

Grade 2 Science

Unit 4: Electricity and Magnetism

10 lessons and a unit quiz. Use this pack with the **Electricity and Magnetism Student Reader** (print it, or download it once from the course) to teach the whole unit without the internet.

What is in this pack

- A lesson plan for each chapter: the Big Question, words to know, which pages to read, questions to talk over and the activity pages.
- The unit quiz, ready to print.
- Answers for the teacher at the back: every discussion question and the quiz key.

This course is based on an original work of the Core Knowledge® Foundation (www.coreknowledge.org) made available through licensing under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. This does not in any way imply that the Core Knowledge Foundation endorses this work. PGAMO added the lesson pages, study packs and quizzes layout, and shares them under the same license. License: CC BY-NC-SA 4.0 (<https://creativecommons.org/licenses/by-nc-sa/4.0/>).

Lesson schedule

Two or three lessons a week, about 30 minutes each. Tick each one off as you go.

	Lesson	Reader pages	Activity pages
☐	Lesson 1: What Is Lightning?	PDF pages 6–9	AP 1.1
☐	Lesson 2: What Has Electricity?	PDF pages 10–15	AP 2.1
☐	Lesson 3: What Are the Types of Electricity?	PDF pages 16–21	AP 3.1
☐	Lesson 4: It’s Not Magic...It’s Static!	—	AP 4.1
☐	Lesson 5: What Are the Sources of Electricity?	PDF pages 22–27	AP 5.1
☐	Lesson 6: What Is a Circuit?	PDF pages 28–33	AP 6.1
☐	Lesson 7: Building a Simple Circuit	—	AP 7.1
☐	Lesson 8: Magnets and Electricity	PDF pages 34–39	AP 8.1
☐	Lesson 9: Magnets and Rotating Motion	—	AP 9.1
☐	Lesson 10: Science in Action: A Day with an Electrician	PDF pages 40–50	—
☐	Unit review and assessment	—	—
☐	Words quiz	—	—

Page numbers are the PDF page numbers of the Student Reader file, so they match what your PDF reader shows.

Lesson 1: What Is Lightning?

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: Where can you see evidence of electricity?

Words to know

- **appliance** — a device that performs a specific task
- **electrical storm** — an electrical disturbance in the atmosphere
- **lightning** — a bolt of electricity that occurs naturally outside
- **power** — the rate of time it takes to deliver energy or do work
- **power outage** — the loss of electricity to an area
- **utility pole** — a tall pole that holds power lines above ground

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 21–26: the steps, materials and timing for this lesson.

Read

Read Student Book, Chapter 1: “Lightning Outside, Lights Out Inside!”: PDF pages 6–9. Look at the pictures and maps together.

Talk it over

1. flashlight Ch. 1 Activity Page Activity Page What Can We Do with and without Electricity?
2. It will work; it will turn on; it will do something it is supposed to do.
INFERENTIAL—What would have happened if the electricity had gone out at Eva’s house before their dinner was ready? Why?
3. so they can see while they eat dinner 3. List different types of activities. Activity Page AP 1.1 Distribute What Can We Do with and without Electricity?
4. LITERAL—What is the weather like where Eva lives?
5. LITERAL—What is going on at Eva’s house?
6. LITERAL—What could have caused the power to go out at Eva’s house?
7. INFERENTIAL—How do you think the picture would look if the neighborhood had electricity?
8. LITERAL—What is the only kind of light that Eva can see outside?
9. LITERAL—Why can’t Eva watch television?
10. LITERAL—How do you know if something, like an appliance, has electricity?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: Where can you see evidence of electricity?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 1.1: What Can We Do with and without Electricity? — Teacher Guide PDF page 79

Lesson 2: What Has Electricity?

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: What familiar devices are powered by electricity?

Words to know

- **appliance** — a device that performs a specific task
- **cord** — a flexible, thin rope or string
- **electricity** — a form of energy that gets things to work
- **power** — the rate of time it takes to deliver energy or do work
- **recharge** — to put the capacity for electrical energy back into something like a battery
- **shock** — a sudden electric current through the body that can be painful
- **wire** — a thin metal thread that is flexible

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 27–33: the steps, materials and timing for this lesson.

