a circle (like a pinwheel) or back and forth (like a swing) or even in a zigzag pattern. Objects near Earth fall to the ground unless something holds them up.

Object motion can be faster, slower, or change direction by pushing or pulling the object. Experimentation, testing, and investigations of different ways to change the motion of different objects (such as a ball, a pinwheel, or a kite) must be used to demonstrate movement.

	Note 1: Scientific definitions and calculations of speed are inappropriate at this grade. Note 2: Force is a push or pull between two objects, and energy is the property of an object that can cause change. A force acting on an object can sometimes result in a change in energy. The differences between force and energy will be developed over time and are not appropriate for this grade. ***Future Application of Concepts*** Grade 2: Forces are necessary to change the motion of objects. Grades 3-5: The amount of change in movement of an object is based on the mass* of the object and the amount of force exerted. Note: While mass is the scientifically correct term to use in this context, the NAEP 2009 Science Framework (page 27) recommends using the more familiar term "weight" in the elementary grades with the distinction between mass and weight being introduced at the middle school level. In Ohio, students will not be assessed on the differences between mass and weight until Grade 6.
Content Vocabulary • circle • energy • force • gravity • position (in front, behind, above, below) • pull • push • straight line • swing (back and forth) • zigzag	**Academic Vocabulary** • predict • effect • prove • notice • identify • demonstrate
Formative Assessments • Student responses (written and oral) • Student participation in discussion and activities • Teacher observation	**Summative Assessments** Not applicable at this grade level

Resources • Balls • Toy cars • Pinwheel • Rope/string • *STEM for Primary – Race Car Challenge*	**Enrichment Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students write observations, ask questions, and draw pictures in their science journals. Teacher responds to answer questions and suggest further extensions to differentiate and promote higher learning.
Integrations	**Intervention Strategies** • Content related materials available for daily exploration during centers and/or free choice when other work is completed. • Students may also work with a partner during activities planned to be completed individually.