

4th Grade Science

Pacing Guide and Unpacked Standards



**GROVEPORT
MADISON**
SCHOOLS

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Groveport Madison Science Pacing Guide

4	Science Inquiry & Application	Life Science	Physical Science	Earth & Space Science
1st 9 wks	Thinking Like a 21st Century Scientist/Engineer Intro to Science, Technology and Engineering: Lab Safety, Procedures/Equipment; Team Building; Process Skills, Computer Technology; Engineering Design *These skills/topics should continue throughout the year. 2 weeks	Ecosystems(4.LS.1) Impact from Environmental Changes, Populations, Fossil Record Evidence 3 weeks		Earth's Surface (4.ESS.1) Landforms 4 weeks
2nd 9 wks	Thinking Like a 21st Century Scientist/Engineer (continue to integrate)	Ecosystems (4.LS.1) 3 weeks Fossils (4.LS.2) Fossil Evidence, Changes Over Time, Past Environments, Past Organisms 3 weeks	Matter (4.PS.1) Conservation of Matter 3 weeks	
3rd 9 wks	Thinking Like a 21st Century Scientist/Engineer (continue to integrate)		Energy Transfer (4.PS.2) Temperature Change Heat 4 weeks Energy Transformations (4.PS.2) Electrical Circuits, Conductivity Electrical Devices, Electricity and Magnetism 5 weeks	
4th 9 wks	Thinking Like a 21st Century Scientist/Engineer (continue to integrate)			Weathering/Erosion and Deposition (4.ESS.2; 4.ESS.3) Weathering Process Rate, Erosion Process, Deposition Process, and Gravitational Force 5 weeks

Ohio's Learning Standards- Clear Learning Targets

Science, Grade 4

4.ESS.1

EARTH'S SURFACE

Earth's surface has specific characteristics and landforms that can be identified.

Essential Understandings:

- About 70 percent of the Earth's surface is covered with water and most of that is the ocean.
- Only a small portion of the Earth's water is freshwater, which is found in rivers, lakes, ground water, and glaciers.
- Earth's surface can change due to erosion and deposition of soil, rock or sediment.
- Catastrophic events such as flooding, volcanoes and earthquakes can create landforms.

Vocabulary

Canyon	Catastrophic
Characteristics	Delta
Deposition	Dune
Earthquake	Erosion
Event	Flooding
Floodplain	Glacial Feature
Mountain Range	Weathering
Glacial Movement	
Remote Sensing Data	
Topographic Map	
Physical Geography Map	

Essential Skills:



The students can explain that 70 percent of the Earth's surface is covered with water and most of which is ocean.

The students can research and identify landforms and the processes in which they are created.

The students can design and construct a model of a landform and explain the process by which it formed.

The students can synthesize information related to landforms and their processes and present the findings to others.

Misconceptions

- NSTA offers a list of landform resources at <http://learningcenter.nsta.org/search.aspx?action=quicksearch&text=landforms>. Included are guides for formative assessment techniques that can be used to determine student misconceptions about landform formation, weathering and erosion.
- One reference in particular (an assessment probe) can be found at http://learningcenter.nsta.org/product_detail.aspx?id=10.2505/9780873552554.22. It deals with beach sand and applies to all Earth Science content at grade 4.
- Funded by the National Science Foundation, *Beyond Penguins and Polar Bears* is an online magazine for K-5 teachers. For a list of common misconceptions about glacial movement, weathering and erosion, as well as ways to address them, <http://nsdl.oercommons.org/courses/differentiating-science-and-literacy-content-with-beyond-penguins-and-polar-bears/view>.