Read

Read Student Book, Chapter 2: “Things That Use Electricity”: PDF pages 10–15. Look at the pictures and maps together.

Talk it over

1. It is wired directly to the house's electricity through the ceiling. **INFERENTIAL**—How would you know if electricity were powering a ceiling fan? How would you know if it were powering a lamp?
2. electric shaver **INFERENTIAL**—How are the electric toothbrushes and the electric shaver different from other appliances in the bathroom?
3. **LITERAL**—What appliances in the kitchen does Eva find that use electricity?
4. **INFERENTIAL**—Which items in the living room are plugged into a socket, and which ones aren't?
5. **LITERAL**—How does the ceiling fan get electricity if it is not plugged into a socket?
6. **LITERAL**—What items in the bathroom use electricity?
7. **LITERAL**—How does Eva know that the hair dryer and curling iron use electricity?
8. **LITERAL**—What items in Eva's bedroom use electricity?
9. **LITERAL**—What items in the garage use electricity?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: What familiar devices are powered by electricity?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 2.1: Electricity Scavenger Hunt — Teacher Guide PDF page 80

Lesson 3: What Are the Types of Electricity?

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: How are static electricity and electric current different?

Words to know

- **charge** — to store electrical energy in a battery for later use
- **electrical storm** — an electrical disturbance in the atmosphere
- **electricity** — a form of energy that gets things to work
- **lightning** — a bolt of electricity that occurs naturally outside
- **spark** — a bright electrical discharge
- **surface** — the outside layer of something

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 34–39: the steps, materials and timing for this lesson.

Read

Read Student Book, Chapter 3: “Two Types of Electricity”: PDF pages 16–21. Look at the pictures and maps together.

Talk it over

1. LITERAL—What does Eva want to know about electricity?
2. Why or why not?
3. LITERAL—What are the two types of electricity?
4. EVALUATIVE—Which terms on the page describe how static electricity and current electricity move?
5. INFERENTIAL—What do you think is happening to the boy in the picture?
6. LITERAL—Is a shock like the one the boy is getting in the picture caused by static or current electricity?
7. What are the surfaces involved in the static electricity that the boy is experiencing in this picture?
8. LITERAL—What is needed for lightning to occur?
9. INFERENTIAL—Why is lightning considered static electricity and not current electricity?
10. CORE VOCABULARY—Explain that power lines are giant wires that carry electricity to your home. (See Know the Science 2.) LITERAL—What does current electricity need to exist?

11. LITERAL—What are the different ways that power lines can break or be damaged?
12. The grounding of wires into the earth allows for a complete circuit to and from the power plant generator. 32 ELECTRICITY AND MAGNETISM LITERAL—Who fixes the power lines when they break?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: How are static electricity and electric current different?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 3.1: Types of Electricity — Teacher Guide PDF page 81

Lesson 4: It's Not Magic...It's Static!

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: What does evidence of static electricity look like?

Words to know

- **attract** — to pull toward something without touching
- **cling** — to tightly hold on to something
- **electricity** — a form of energy that gets things to work
- **repel** — to force something away

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 40–45: the steps, materials and timing for this lesson.

Talk it over

1. Ask students the following questions: • Was the paper being pulled or pushed to the comb?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: What does evidence of static electricity look like?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 4.1: Static Stations — Teacher Guide PDF page 82

Lesson 5: What Are the Sources of Electricity?

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: Where does the electricity that powers our familiar devices come from?

Words to know

- **electricity** — a form of energy that gets things to work
- **source** — the beginning of a place or something
- **wiring** — a group of wires that form electric circuits

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 46–51: the steps, materials and timing for this lesson.

Read

Read Student Book, Chapter 4: “Sources of Electricity”: PDF pages 22–27. Look at the pictures and maps together.

