

Electricity Through Nonfiction Text

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Overview:

The Common Core State Standards have had several impacts on education. One of the impacts is the focus on informational text being part of the curriculum from the very beginning. Throughout this unit I will use informational text to teach students that electricity carries energy. Students will also learn the difference between an open and closed circuit and that energy flows in a closed circuit. Students will then sort various objects as good conductors and insulators of electricity. As students learn how electricity carries energy they will be building upon their reading and writing skills. As a final project students will create a circuit in order to make a light bulb light.

Rationale:

When students are reading about the world around them and are given opportunities to demonstrate their expertise on these topics through writing they appear to be highly engaged (Duke, 2013). Throughout this unit I will follow Nell K. Duke's seven things that should be seen in a primary classroom effectively using informational text as I teach students about electricity.

Duke begins by stating that the most effective thing to help students learn to read and write with informational text is to use informational text from the beginning. As this unit is intended for first grade students and could be adapted for a kindergarten classroom, using informational text to teach about electricity will be incorporating informational text from the beginning.

Finding text that beginning readers can read independently and comprehend will have limited content. In order to increase students' content knowledge of informational text read-alouds combined with engaging instructional activities should be presented (Duke, 2013). Some examples of read-aloud informational text that will be included in this unit are *Switch On, Switch Off* by Melvin Berger, *What is Electricity?* by Lisa Trumbauer, *My Light* by Molly Bang, and *Science Everywhere! Electricity* by Clint Twist.

In addition to the read-aloud text, students should be provided with sets of related text. A sufficient number of informational texts on a single topic should be available for readers across the grade level (Duke, 2013). These texts should be acquired by the teacher prior to teaching the topic. Having various texts on a single topic available help to meet Common Core State Standards such as the standard that states "identify basic similarities in and differences between two texts on the same topic" (Duke, 2013). In addition to the read-aloud text, some additional related text I will use throughout this unit are *Charged Up: The Story of Electricity* by Jacqui Bailey and Matthew Lilly, *Oscar and the Bird: A Book About Electricity* by Geoff Waring, *You Wouldn't Want to Live Without Electricity* by Ian Graham, and *The Boy Who Harnessed the Wind* by William Kamkwamba.

As well as having a variety of text available for students to read and reference throughout the unit, the entire classroom environment should be an informational-text-rich environment (Duke, 2013). This can include posters around the room, articles hanging in places that are visited often by students, and also students own work that has been created on the topic should be posted around the room. The graphic organizers and work the students complete throughout this unit should be posted around at student eye levels.

Informational text often includes many unfamiliar words to younger readers (Duke, 2013). Throughout this unit students will be coached to ask and answer questions about unknown words in order to meet Common Core State Standards. There will be several key vocabulary words that students will need to investigate, understand, and demonstrate. Some of the key vocabulary words include electricity, current, circuit, opened, closed, insulators, and conductors. These vocabulary words and their definitions will be displayed on sentence strips on a classroom bulletin board for student reference throughout the unit.

Throughout the process of including informational text in read-alouds, as related text, and in creating an informational-text-rich environment student should also be taught about the text itself. In Grade 1, in which this lesson is intended, the focus should be on headings, table of contents, glossaries, electronic menus, and icons (Duke, 2013). Students can enrich and demonstrate their understanding of informational text by creating their own informational text with these features.

Finally, an opportunity to share information through writing is a very important part of the Common Core State Standards. Throughout the lessons there will be opportunities as a whole group and as an extension activity for students to share information that have learned through their writing. These writing activities will also be posted throughout the classroom to increase our nonfiction print enriched classroom.

Vocabulary:

Energy is “usable power that comes from heat, electricity, etc.” as defined by Merriam-Webster.com (“Energy,” n.d.).

Electricity is “a form of energy that is carried through wires and is used to operate machines, lights, etc.” as defined by Merriam-Webster.com (“Electricity,” n.d.).

A **battery** is “a device that is placed inside a machine (such as a clock, toy, or car) to supply it with electricity” as defined by Merriam-Webster.com (“Batteries,” n.d.)

A **cable** is “a group of wires, glass fibers, etc., covered in plastic or rubber and used to carry electricity or electrical signals” as defined by Merriam-Webster.com (“Cable,” n.d.).

Lightning is “the flashing of light produced by a discharge of atmospheric electricity” as defined by Merriam-Webster.com (“Lightning,” n.d.).

A **circuit** is “the complete path that an electric current travels along” as defined by Merriam-Webster.com (“Circuit,” n.d.).

