

CONNECT TO LITERACY

Discuss the Text

NGSS.4-PS3-2, NGSS.4-PS3-4, CCSS.ELA-Literacy.RI.4.2

Have students focus on these questions about the text:

- **Prove** *What proof can you think of that electricity can be transferred from place to place? Explain how it is transferred.* (Accept reasonable responses. Students should explain that electricity that is used in homes, schools, and businesses comes from a long distance through wires. Also, wires transfer electricity throughout a town and the buildings in it.)
- **Create** *Imagine that you are creating a circuit that changes electrical energy to heat and light. Draw a diagram of your circuit and label its parts.* (Students might use batteries or wires that plug into an outlet, wires, a switch, and light bulbs or heating elements.)
- **Apply Concepts** *Suppose a friend says, “The supply of electricity is unlimited, so I shouldn’t have to turn off lights and try to save it.” Craft an answer to share with your friend that explains how using less electricity is helpful.* (Making electricity often uses nonrenewable resources that cause pollution. Also, people have to pay for the electricity they use so using less electricity saves money.)

Provide Prompts for Response

Offer prompts that allow students to explore the text:

- Create a flow chart that shows the process of using energy to produce electricity in a power plant.
- Examine an electric bill and describe the amount of electricity used, the units, and how much the electricity costs.
- Tell which ideas were new to you. What questions do you still have about electricity?
- Review the book. Give it a rating between one and four stars and explain why it earned that rating.

Connect with Writing: Narrative Text

CCSS.ELA-Literacy.4.3a, W.4.3b, W.4.3c, W.4.3d, W.4.3e

Introduce the Text Type and Assignment *Say: A personal narrative is a narrative about a real event in the life of the writer. A personal narrative can tell about one brief moment in a person’s life, like falling off a bicycle, or an event lasting several days, like a family trip. In our daily lives, we have all experienced the electricity Max described in the text. When I was reading about electricity, I was reminded of an event that gave me a shock. Today, we will each write a personal narrative about an event involving electricity in our daily lives.*

Review Features Review the features of a personal narrative and be sure to display these features for students’ reference:

- has a narrator who explains what is happening
- uses signal words to tell the order of events
- uses sensory details, imagery, description
- has an ending that concludes the story

Model the Writing Model the writing process as you begin a personal narrative: *I choose to tell about a time I got a shock. Watch as I use interesting and exciting verbs to bring the action to life.*

.....
 My cat was purring loudly as I brushed her. Soon her hair was sticking straight up in the air. I thought I would brush the hair down. Zap! We both got a shock. I jumped back as my cat jumped down.

Notice that I used plenty of sensory details to describe the action and give the reader a feel for what I felt and observed. Model one more paragraph of the text, describing the next group of events in the sequence, such as I looked down and my sweater was covered in cat hair.

Support Writers Display your model as students begin writing. Remind them that their writing should include temporal words and phrases that signal event order, colorful descriptions, and strong verbs to help readers see and feel the action that took place.

Revise and Edit Show students how to revise and edit for specific points, such as:

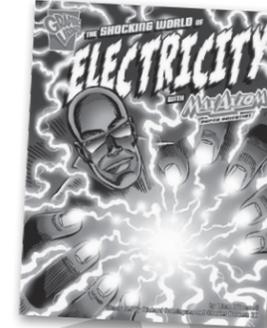
- Dialogue punctuation
- Sentence variety
- Sensory details to help readers experience the events
- Logical transitions from one event to the next

Share and Reflect Allow time for students to share their work with an authentic audience. Then ask questions to guide self-reflection:

- For what purpose do we write a personal narrative?
- How did you help the reader experience your story?
- What descriptions did you include? Was your language creative, vivid, and powerful?
- What tips would you give a friend for narrative writing?

Connecting Literacy and Content

The Shocking World of Electricity with Max Axiom, Super Scientist



Level V Physical Science

Content: Electricity—what it is, how it is produced, and how it is distributed

Objectives

Students will:

- describe what electricity is, how it is produced, and how it is distributed.
- interpret a text feature: text boxes.
- determine cause and effect.
- do a close reading to answer questions about content.
- define and use academic vocabulary related to electricity.
- use context to determine meanings of words.
- read grade-level prose with expression.
- write a personal narrative about electricity in their daily lives.

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Build Content Background

Engage Students

Show students a balloon that is filled with air. Hold the balloon against a wall and let go. It will fall to the floor. Say: *I am going to rub the balloon on my hair or a piece of wool. Then I’ll hold it against the wall again. Predict what will happen. Why do you think it will happen?* Have students turn and talk with partners about their predictions. After volunteers share their predictions, carry out the experiment. Explain that rubbing the balloon gave it a charge. Tell students that they will be learning what causes charges in this book.