Talk it over

1. LITERAL—Why doesn't Eva's flashlight turn on?
2. INFERENTIAL—Where do you think the light bulb in the larger picture is getting its electrical energy?
3. LITERAL—How does the electrical energy from a power plant get to the buildings in a community?
4. LITERAL—What makes the lamp in the house (in the picture) light up?
5. LITERAL—Which do you think lights up a neighborhood like Eva's: a battery or a power plant?
6. Some batteries are large and are designed to power larger objects, such as vehicles.
- 44 ELECTRICITY AND MAGNETISM LITERAL—Why do some objects store electricity?
7. Discuss Core Vocabulary, and ask students the following questions: • Where is the source of electricity for a home?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: Where does the electricity that powers our familiar devices come from?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 5.1: Follow the Electricity — Teacher Guide PDF page 83

Lesson 6: What Is a Circuit?

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: What is a circuit?

Words to know

- **complete** — whole, finished
- **electricity** — a form of energy that gets things to work
- **incomplete** — not whole, unfinished
- **insulate** — to add material to something in order to protect from electricity, heat loss, or sound
- **loop** — a thing or process where the end connects to the beginning

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 52–57: the steps, materials and timing for this lesson.

Read

Read Student Book, Chapter 5: “What Is a Circuit?”: PDF pages 28–33. Look at the pictures and maps together.

Talk it over

1. yellow markers (1 per student) Activity Page Will the Bulb Light Up?
2. Sample answer: so the electricity travels to where it is supposed to go
EVALUATIVE—What would you do if you saw an electrical cord near water?
3. so they can protect you from the electricity 3. Check for understanding. Activity Page Distribute Will the Bulb Light Up?
4. How do you know?
5. LITERAL—What do you notice about the materials in this picture (compared to the previous picture)?
6. LITERAL—What are the two things a circuit can be?
7. LITERAL—What does electricity usually flow through in houses?
8. Examples: cotton, wool, wood, steel, metal, silk, plastic, rubber, glass
EVALUATIVE—Why do you think it is important to keep the electricity only in the wires?
9. LITERAL—Is it safe to touch electricity?
10. Still, it's wise to always consider the juxtaposition of water and electricity as very dangerous. 50 ELECTRICITY AND MAGNETISM EVALUATIVE—Why is it important that these objects are made from these materials?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: What is a circuit?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 6.1: Will the Bulb Light Up? — Teacher Guide PDF page 84

Lesson 7: Building a Simple Circuit

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: How can we build a simple circuit?

Words to know

- **assemble** — to bring people or things together
- **complete** — whole, finished
- **contact** — to touch
- **electricity** — a form of energy that gets things to work
- **incomplete** — not whole, unfinished

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 58-61: the steps, materials and timing for this lesson.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: How can we build a simple circuit?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 7.1: Simple Circuits — Teacher Guide PDF page 85

Lesson 8: Magnets and Electricity

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: How do electric motors and electricity generators use magnets?

Words to know

- **electricity** — a form of energy that gets things to work
- **generator** — a device that converts mechanical energy into electrical energy
- **magnetic pole** — the area at each end of a magnet
- **motor** — a machine that uses electricity or fuel to do work

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 62–66: the steps, materials and timing for this lesson.

Read

Read Student Book, Chapter 6: “Magnets and Electricity”: PDF pages 34–39. Look at the pictures and maps together.

Talk it over

1. LITERAL—What makes the generator work?
2. LITERAL—What produces the electricity?
3. LESSON 8 | MAGNETS AND ELECTRICITY 57 INFERENTIAL—Why does Eva’s dad plug the refrigerator into the generator?
4. If necessary, remind students that a power plant is where electricity is made. (See Know the Science 1.) LITERAL—What allows electricity to get to your house from the power plant?
5. INFERENTIAL—How would this affect people’s homes?
6. INFERENTIAL—How is a hand-crank flashlight like the battery on the simple circuits you made in the last lesson?
7. INFERENTIAL—If magnets a and b push each other, do you think these magnets move closer to or away from each other?
8. INFERENTIAL—What can you tell about the fan blades based on the arrows?
9. LESSON 8 | MAGNETS AND ELECTRICITY 59 LITERAL—What is powering the generator?
10. LITERAL—What is the hand crank powering?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: How do electric motors and electricity generators use magnets?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 8.1: Motors and Generators — Teacher Guide PDF page 86

Lesson 9: Magnets and Rotating Motion

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: Can the push of a magnet make something rotate?