A **conductor** is “a material or object that allows electricity or heat to move through it” as defined by Merriam-Webster.com (“Conductor,” n.d.).

An **insulator** is “a material that allows little or no heat, electricity, or sound to go into or out of something” as defined by Merriam-Webster.com (“Insulator,” n.d.)

Objectives:

This unit is intended for students in 1st grade. The students spend most of their day in a self-contained classroom. They only leave for a 45 minute lunch period and a 45 minute prep class.

The Objectives of this unit will include the following:

- The students will be able to discuss observations and record discoveries.

- The students will be able to discuss and compare observations and test results.
- The students will be able to use writing as a tool for understanding.
- The students will be able to participate in small and large group activities, interacting cooperatively.

Strategies:

Think-Pair-Share

Think-Pair-Share is another strategy that will be used. During Think-Pair-Share students will think in their head for several minutes about a question or idea, and then they will turn to the person next to them and share their thoughts. Think-Pair-Share allows for an increase in the quality of student responses. It gives students time to think and respond to questions or prompts. It also relieves the pressure off of students who may be intimidated to respond in front of the whole group. As students are discussing their responses they are also talking out their answers and are able to make better sense of their ideas.

Activating Prior Knowledge

The teacher will activate prior knowledge through each lesson. Through activating prior knowledge teachers are helping children to connect the text to what they already know. Activating prior knowledge helps students to begin to make connections to the new text they will be reading. When students are able to make connections to text they become more invested in the text they are reading or listening to.

KWL Chart

A KWL chart is a graphic organizer that can be used in any subject area. The K stands for what the students already know. The W stands for what the students want to know about the subject. Finally, L is for what the students learn about the subject. The KWL follows the students throughout an entire unit or theme.

Graphic Organizers

Students will use graphic organizers throughout this unit. Graphic organizers are a tool that allows students to visually express ideas and concepts. When students use graphic organizers they are able to see undiscovered patterns and relationships that they may not have seen by simply reading or listening to a story. Graphic organizers also help to facilitate conversation about the story and make an excellent reference.

Modeling

Modeling will be used by the teacher to help convey understanding of new ideas and methods. Modeling is when the teacher demonstrates how to complete different activities by saying aloud the thought process.

Standards:

The Core Curriculum of the School District of Philadelphia is aligned to the Pennsylvania Common Core State Standards.

1.2.1.E: Use various text features and search tools to locate key facts or information in a text.

1.2.1.F: Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.

1.2.1.G: Use the illustrations and details in a text to describe its key ideas.

1.2.1.B: Ask and answer questions about key details in a text.

1.2.1.J: Use words and phrases acquired through conversations, reading, and being read to, and responding to texts, including words that signal connections and relationships between the words and phrases.

1.2.1.K: Determine or clarify the meaning of unknown and multiple-meaning word and phrases based on grade level reading and content.

Classroom Activities:

Lesson 1: What Do We Need Electricity For? (Building Background Knowledge)

Objectives:

- The students will be able to ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- The students will be able to ask and answer questions about key details in text.
- The students will be able to use illustrations and details in a text to describe its key ideas.

Materials:

- Chart paper
- Markers
- *What is Electricity?* By Lisa Traumbaur
- “It’s Electric” handout (see appendix a)
- Magazines
- Glue

- Sentence strips with the definitions for energy, electricity, batteries, cable, and lightening

Procedure:

- Begin by creating a KWL chart with your students. Label the top of the chart paper “Electricity”. Ask students to tell you what they think they know about electricity and write answers in the Know column. Then explain to students that we will be learning about electricity. Tell students that electricity carries energy. Then fill in the W of the KWL chart, what do students want to know about electricity.
- Next, display the text *What is Electricity* by Lisa Trumbaur. Discuss that this text is a nonfiction text and discuss the differences between fiction and nonfiction. A nonfiction text is going to give us factual information. Throughout reading this text there are a few important vocabulary words that students must know. Review the words and definitions for the following words: energy, electricity, batteries, cable and lightning. Display the words and definitions on a bulletin board this will add to your nonfiction print enriched environment.
- Then read aloud the text *What is Electricity* by Lisa Trumbaur pausing throughout to ask questions and clarify. Examples of questions you may ask are:
 - Do we usually see electricity?
 - What was one of the very first inventions to use electricity?
 - How does electricity get into our homes?
 - How would life be different if we did not have electricity today?
- Next, pass out the handout title “It’s Electric” (see appendix a) and give each table or group of students a variety of magazines. Challenge the students to fill their “It’s Electric” handout with pictures of items that use electricity.
- Have students share several of the items they found that use electricity.
- Finally, have students think-pair-share what they have learned today. Add any learned information to the L column of the KWL chart.