Instructional Strategies and Resources

- Fieldtrips to local caves, caverns, sinkholes, glacial areas, stream systems, lakes, etc., should be encouraged to experience Ohio geologic landforms and features first hand. There also are numerous virtual fieldtrips to visit caves, canyons, glaciers, mountains and valleys. <http://www.olentangyindiancaverns.com/> and <http://www.metroparks.net/>
- The Ohio History Center www.ohiohistory.org/
- The Ohio Department of Natural Resources provides helpful resources and **geologic maps** that can be used to study landforms and surface geology of Ohio. The relationship between the types of rocks and the resulting features or landforms is a very important connection, especially if local/regional maps are used in conjunction with field trips or outside investigations around the community or school property.
- Viewing landforms and surface geology from **satellite photographs** and through remote sensing can be a helpful tool in illustrating landforms in different parts of the world and conditions that exist for formation. Click on the geographical features icon to see satellite photos of Earth's surface.
- The **NASA Visible Earth Program** houses hundreds of satellite photos that can be used to illustrate specific landforms. Comparing the photo to a map can be a good way to learn about recognizable features such as delta systems, mountain ranges, volcanoes and canyons.
- The **National Atlas** mapmaker site can plot areas within the United States where specific geologic features are found. For example, by clicking on *Geology*, then the *Karst, Engineering Aspects* option, areas that have caves, caverns and sinkholes are shown. This can be a good starting resource to locate other maps, photos and graphics related to landforms and features that form through erosion and/or deposition.
- The **USGS** website provides data, information, books and maps that relate to Earth's surface, weathering and erosion. Many of these resources are free and some are available at cost.
- The **National Speleological Society** provides information and resources for caves and caving for young students. Taking a field trip to an Ohio cave connects what is learned in the classroom about weathering and erosion to the real world. It is essential to learn about the processes of cave formation and karts topography, including lab investigations, to prepare students for a cave or cavern field experience.

Career Connections

Hydrogeologist, Hydraulic engineer, Structural engineer, Water resources engineer, Civil engineer, Hydrology engineer, Geologist

Prior Knowledge

3.ESS.1: The composition and characteristics of rocks and soil are compared.

Future Knowledge

5.ESS.1: Earth is a planet in the solar system that has a unique composition.

Ohio's Learning Standards- Clear Learning Target

Science, Grade 4

4.ESS.2

EARTH'S SURFACE

The surface of Earth changes due to weathering.

Vocabulary

Flooding	Freeze/thaw
Earthquakes	Exposure
Glaciers	Types of rocks
Characteristics	Earthquakes
Ice movement	Earth's Glaciers
Glaciers	Mass wasting
Erosion	Volcanic activity
Pollution	
Catastrophic event	
Weathering factors	
Weathering process	
Weathering rates	

Essential Understandings:

- Rocks change shape, size and/or form due to water or glacial movement, freeze and thaw, wind, plant growth, acid rain, pollution and catastrophic events such as earthquakes, flooding, and volcanic activity.

Note: Differentiating between chemical and physical weathering is not the focus at this grade level.

Essential Skills:

The students can explain the process of weathering in changing the Earth's surface.

The students can explain the process of erosion and deposition in changing the Earth's surface.

The students can differentiate between weathering, erosion, and deposition.

The students can connect concepts of weathering, erosion, and deposition to the real world.

The students can design, construct, and evaluate a model using research to prevent riverbank erosion.

Misconceptions

- Funded by the National Science Foundation, *Beyond Penguins and Polar Bears* is an online magazine for K-5 teachers. For a list of common misconceptions about glacial movement, weathering and erosion, as well as ways to address them, visit <http://nsdl.oercommons.org/courses/differentiating-science-and-literacy-content-with-beyond-penguins-and-polar-bears/view>.

Instructional Strategies and Resources

- The Byrd Polar and Climate Research Center at The Ohio State University <http://bpcrc.osu.edu/educators>
- The Ohio History Center www.ohiohistory.org/
- Discovery Education: www.discoveryeducation.com
- It is important for students to understand **the difference between weathering and erosion**, as well as how the two processes work together to form geologic features.
- **Online geologic museum sites** can offer examples and data for studying rates of weathering and different types of weathering. Testing the weathering rate of a variety of substances can help in the understanding that some things may take a long time to weather and others a short time.
- The **USGS** provides weathering-rate data for a variety of rocks and types of soil. This data can help teachers determine types of materials that weather at a rate that could be observed in a classroom setting).

Career Connections

Geologist, Engineer, Ecologist, Seismologist

Prior Knowledge

Grade 3: N/A

Future Knowledge

Grade 5: N/A

Ohio's Learning Standards- Clear Learning Targets

Science, Grade 4

4.ESS.3

EARTH'S SURFACE

The surface of Earth changes due to erosion and deposition.