Words to know

- **magnetic pole** — the area at each end of a magnet
- **repel** — to force something away

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 67–71: the steps, materials and timing for this lesson.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: Can the push of a magnet make something rotate?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 9.1: Magnets and Rotation — Teacher Guide PDF page 87

Lesson 10: Science in Action: A Day with an Electrician

THE BIG QUESTION

Why do the lights sometimes go out during a thunderstorm?

Lesson Question: What does an electrician do?

Words to know

- **electric panel** — a box where electricity enters and is sent to different circuits in a home or place words and phrases are unit that you should model for use in isolated drill or memorization
- **electricity** — a form of energy that gets things to work
- **install** — to put in place so something is ready to use
- **insulated wire** — a wire covered in material that resists electrical currents
- **patent** — a license for a certain period of time that keeps others from making, using, or selling someone's invention

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 72–77: the steps, materials and timing for this lesson.

Read

Read Student Book, Chapter 7: “Science in Action”: PDF pages 40–50. Look at the pictures and maps together.

Talk it over

1. three wires wrapped together EVALUATIVE—If the electric current travels in a loop, is that a closed or open circuit?
2. LESSON 10 | SCIENCE IN ACTION: A DAY WITH AN ELECTRICIAN 67 LITERAL—What is Eva's mom going to show Eva?
3. LITERAL—Where does the electricity from power lines enter the house?
4. LITERAL—What does construction of a wall begin with?
5. LITERAL—What is Eva's mom installing?
6. Emphasize that Edison is one of the most widely known U.S. inventors. (See Know the Standards 2 and 3.) LITERAL—How was Thomas Edison important in helping people understand how to use electricity?
7. INFERENTIAL—Why was it important for the wrapping around the wire to be waterproof and fireproof?
8. LITERAL—In the picture, which parts of the wires are insulated coating?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Why do the lights sometimes go out during a thunderstorm? Lesson Question: What does an electrician do?
- Use one of today's words in a sentence of your own.

UNIT REVIEW

Unit review and assessment

- Activity page answer key (for the teacher): Teacher Guide PDF pages 88–88

WORDS QUIZ

Electricity and Magnetism

Name: _____ Date: _____

Circle the letter of the best answer.

1. Which word means “a form of energy that gets things to work”?
 - a) battery
 - b) cling
 - c) electricity
 - d) charge
2. Which word means “to put in place so something is ready to use”?
 - a) danger
 - b) insulate
 - c) battery
 - d) install
3. Which word means “to come up with something that is new or has not existed before”?
 - a) recharge
 - b) magnetic pole
 - c) invent
 - d) socket
4. Which word means “a small opening where electrical cords can be plugged in to access electricity”?
 - a) install
 - b) socket
 - c) insulate
 - d) static electricity
5. Which word means “to turn about a central axis”?
 - a) rotate
 - b) lightning
 - c) assemble
 - d) power plant
6. Which word means “someone who specializes in electrical wiring and installs or fixes electrical equipment”?
 - a) patent
 - b) electrician
 - c) wire
 - d) appliance

- 7.** Which word means “a flexible, thin rope or string”?
- a) power plant
 - b) connected
 - c) power
 - d) cord
- 8.** Which word means “a type of electricity that exists in wires”?
- a) utility pole
 - b) install
 - c) current electricity
 - d) surface
- 9.** Which word means “a place where electrical energy is created for use”?
- a) recharge
 - b) power plant
 - c) power outage
 - d) source
- 10.** Which word means “something that produces invisible pushes and pulls”?
- a) complete
 - b) wiring
 - c) loop
 - d) magnet
- 11.** Which word means “a type of electricity that occurs on the surfaces of objects”?
- a) static electricity
 - b) charge
 - c) electrician
 - d) shock
- 12.** Which word means “a device that performs a specific task”?
- a) electrician
 - b) appliance
 - c) invisible
 - d) wire

Answers

Lesson 1: What Is Lightning?