Use a Graphic Organizer

Draw a KWL chart on the board. Explain: *We use KWL charts to record what we know, what we want to find out, and what we learn. We write what we know in the K column. I’ll write, “Electricity comes to my home through wires.” We write questions we have in the W column. I’ll write, “Where does the electricity come from?” After we read, we write what we have learned in the L column.* Have students pair up. Give each pair two sticky notes. Have them write a fact they know about electricity on one sticky note and a question they have on the other. They can place their sticky notes in the correct columns on the chart. After reading, return to the chart and have students fill in the L column of the chart with what they have learned.

Topic: Electricity		
What I Know	What I Want to Know	What I Learned
Electricity comes to my home through wires.	Where does the electricity come from?	

Introduce the Content

Preview Electricity

Give each student a copy of the text and explain: *In this book, we follow the adventures of Max as he explores electricity.* Have students thumb through the book, paying attention to the illustrations and diagrams. *What do you think we will read about electricity?* Allow a few moments for students to turn and talk to share their predictions.

Preview Academic Vocabulary CCSS.ELA-Literacy.RI.4.4

Turn to p. 30. Say: *This glossary shows some of the important science vocabulary words about electricity. Notice that after each word, in parentheses, the word is spelled phonetically—or how it sounds. You can use these spellings to help you say the words correctly.* Model how to pronounce the first word, *amp*, for students and read the definition. Pronounce the word again and have students say it. Work through the remaining words with students pronouncing each out loud as you go.

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Discuss Text Features

CCSS.ELA-Literacy.RI.4.5

Say: *Text features add to our understanding of the words on the page. Text boxes may serve many purposes such as defining words or giving extra details.* Examine the textbox on p. 11. Read the text. Ask: *What information does this add to the text?* (It explains the difference between renewable and nonrenewable energy sources.) *The writer used the text box to give in depth information on a concept covered in the text.* Have students work in pairs to examine another text box. (See pp. 17 and 20.) What is the purpose of this text box?

Focus on the Content

NGSS.4-PS3-2, NGSS.4-PS3-4

As you focus on the text, ask questions that require students to use varying depths of knowledge. Model how to determine the answer to a question before you pose additional questions. (A model is shown for the third question.)

- **Compare** (pp. 6–7) *Compare electrons, neutrons, and protons.* (All are tiny particles that are parts of an atom. Neutrons and protons are in a nucleus. Electrons move around the nucleus. Electrons have a negative charge, neutrons have no charge, and protons have a positive charge.)
- **Interpret** (p. 8) *Take a look at the illustration of atoms at the top of page 8. Which atom has a negative charge? Which has a positive charge? How do you know?* (The atom on the left has a positive charge because one of its electrons jumped to the atom on the right. The atom on the right has a negative charge because it has an extra electron.)
- **Identify** (p. 10) *What natural energy resources are used to make electricity?* (Possible responses: water, wind, and coal)

Model *This question is asking me to identify, or name, natural energy resources. As I look at page 10, I can see right away that water is falling over a dam. Water must be one energy resources. I also see wind turbines, so wind must be another resource. At the bottom of the page, I see something being taken out of the earth. I think coal is dug out of the earth. Coal might be used for energy.*

Collaborate *Partners, read the text together. Read to find out if you identified the sources in the illustrations correctly.*

Provide independent practice Have students look at the text box on p. 11 to identify another energy sources that can be turned into electricity. Then direct them to identify which of the sources they have identified are renewable.

Summarize *We've listed natural energy resources that are used to make electricity. We used clues in the illustrations, the text, and the text box to determine these energy sources.*

- **Cause and Effect** (pp. 12–13) *Take a look at the diagrams on pages 12 and 13. How does energy from coal cause the turbine to spin?* (Possible answer: The heat caused by burning coal heats water and creates steam. The steam turns the turbine.)
- **Hypothesize** (p. 17) *Why does the voltage need to be reduced as electricity travels through the power distribution grid?* (Accept reasonable responses. Students should support their answers with evidence from the text and background knowledge.)
- **Recall** (p. 25) *What are four things that resistors help turn electric current into?* (sound, light, heat, and motion)

Discuss Concepts

Ask:

- *What sometimes causes a shock when a person touches a doorknob?* (Possible answer: Extra electrons move into the person's body, which then has a negative charge. These electrons are attracted to the positive atoms in the doorknob and jump to the doorknob. When the electrons jump the person gets a shock.)
- *What is needed before any electricity can be produced?* (an energy source)
- *Why is it important to understand electricity?* (Answers will vary. Sample response: We use electricity everyday for such things as lights, refrigerators, heat, air conditioners, and computers. Understanding electricity and how it is made and distributed can help use it safely and wisely.)