Vocabulary

Surface	Deposition
Catastrophic events	Deposit
Gravitational force	Gravity
Landforms	Mass wasting
Process	Sediment
Topographic maps	Transport
Weathering	
Deposition (as a constructive process)	
Erosion (as a destructive process)	

Essential Understandings:

- Liquid water, wind and ice physically remove and carry rock, rock, soil and sediment (erosion) and deposit the material in a new location (deposition).
- Gravitational force affects movements of water, rock and soil.

Essential Skills:

- The students can explain the process of weathering in changing the Earth's surface.
- The students can explain the process of erosion and deposition in changing the Earth's surface.
- The students can differentiate between weathering, erosion, and deposition.
- The students can connect concepts of weathering, erosion, and deposition to the real world.
- The students can design, construct, and evaluate a model using research to prevent riverbank erosion.

Misconceptions

-Funded by the National Science Foundation, Beyond Penguins and Polar Bears is an online magazine for K-5 teachers. For a list of common misconceptions about glacial movement, weathering and erosion, as well as ways to address them, visit <http://beyondpenguins.nsd.org/issue/column.php?date=August2009&departmentid=professional&columnid=professional!misconceptions>.

Instructional Strategies and Resources

- The Byrd Polar and Climate Research Center at The Ohio State University <http://bpcrc.osu.edu/educators>

- The Ohio History Center www.ohiohistory.org/

- The **USGS and the National Park Service** provide explanations about how erosion and weathering are different processes, but often work together. This is a good site to assist teachers in preparing to teach about weathering and erosion.

- The **Ohio Department of Natural Resources** provides resources and information about Ohio's surface geology, including surficial geology maps of Ohio that show **glacial patterns** in Ohio very clearly.

- Understanding **Ohio's glacial history** and the different glacial periods will help middle school students prepare for understanding the geologic history of Ohio. This website includes a discussion of specific resultant landforms that can be seen today. Showing photographs of the landforms and connecting them to maps, drawings or historical stories connects to the real world. Taking a field trip to view a landform in person can be a culminating experience.

- The Ohio **EPA** provides basic background information about sediment contamination and control issues within Ohio. There are video clips of actual sediment-control measures and problems. This is a good starting point for the design section (classroom example) listed above.

Career Connections

Geologist, Engineer, Ecologist, Seismologist, Environmental Inspector, Erosion Control Specialist

<p>Prior Knowledge</p> <p>3.ESS.1: Soil and rock have unique characteristics.</p>	<p>Future Knowledge</p> <p>5.ESS.1: Earth is a planet in the solar system that has a unique composition.</p>
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Ohio's Learning Standards- Clear Learning Targets

Science, Grade 4

4.LS.1

EARTH'S LIVING HISTORY

Changes in an organism's environment are sometimes beneficial to its survival and sometimes harmful.

Vocabulary

Evidence	Survival
Abiotic	Beneficial
Biotic	Climate
Detrimental	Ecosystem
Impact	Fossil
Record	Interrelationships
Migration	Organism
Populations	Reproduce
Resources	Secondary

Essential Understandings:

- Ecosystems can change gradually or dramatically.
- When the environment changes, some plants and animals survive and reproduce and others die or move to new locations.
- Ecosystems are based on interrelationships among and between biotic and abiotic factors.
- These include the diversity of other organisms present, the availability of food and other resources, and the physical attributes of the environment.

Essential Skills:

The students can explain that some changes in an environment take a really long time to happen and some changes can be dramatic.

The students can conduct an experiment to show the effects of various factors on an organism.

The students can design and create a picture book to explain the ideas of environmental change.

The students can explain that some changes in an environment can be beneficial and some changes can be detrimental to different organisms in an ecosystem.

The students can observe and record factors in an environment.

The students can compare an ecosystem in Ohio from the past to the present.

The students can create a plan to benefit an endangered species in Ohio.

The students can evaluate a plan proposed to help an endangered species.

Misconceptions

- Students may think that people provide the materials (water, nutrients, light) needed for plants to survive. **Beyond Penguins and Polar Bears** is an online magazine for K-5 teachers that provides information for misconceptions about plants.
- A list of common **ecological misconceptions** about adaptation is provided with strategies for implementing the 5E model of instruction to overcome misconception.