1. **flashlight Ch. 1 Activity Page Activity Page What Can We Do with and without Electricity?**
AP 1.1
2. **It will work; it will turn on; it will do something it is supposed to do.**
INFERENTIAL—What would have happened if the electricity had gone out at Eva’s house before their dinner was ready? Why?
See Know the Standards.
3. **so they can see while they eat dinner 3. List different types of activities.**
Activity Page AP 1.1 Distribute What Can We Do with and without Electricity?
AP 1.1
4. **LITERAL—What is the weather like where Eva lives?**
It is stormy; there is lightning; it is windy and raining; there is thunder. CORE VOCABULARY—Explain that lightning is a bolt of electricity that occurs naturally outside. It happens between the clouds (or air) and the ground. **LITERAL—What is the difference between thunder and lightning?**
5. **LITERAL—What is going on at Eva’s house?**
The lights are out.
6. **LITERAL—What could have caused the power to go out at Eva’s house?**
A tree limb could have fallen on electric lines.
7. **INFERENTIAL—How do you think the picture would look if the neighborhood had electricity?**
You would see lights on in the houses or outside on the street. **INFERENTIAL—Do you think the other houses in the neighborhood had their televisions, refrigerators, and microwaves turn off during the storm? Why?**
8. **LITERAL—What is the only kind of light that Eva can see outside?**
Lightning
9. **LITERAL—Why can’t Eva watch television?**
The TV is off because the electricity is out. The TV needs electricity to work. **SUPPORT—Explain that appliances are objects that are designed to perform special tasks and are often found in kitchens, bathrooms or laundry areas in a home. For example, the refrigerator is an appliance and so is a washing machine.**
10. **LITERAL—How do you know if something, like an appliance, has electricity?**
It will work; it will turn on; it will do something it is supposed to do. **INFERENTIAL—What would have happened if the electricity had gone out at Eva’s house before their dinner was ready? Why? (See Know the Standards.)**

Lesson 2: What Has Electricity?

1. **It is wired directly to the house's electricity through the ceiling.**
INFERENTIAL—How would you know if electricity were powering a ceiling fan? How would you know if it were powering a lamp?
See Know the Standards 2.
2. **electric shaver INFERENTIAL—How are the electric toothbrushes and the electric shaver different from other appliances in the bathroom?**
See Know the Science.
3. **LITERAL—What appliances in the kitchen does Eva find that use electricity?**
Coffee pot
4. **INFERENTIAL—Which items in the living room are plugged into a socket, and which ones aren't?**
The lamp, television, video game console, and computer are plugged into a socket.
5. **LITERAL—How does the ceiling fan get electricity if it is not plugged into a socket?**
It is wired directly to the house's electricity through the ceiling. **INFERENTIAL—How would you know if electricity were powering a ceiling fan? How would you know if it were powering a lamp? (See Know the Standards 2.)**
6. **LITERAL—What items in the bathroom use electricity?**
Light and fan
7. **LITERAL—How does Eva know that the hair dryer and curling iron use electricity?**
They have cords that plug into the wall sockets.
8. **LITERAL—What items in Eva's bedroom use electricity?**
Lamp
9. **LITERAL—What items in the garage use electricity?**
Lawn mower

Lesson 3: What Are the Types of Electricity?

1. **LITERAL—What does Eva want to know about electricity?**
She wants to know how the storm made the electricity go out. She also wants to know why her mom cannot fix it.
2. **Why or why not?**
No, because the room is still dark; they are using a candle for light.
3. **LITERAL—What are the two types of electricity?**
Static electricity and current electricity **INFERENTIAL—Which picture shows static electricity? Which picture shows current electricity?**
4. **EVALUATIVE—Which terms on the page describe how static electricity and current electricity move?**
Static electricity occurs when objects rub together; it can go from one surface to another.