Apply Concepts Have students return to the KWL chart from the beginning of the lesson. Enlarge this chart on a bulletin board or on the wall. Have students work in pairs or small groups to add what they have learned to the L column of the chart. They might add photographs they find from research, diagrams or charts they create, additional examples on sticky notes, and so on. They can add their findings and examples to the chart and then introduce them to the group.

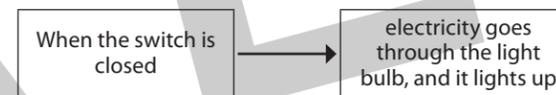
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Determining Cause and Effect

CCSS.ELA-Literacy.RI.4.5

Introduce the Strategy Say: *When something makes something else happen, it causes it to happen. The first event is the cause. The result is the effect. A text often includes clue words such as since, so, because, when, as a result, or so that to indicate cause and effect. Authors also describe the "effect" immediately after the "cause." Using these textual clues can help you better identify a cause and effect relationship.*

Model Create a simple cause and effect graphic organizer, such as two horizontal boxes connected by an arrow. Focus on the top of p. 23: *As I read, I notice the signal word When. The word tells me there is a cause and effect relationship here. The words "When the switch is closed" is the cause. The words "electricity goes through the light bulb, and it lights up" is the effect.* Model writing the cause is the first box and the effect in the second box.



Guide Practice Have students work in pairs to find and record other cause and effect relationships in the text.

Close Reading

CCSS.ELA-Literacy.RI.4.2

Compare electrons, neutrons, and protons. (All are tiny particles that are parts of an atom. Neutrons and protons are in a nucleus. Electrons move around the nucleus. Electrons have a negative charge, neutrons have no charge, and protons have a positive charge.)

Introduce the Strategy Say: *When we are answering a question about the text, it isn't enough to simply rely on our own knowledge or what we think about a text. We need to look at the text and do a close reading. That means that we go right back to the author's words on the page to find proof for our answers.*

Model Model with the **Compare** question: *The question asks me to compare electrons, neutrons, and protons. I know that there are similarities and differences between them. All are tiny particles that are parts of an atom. But how are they different? Watch as I take a close look at the text to answer the question. Page 6 explains that two of the particles are in a cluster called the nucleus. Electrons are whizzing around the nucleus. I am marking these ideas with a highlighter to remember them. Now notice as I look at page 7. The author uses specific details to help me answer this question. I am highlighting electrons have a negative charge, nucleus, made of neutrons and protons, neutrons don't have a charge, and protons carry a positive charge.*

Guide Practice Provide copies of pp. 12–13 along with highlighters. Have students highlight textual evidence to answer the **Cause/Effect** question.

Focus on Fluency

CCSS.ELA-Literacy.RF.4.4b

Model Fluent Reading Say: *When I read, I pay attention to cues that help me read with expression. Even informational text like this is loaded with cues that show me how to read in ways that are lively and interesting—and, most important—help me engage with the meaning of the text.* Read the text on p. 5. Let your voice lift in the question *Did you see that?* to show excitement. Emphasize the word *shock* in the next sentence. Ask students what they noticed about your reading and identify the cues you used to read with expression.

Guide Practice Choose another passage from the book for students to practice fluent reading. Project the passage and highlight cues and key phrases as students suggest them. Have students pair up and read the passage to each other. Circulate and offer assistance as needed.

Study Words

CCSS.ELA-Literacy.L.4.4a

Introduce the Strategy Say: *When we don't know the meaning of a word, we can look at the context in order to find that meaning. The context is the words or sentences surrounding the word nearby in the text. The context can provide clues as to the word's meaning. On page 6, I see the word particles, and I'm not sure what they are. If I look at the sentence the word is in, it says "every atom is made of even smaller particles." The sentence before it says "atoms are too small to spot." The sentence at the bottom of the page says "electrons are particles." I also notice that the diagram has electrons labeled in an atom. A particle must be an extremely small unit of matter inside an atom.*

Practice the Strategy Direct students to p. 7 and focus on the term *electrical charge*. Have students work with partners to read the sentences the term is found in to find clues as to the term's meaning. Then have them share their ideas. Continue practicing with other words in the text.