Instructional Strategies and Resources

- COSI on Wheels <http://www.cosi.org/educators/outreach/cow>
- Discovery Education: www.discoveryeducation.com
- Investigate various species that have been endangered due to environmental changes and examine efforts to reestablish and support their populations. One example is the trumpeter swan. The **Ohio History Central** provides details of this bird's story.
- The **Virtual Nature Trail at Penn State New Kensington** is an opportunity to observe photos of various species of plants interacting with one another and the environment and examine what changes result due to those interactions.
- **Citizen Science** is program promoted by the National Wildlife Federation to have the public volunteer time to assist scientists in their wildlife research by collecting data, sharing experiences and spreading valuable information. Wildlife can be monitored and the changes that occur in the ecosystem can be monitored and analyzed.
- The ODNR-Division of Wildlife's **Research and Survey** website has information on current research projects on Ohio wildlife, including migration tracking, distribution and reintroduction and monitoring programs.
- The ODNR-Division of Wildlife has a poster with an activity called *Ohio's Wildlife History*. The poster can be ordered by mail through the Education Materials Brochure found online at www.wildohio.com.
- *Project Wild* was developed through a joint effort of the Western Association of Fish and Wildlife Agencies and the Council for Environmental Education. This program helps students learn basic concepts about wild animals, their needs and importance and their relationships to people and the environment. The activity guides are available to educators free of charge when they attend a workshop. Information about upcoming workshops are available on the **ODNR Website**. In the activity *Oh Deer*, students portray deer and habitat components in a physical activity that illustrates the factors that cause fluctuations in wildlife populations over time. In *Here Today, Gone Tomorrow*, students identify and describe causes of extinction within animal species and identify locally endangered and threatened species.
- Students will choose a recent disaster to explore (e.g., hurricane, earthquake, oil spill, tsunami) and identify the immediate and long-term consequences including the interactions and relationships among the Earth's surface, ecosystem, and plant and animal populations. Through exploring the impact, students will address the types of careers involved in addressing the issues. This may include performing tasks, such as relocating organisms, rebuilding habitats, rescuing or rehabilitating organisms.

Career Connections

Biologist, Zoologist, Ethologist, Botanist, Horticulturalist, Farmer, Forest Ranger, Environmental Scientist, Researcher

Prior Knowledge

3.LS.1: Some behavioral traits are learned through interactions with the environment and are not inherited.

3.LS.2: Individuals of the same kind of organism differ in their inherited traits. These differences give some individuals an advantage in surviving and/or reproducing.

3.LS.3: Plants and animals have life cycles that are part of their adaptations for survival in their natural environments.

Future Knowledge

5.LS.1: All of the processes that take place within organisms require energy.

Ohio's Learning Standards- Clear Learning Targets

Science, Grade 4

4.LS.2

EARTH'S LIVING HISTORY

Fossils can be compared to one another and to present- day organisms according to their similarities and differences.

Vocabulary

Abiotic	Biotic
Cast	Ecosystem
Extinct	Fossil Record
Migration	Mold
Populations	Resources
Trace	

Essential Understandings:

- The concept of biodiversity is expanded to include different classification schemes based upon shared internal and external characteristics of organisms.
- Most species that have lived on Earth are extinct.
- Fossils provide a point of comparison between the types of organisms that lived long ago and those existing today.

Essential Skills:

The students can explain how fossils are used to learn about organisms that no longer exist.

The students can compare fossils to other fossils and living organisms to identify similarities and differences.

The students can design and carryout an experiment to discover how organisms can leave fossil evidence.

The students can infer possible facts about organisms and their environment based on observations of fossils or models of fossils.

Misconceptions

- The Annenberg Media series *Essential Science for Teachers: Life Science: Session 5: Children's Ideas* provides greater insight to misconceptions children hold about differing traits within a species and their causes. Strategies to address those misconceptions are addressed.
- Students may have the naïve conception that if organisms look alike, then they must have a common evolutionary history.