5. **INFERENTIAL—What do you think is happening to the boy in the picture?**
He is getting a little shock!
6. **LITERAL—Is a shock like the one the boy is getting in the picture caused by static or current electricity?**
It is from static electricity.
7. **What are the surfaces involved in the static electricity that the boy is experiencing in this picture?**
The socks and the carpet Differentiation
8. **LITERAL—What is needed for lightning to occur?**
Clouds EVALUATIVE—Describe how lightning moves.
9. **INFERENTIAL—Why is lightning considered static electricity and not current electricity?**
It comes from the surfaces of clouds and not through wires.
10. **CORE VOCABULARY—Explain that power lines are giant wires that carry electricity to your home. (See Know the Science 2.) LITERAL—What does current electricity need to exist?**
Power lines; wires EVALUATIVE—Where is the electricity in this picture?
11. **LITERAL—What are the different ways that power lines can break or be damaged?**
A storm can make trees break and fall on power lines. Lightning can strike the wires.
INFERENTIAL—Why are trees a threat to power lines?
12. **The grounding of wires into the earth allows for a complete circuit to and from the power plant generator. 32 ELECTRICITY AND MAGNETISM**
LITERAL—Who fixes the power lines when they break?
People who work for the power company EVALUATIVE—Why do broken or damaged power lines cause people to lose power in their homes?

Lesson 4: It's Not Magic...It's Static!

1. **Ask students the following questions: • Was the paper being pulled or pushed to the comb?**
Pulled

Lesson 5: What Are the Sources of Electricity?

1. **LITERAL—Why doesn't Eva's flashlight turn on?**
It needs new batteries. CORE VOCABULARY—Explain that batteries are sources of electrical energy and that things that use batteries can operate even when they are not plugged into wall sockets. (See Know the Science 1.) INFERENTIAL—What is similar about the flashlights that Eva's dad gives to her and her mom? What is different about them?
2. **INFERENTIAL—Where do you think the light bulb in the larger picture is getting its electrical energy?**
Electricity through the cord from the ceiling INFERENTIAL—Where do you think the flashlight is getting its electrical energy?

3. **LITERAL—How does the electrical energy from a power plant get to the buildings in a community?**

Through power lines Talk about what students notice about the power plant and the power lines. Draw their attention to the fact that there are a lot of lines—or wires—that they see in the pictures. **INFERENTIAL—Where do you think the electricity flows?**

4. **LITERAL—What makes the lamp in the house (in the picture) light up?**

Electricity **LITERAL—Where is the electricity in the picture?**

5. **LITERAL—Which do you think lights up a neighborhood like Eva’s: a battery or a power plant?**

A power plant **LITERAL—Which produces more current electricity: a power plant or a battery?**

6. **Some batteries are large and are designed to power larger objects, such as vehicles. 44 ELECTRICITY AND MAGNETISM LITERAL—Why do some objects store electricity?**

So that the electricity can be used later **EVALUATIVE—How would you describe recharging a battery?**

7. **Discuss Core Vocabulary, and ask students the following questions: • Where is the source of electricity for a home?**

Power plant

Lesson 6: What Is a Circuit?

1. **yellow markers (1 per student) Activity Page Will the Bulb Light Up?**

AP 6.1

2. **Sample answer: so the electricity travels to where it is supposed to go EVALUATIVE—What would you do if you saw an electrical cord near water?**

See Know the Science 3.

3. **so they can protect you from the electricity 3. Check for understanding. Activity Page Distribute Will the Bulb Light Up?**

AP 6.1

4. **How do you know?**

They are using a candle, but a candle does not use electricity. It is not plugged into anything, and candles do not have batteries. **LITERAL—What are Eva and her mom building?**

5. **LITERAL—What do you notice about the materials in this picture (compared to the previous picture)?**

There is one wire connected to the bulb and the battery. **INFERENTIAL—What is the source of the electrical energy for this circuit?**

6. **LITERAL—What are the two things a circuit can be?**

Open or closed (or complete/incomplete) **INFERENTIAL—If a switch is on, is that an open or closed circuit?**