Extension:

As an extension either in the classroom or for homework have the students write about one thing that uses electricity and they must use the word electricity in the sentence.

Lesson 2: What is a Circuit? Open vs. Closed

Objectives:

- The students will be able to ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- The students will be able to ask and answer questions about key details in text.
- The students will be able to use illustrations and details in a text to describe its key ideas.

Materials:

- KWL chart
- *Switch On, Switch Off* by Melvin Berger
- Circuit demonstration board
- “Open vs. Closed” handout (see appendix b)
- Sentence strips with vocabulary words and definitions for electrical current and electrical circuit

Procedure:

1. Review the KWL chart from yesterday. Focus on what students learned about electricity, activating their prior knowledge.
2. Introduce the text *Switch On, Switch Off* by Melvin Berger. Explain to students that this is a nonfiction text that will help us to learn how electricity uses currents to get into our house. Show students the definition for electrical current explaining that this is the flow of electrical charge. Then show the word electrical circuit and explain that a circuit is the path a current takes.
3. Then begin reading *Switch On, Switch Off* starting at page 21 and read until the end pausing throughout to ask questions and clarify. Examples of questions you may ask are:
 - How is electricity brought into your house?
 - How do we use a switch to turn lights on an off?
 - If you want to turn the light on do you want the circuit to be open or closed?
4. Show students your circuit board. Allow students to practice closing the circuit to make the light go on.
5. Pass out “Open vs. Closed” handout (see appendix b). Explain to students that they must first circle all the closed circuits. Then they need to draw to complete the opened circuits to make all the lights go on.

Extension:

As an extension, either in the classroom or for homework, have the students illustrate their own open and closed circuits.

Lesson 3: Insulators vs. Conductors

Objectives:

- The students will be able to ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- The students will be able to ask and answer questions about key details in text.
- The students will be able to use illustrations and details in a text to describe its key ideas.

Materials:

- KWL chart
- *Science Everywhere! Electricity* By Clint Twist
- Classroom fan, TV, lamp, etc. (anything that plugs in with a cord)
- Chart paper
- Insulators vs. Conductors cut and paste (see appendix c)
- Sentence strips with vocabulary words and definitions for insulators and conductors.

Procedure:

1. Review with students the KWL chart and what students have already learned about electricity.
2. Review vocabulary bulletin board.
3. Direct students' attention to the classroom fan. Ask students how the fan is working. Expect answers such as the fan is getting electricity from the wall or from outside. Then ask how the electricity gets from the outlet to the fan to make it move. Listen to various answers. Then show students the cord. Explain that underneath the plastic covering are hidden wires that take the electricity from the outlet to the fan. The plastic covering protects us from getting hurt from the wires. Wires are one thing that can get electricity from one place to another. This is called a conductor. The plastic around the wires that does not omit electricity is an insulator.
4. Now read aloud pages 14 through 17 in the text *Science Everywhere! Electricity* By Clint Twist.
5. After reading about conductors and insulators create a chart of conductors and insulators from the story and then add others that students can now think of.
6. Have students complete the cut and paste Insulators vs. Conductors to demonstrate understanding (appendix c).
7. After students have complete the cut and paste have students add to the L section of the KWL chart.

Extension:

As an extension, either in the classroom or for homework, have the students create a chart of conductors and insulators they see in the classroom or at their home.

Lesson 4: Light it Up!

Objectives:

- The students will be able to ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- The students will be able to ask and answer questions about key details in text.
- The students will be able to use illustrations and details in a text to describe its key ideas.
- The students will be able to participate in small and large group activities, interacting cooperatively.

Materials:

- KWL chart
- AA batteries – enough for your class to work in groups of 2 or 3
- Miniature light bulbs
- Plastic coated wires with the plastic ends cut off to expose the wires
- A variety of small insulators and conductors the students can experiment with. For example, cotton balls, pennies, erasers, etc.
- Light it Up! Handout (see appendix d)
- Sentence strips with vocabulary words and definitions for insulators and conductors.

Procedure:

1. To prepare for this lesson be sure to have all your supplies ready. You must have one AA battery for each group of 2 to 3 students. Each group will also need two wires, cut about 6 inches long each with the plastic coating cut off the ends to expose the tips of the wires. Finally, each group will need one miniature light bulb.
2. Before beginning the lesson review the KWL chart to review what students learned about electricity, batteries, circuits, insulators, and conductors.
3. Then explain that today students will take what they've been learning and they are going to discover how to make a light bulb light up!