Instructional Strategies and Resources

- Discovery Education: www.discoveryeducation.com
- <http://www.brighthub.com/environment/science-environmental/articles/122335.aspx> - additional experiments for making fossils.
- <http://www.tarpits.org/la-brea-tar-pits/timeline> - LeBrea Tar pits virtual fieldtrip
- <http://www.fossilmuseum.net/museum-fossils.htm>
- <https://ortongeologicalmuseum.osu.edu/education> - The Ohio State University
- The University of Berkeley website **Understanding Evolution** can provide teachers with content knowledge on the topic of evolution. This site provides detailed information from various research projects about how fossils provide evidence of climate changes.
- The University of Berkeley's **Stories from the Fossil Record, Past Lives** provides information on how fossils provide information on the behavior of organisms (family and social) as well as how certain features of organisms came to be. Observe fossils and compare them to similar plants and animals that live today, using simple classification schemes. The **Ohio History Central** provides a list of fossils found in Ohio.
- *National Geographic's* movie **Sea Monsters** provides an opportunity to go on a virtual fossil dig and explore organisms that lived a long time ago but are similar to organisms that are alive today.
- **Life Has a History**, produced by the University of California Museum of Paleontology, illustrates the similarities and differences between living things that exist today and organisms that lived in the past. It is a simple introduction to the fossil record.
- Session 6 of the Annenberg Media series *Essential Science for Teachers: Life Science* provides information about how children can learn about the variations of living things that lead to evolution and offers classroom footage to illustrate implementation at <http://www.learner.org/resources/series179.html>.

Career Connections

Paleontologist, Biologist, Zoologist, Museum Curator

Prior Knowledge

Grade 3: N/A

Future Knowledge

Grades 5: N/A

Ohio's Learning Standards- Clear Learning Targets

Science, Grade 4

4.PS.1

ELECTRICITY, HEAT, AND MATTER

When objects break into smaller pieces, dissolve, or change state, the total amount of matter is conserved.

Vocabulary

Melting	Weight
Conservation of Matter	Constant
Evaporation	Liquid
Evidence	Gas
Experimental	Mass
Phase change	Matter
Property	Solid
Volume	
Phases or States of Matter	

Essential Understandings:

- When an object is broken into smaller pieces, when a solid is dissolved in a liquid or when matter changes state (solid, liquid, gas), the total amount of matter remains constant.

Note: Differentiation between mass and weight is not necessary at this grade level.

Essential Skills:

- The students can explain that matter remains constant when it undergoes a change (based on experimental experiences).**
- The students can explain that when an object is broken into smaller pieces, the total amount of matter remains constant.**
- The students can explain that when a solid is dissolved in a liquid, the total amount of matter remains constant.**
- The students can explain that when matter changes state (solid, liquid, gas), the total amount of matter remains constant.**
- The students can explain that the sum of all of the parts in an object equals the mass of the object.**

Misconceptions

- Gases are not matter because most are invisible.
- Gases do not have mass*.
- When things dissolve, they disappear.
- Melting and dissolving are confused.
- Mass* and volume, which both describe an amount of matter, are the same property.
- Breaking something or dissolving makes it weigh less.
- Changing the shape changes the mass* and volume.
- Students believe matter is lost during burning.
- Students believe that a warmed gas weighs less than the same gas that is cooler (Driver, Squires, Rushworth & Wood-Robinson, 1994).

*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.

Instructional Strategies and Resources

-Discovery Education: www.discoveryeducation.com

- **Keeping Warm**, an interactive simulation from BBC Schools, allows students to measure temperature changes over time for different insulating materials.
- **Melting and Freezing** from Science NetLinks gives an example of using inquiry to explore the mass of water, margarine and chocolate chips before and after melting. To extend this, students can put the substances in the refrigerator or freezer to reform the solid and find the mass again.
- **Essential Science for Teachers: Physical Science Video 3 Conservation of Matter Part I**, a video on demand produced by Annenberg, is designed for teachers to improve their understanding of physical science and make them aware of common student misconceptions. It also highlights ways to help students overcome misconceptions. While teachers should be aware of the ideas of physical changes and the particle nature of matter, these topics are not appropriate for this grade level.
- **Essential Science for Teachers: Physical Science Video 3 Conservation of Matter Part II**, a video on demand produced by Annenberg, is designed for teachers to improve their understanding of physical science, to make them aware of common student misconceptions. It also highlights ways to help students overcome these misconceptions. While teachers should be aware of the ideas of chemical changes and the particle nature of matter, these topics are not appropriate for this grade level.

Career Connections Engineer, Researcher, Scientist

Prior Knowledge

3.PS.1: Objects are composed of matter, which has mass and takes up space. Matter includes solids, liquids and gases.

Future Knowledge

5.PS.1: The amount of change in movement of an object is based on the mass of the object and the amount of force exerted.

Ohio's Learning Standards- Clear Learning Targets

Science, Grade 4

4.PS.2

ELECTRICITY, HEAT, AND MATTER

Energy can be transferred from one location to another or can be transformed from one form to another.