7. **LITERAL—What does electricity usually flow through in houses?**
Copper wires
8. **Examples: cotton, wool, wood, steel, metal, silk, plastic, rubber, glass**
EVALUATIVE—Why do you think it is important to keep the electricity only in the wires?
Electricity can be dangerous.
9. **LITERAL—Is it safe to touch electricity?**
No LITERAL—What materials do you see in the pictures that make the objects safe to use and touch?
10. **Still, it's wise to always consider the juxtaposition of water and electricity as very dangerous. 50 ELECTRICITY AND MAGNETISM EVALUATIVE—Why is it important that these objects are made from these materials?**
So they can protect you from the electricity

Lesson 8: Magnets and Electricity

1. **LITERAL—What makes the generator work?**
It uses fuel.
2. **LITERAL—What produces the electricity?**
The motor
3. **LESSON 8 | MAGNETS AND ELECTRICITY 57 INFERENTIAL—Why does Eva's dad plug the refrigerator into the generator?**
So that the refrigerator gets electricity made by the generator and the food will stay cold Page 31
4. **If necessary, remind students that a power plant is where electricity is made. (See Know the Science 1.) LITERAL—What allows electricity to get to your house from the power plant?**
Power lines INFERENTIAL—What do you think would happen if a generator at a power plant did not work?
5. **INFERENTIAL—How would this affect people's homes?**
People would not be able to use anything in their homes that requires electricity.
6. **INFERENTIAL—How is a hand-crank flashlight like the battery on the simple circuits you made in the last lesson?**
The hand crank provides mechanical energy that is converted to electrical energy. This is what gives the flashlight power to turn on. The battery in the simple circuit converts chemical energy to electrical energy to power its light bulb.
7. **INFERENTIAL—If magnets a and b push each other, do you think these magnets move closer to or away from each other?**
Away from each other INFERENTIAL—If magnets c and d pull each other, do you think these magnets move closer to or away from each other?
8. **INFERENTIAL—What can you tell about the fan blades based on the arrows?**
The blades are spinning. LITERAL—Where is the electricity coming from?

9. **LESSON 8 | MAGNETS AND ELECTRICITY 59 LITERAL—What is powering the generator?**

Fuel (gasoline) LITERAL—Where do you think the magnets are?

10. **LITERAL—What is the hand crank powering?**

A light INFERENTIAL—What do you think more volts means?

Lesson 10: Science in Action: A Day with an Electrician

1. **three wires wrapped together EVALUATIVE—If the electric current travels in a loop, is that a closed or open circuit?**

If necessary, remind students of the simple circuits they made and how the current traveled in a closed loop.

2. **LESSON 10 | SCIENCE IN ACTION: A DAY WITH AN ELECTRICIAN 67**

LITERAL—What is Eva’s mom going to show Eva?

How she puts electrical wires inside the walls of a house INFERENTIAL—What do you think Eva’s mom uses the toolbox for?

3. **LITERAL—Where does the electricity from power lines enter the house?**

Through the electric panel INFERENTIAL—Why do you think Eva’s mom needs to attach wires to the box and run them to the home’s electrical sockets?

4. **LITERAL—What does construction of a wall begin with?**

Wood or metal frames LITERAL—Does Eva’s mom do her work when the wall frames are open or closed?

5. **LITERAL—What is Eva’s mom installing?**

An electrical socket LITERAL—What does Eva see inside the wire’s plastic coating?

6. **Emphasize that Edison is one of the most widely known U.S. inventors. (See Know the Standards 2 and 3.) LITERAL—How was Thomas Edison important in helping people understand how to use electricity?**

He came up with ways for people to use electricity in their homes. LITERAL—What is Edison famous for inventing? What did he build?

7. **INFERENTIAL—Why was it important for the wrapping around the wire to be waterproof and fireproof?**

So the wire would be safe and keep the electricity inside it INFERENTIAL—What does insulated electrical wire let people do?

8. **LITERAL—In the picture, which parts of the wires are insulated coating?**

The black parts

Unit quiz key

1. c 2. d 3. c 4. b 5. a 6. b 7. d 8. c 9. b 10. d 11. a 12. b