4. Hold up the battery first and ask students to tell you what it is and what its purpose is. Review the definition of a battery.
5. Next, hold up the wires. Ask students to identify them. Ask students to define what a wire does. Ask students to explain why the end of the wires would be exposed and what the plastic coatings purpose is. Review the definitions of insulators and conductors.
6. Finally, show students the light bulb. Ask students to identify the light bulb. Ask students if the light bulb is on or off. Ask students to explain why the light bulb is not on and what can we do to make it turn on. How can we use these supplies to make the light bulb light up? Allow for various student answers. Do not correct any answers, let students give their ideas, and review using the terms we have discussed throughout the unit.
7. Then break students into groups of two or three and allow them to collect the supplies they will need. Students can then work in small groups to try and get the light bulb to light. After students are able to get the light bulb to light have them draw a picture of their circuit and write to describe the steps they took to light the bulb (appendix d).
8. Bring the class back together to review how they made their light bulb light up. Have students model for the class how they created their circuit. Add any new information to the KWL chart.

Extension:

Students who complete their circuit, make the light bulb light, and complete the hand out Light it Up! allow to experiment with the various insulators and conductors to see what will still allow the current to travel through and what will not.

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Appendix A

Name: _____

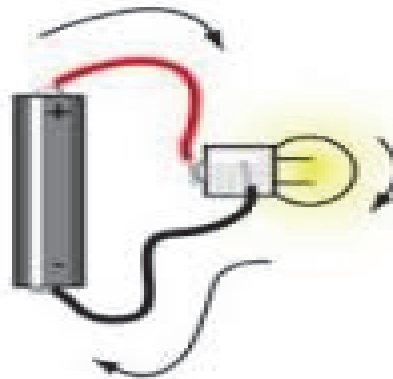
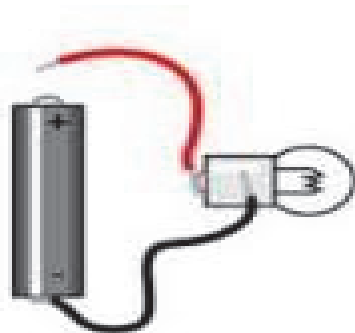
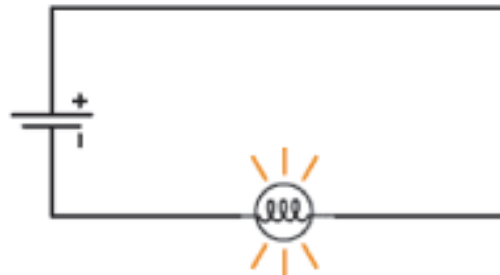
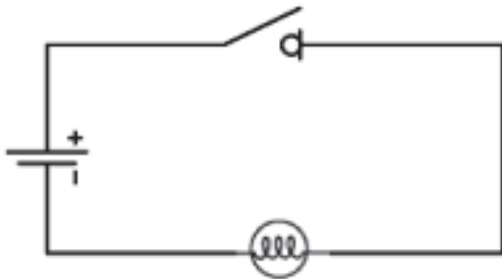
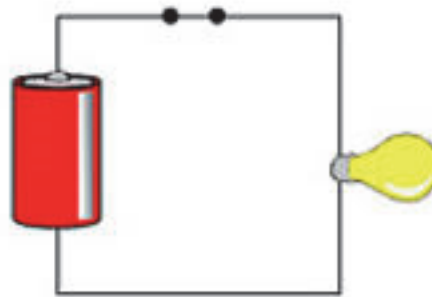
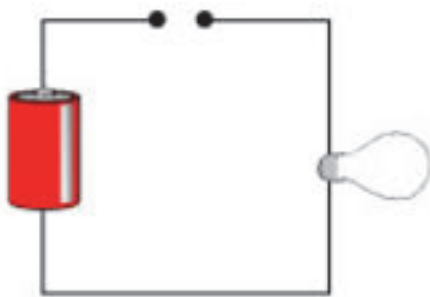
It's Electric!

Directions: Find as many items as you can of items that use electricity and glue them on the page below.

Appendix B

Open vs. Closed

Directions: First circle all the closed circuits. Then draw to complete the opened circuits.



Appendix C

Insulators vs. Conductors

Directions: Cut and paste the insulators and
conductors in the correct row.

Insulators	Conductors

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Appendix D

Light it Up!

Directions: Illustrate a picture of the circuit that made your light bulb light up.

Directions: Write to describe the steps you took to complete your circuit and make your light bulb light up.