Vocabulary

Transfer	Energy
Conductor	Flow
Electrical Circuit	Energy
Electrical Conductivity	Flow
Electrical Conductor	Insulator
Electrical Energy	Heat
Electrical Insulator	Magnetism
Electricity	Temperature
Energy Transfer	
Transformation	
Forms of Energy (Light, heat, sound and motion)	

Essential Understandings:

- Energy transfers from hot objects to cold objects as heat, resulting in a temperature change.
- Electric circuits require a complete loop of conducting materials through which an electrical energy can be transferred.
- Electrical energy in circuits can be transformed to other forms of energy, including light, heat, sound and motion.
- Electricity and magnetism are closely related.

Essential Skills:

The students can observe situations, conduct demonstrations, and record data about energy transfer from hot objects to cold objects as heat, resulting in a temperature change.

The students can make predictions about the heat conductivity of different materials.

The students can demonstrate and explain that electric circuits require a complete loop of conducting materials through which electrical energy can be transferred.

The students can demonstrate and explain how electrical energy in circuits can be transformed to other forms of energy, including light, heat, sound and motion.

The students can demonstrate and explain that when a wire conducts electricity, the wire has magnetic properties and can push and/or pull magnets.

Misconceptions

- Some items cannot be heated.
- Metals get hot easily because they “draw in heat.”
- Energy is a thing, an object or something that is tangible.
- Cold can be transferred.
- Larger magnets are stronger than smaller magnets.
- Current flows from a battery (or other source of electricity) to a light bulb (or other item that consumes electricity), but not from the light bulb to the battery.
- Electricity is produced in the wall socket.
- Pure water is a good conductor of electricity.
- Electricity from a dry cell will shock or hurt if it is touched.
- All wires are insulated.
- Birds can perch on bare wires without being hurt because birds have insulated feet.
- A charge object can only affect other charged objects.
- Ice cannot change temperature.
- Heat is a substance.
- Heat is not energy.
- Temperature is a property of a particular material or object (metal is naturally colder than plastic).
- The temperature of an object depends on its size.
- Heat and cold are different, rather than being opposite ends of a continuum.
- Objects of different temperatures that are in constant contact with each other or in contact with air at a different temperature do not necessarily move toward the same temperature.
- Heat only travels upward.
- Heat rises.
- Objects that readily become warm (conductors of heat) do not readily become cold.

Instructional Strategies and Resources

-Discovery Education: www.discoveryeducation.com

Heat Transmission: Conduction, Convection, Radiation (2:35), Basics of Physics: Exploring Heat – The following clips: Heath and Temperature (2:30), Temperature Scales (3:27), Measuring Heat (3:27), Heat Transfer (2:18), Warm to Cold: The Movement of Heat (1:47), Electricity and Magnetism: Current Electricity(16:58), Hot Line: All About Electricity (15:00), A First Look: Electricity (20:00)

- **Electrical Conductors**, an interactive simulation from BBC Schools, allows students to explore different materials and classify them as electrical conductors or insulators. It also emphasizes that a complete loop of conductors is needed for a circuit to be complete. The optional sections that deal with adding bulbs and batteries are not aligned with this content statement.

- **Electricity in a Brown Bag** from eGFI gives examples of how to use inquiry to teach the basic concepts of electricity safely using readily available materials. Using bulb sockets such as these available from many vendors, allow students to trace the flow of electricity from the wires through the bulb. Students also can try to light the bulb without the socket.

- **Career Corner** from EIA Energy Kids has several articles that give information about different careers in energy.

- **Coffee Can Speakers: Amazing Energy Transformers** is an article from the March 2007 issue of *Science and Children* that gives instructions on how to make a simple speaker to demonstrate the transformation of energy and the relationship between electricity and magnetism. Once the speaker is made and understood, students can be challenged to make changes to the system to improve the sound from the speakers.

Career Connections

Engineer (electrical, electronic), Engineering Technicians, Sound and Lighting Technician, Electrician, Heating and Cooling Specialist

Prior Knowledge

3.PS.3: Objects that have energy can cause change. Heat, electrical energy, light, sound and magnetic energy are all forms of energy.

Future Knowledge

5.PS.2: Light and sound are forms of energy that behave in predictable ways.