


The Practical Web Service for K-12 Teachers

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WHAT'S CURRENT? (ELECTRICITY)

Grades 2 - 3

Overview

This lesson introduces students to the major components and vocabulary of an electrical circuit and electricity through interactive use of video. It culminates with the class making a circuit, complete with switch, to light up a bulb. Measuring with a ruler is also a skill utilized in the activity.

ITV Series

"Take a Look #109: Electricity"

Learning Objectives

Students will be able to:

- Demonstrate knowledge about a circuit by making one to use to light up a bulb.
- Demonstrate knowledge about a circuit breaker to make a switch in a circuit to turn a light on and off.
- Explain why we need to conserve electricity and use it carefully.

Materials

For teacher

- 2 wires
- 1 light bulb (flashlight lamp - 2.33 volts - 0.27 amp.)
- 1 battery
- solar cell (optional)
- fuse (optional)
- dry erase marker/tissue

For each group of two students

- 1 zip lock bag containing the following:
 - 2 pieces of wire, piece of cardboard the size of a 3" by 5" note card,

- two paper fasteners, battery, light bulb, paper clip, paper punch,
- 1 centimeter or inch ruler

Vocabulary

- electricity
- current
- circuit
- electrons
- battery
- energy

Pre-Viewing Activities

We use electricity at school and at home every day. We do not even stop to think about it. We take it for granted. Today we will be talking about electricity, how it works and how it helps us. Let's name all the things we need electricity for at school. At home?" (This gives real life reasons for electrical use.) Chart these on a blackboard or on chart paper.

"What is electricity? Electricity comes from the word electron. Electrons are so tiny we can not even see them with a microscope. They have to flow through a wire to be useful as electric current."

I have two wires, a light bulb, and a battery. Who thinks they can make the bulb light up?" Choose a student to come up. Do not allow too much time to light the bulb. Whether a student can or cannot do it, you can then say:

Today we are going to see a video that helps explain an electric current and how it lights a bulb."

Focus Viewing

To give the class a main focus for viewing this video, ask them to: "Watch this video so you can learn what a circuit is and how to make one so we can light up a bulb."

Kate and Jamie are having electrical problems today. Let's watch to see if Kate can help Jamie with his." To give the students their first specific focus for viewing, ask, "How does electricity work like a toy train?"

Viewing Activities

START video immediately after the title segment "Electricity" appears just as the page turns.

PAUSE video after Kate asks Jamie, "How does it get from the light bulb back to the battery again?" to allow the class time to answer the question (How does electricity work like a toy train?). (Electricity travels in one direction all the way around just as the engine goes around the track and back to the station.)

To give the class the next focus for viewing question, ask, "How can Jamie light up his

bulb?" **RESUME** video.

PAUSE video just as Kate hands Jamie a wire to ask the class to look at Jamie's set up. "Who can come up here and show me what he needs to do to light his bulb?" Have a student come up to show how by marking with a dry erase marker directly on the screen where a wire goes to complete the circuit. Erase.

RESUME video so class can have immediate confirmation of the drawing just made.

PAUSE video after Kate says, "and back to the battery again" and shows the complete circuit, to ask, "Were we correct?"

"Kate and Jamie will be discussing a fuse next. What is a fuse? What does it do?" To give the class a focus for viewing, repeat these two questions.

RESUME video.

PAUSE video after Kate says "Exactly" to give the class time to answer those two questions. Continue this discussion by asking who in the class has seen the fuse box in their house. Discuss what a fuse does to safeguard a house. (It keeps a large amount of electricity from going through the wires and starting a fire when the circuits are overloaded.)

"What do you think a circuit breaker is? Listen to the term: circuit breaker. What do you think that is?" Have the class speculate on it. To give the class their next focus for viewing repeat the question, "What do you think a circuit breaker is?"

RESUME video.

PAUSE video after Kate says, "Only if they are overloaded", so the class can have affirmation of their speculations. "Can you see the path or circuit here in her next set up?" Have a student come up to the screen to show the complete circuit. To give the next focus for viewing question, explain that Kate is going to discuss some materials that conduct electricity. "Listen to see if Jamie can predict which ones can and which one cannot." (The problem with this segment is that it never does show which materials do or do not conduct electricity.)

RESUME video.

PAUSE when Kate says, "Which of these will conduct electricity?" to have the class predict which materials will conduct electricity (some choices are copper, glass, aluminum).

RESUME video to check predictions. The video will never tell you all the answers except that copper will conduct. Decide before you begin how to handle this segment.

PAUSE after Jamie says "in this set up" so someone in the class can predict whether the bulb will light in each of three set-ups. Ask someone to predict for this first one.

RESUME video to let class have affirmation of the prediction.

PAUSE after Jamie says "in this set-up" to again predict about the second set-up.

RESUME to check on this set-up.

PAUSE after Jamie says "in this set-up" to let someone in the class predict for the third one.

RESUME to see if prediction was correct.

PAUSE immediately after Jamie says "the bulb won't light" in the third set-up to give the class their next focus for viewing. "Electrical energy can be produced in many ways. Raise your hand to stop me when you hear three ways."

RESUME video.

PAUSE video as soon as a child raises a hand with the answers to let the class relate three ways (falling water, moving air or wind, sun - solar energy). If you have a solar panel, show it at this time and discuss.

RESUME video.

PAUSE video after Kate says to "only use batteries as your power source". Ask the class why she would say this. Discuss safety issues here.

"Next, a child will be making a poster with pictures of things that use electricity." The next focus for viewing is to ask the class to remember some of them. Resume video.

PAUSE on the poster with pictures pasted on it so that the class will have a better look at the many pictures.

REWIND ever so briefly to the beginning of the poster segment so the class will have one more look at the pictures.

RESUME video.

PAUSE again on the poster to ask the class to name 6 pictures that they saw on this poster that uses electricity. Let the class tell you. Remind the class that "electricity costs money to produce and to use. It shouldn't be wasted. Next a child will be making a poster to tell how to conserve energy. Raise your hand when you can tell me what that poster said." This is the next focus for viewing.

RESUME video.

PAUSE video after the poster segment to allow time to elicit the answer the class got by reading the bottom on the poster (turn off lights when leaving a room). "Next I want you to review parts of a circuit as we watch a girl make a light house." This is the next focus for viewing for the class.

RESUME video.

PAUSE after her bulb lights so class can review those. To give the class their next focus for viewing, ask them to, "Watch closely how to make a switch because I will be asking you to name the equipment we will need to make one."

RESUME video.

PAUSE video at the end of the switch segment with the words "and completes the circuit." This pause allows time to elicit the equipment needed for the post-viewing activity in making a circuit with a switch (2 paper fasteners, piece of cardboard with two holes punched in it, one paper clip, wire, light bulb).

RESUME video.

PAUSE immediately after this segment so you can give the next focus for viewing. "Electricity occurs in nature, too. Raise your hand as soon as you hear it to tell me how it occurs in nature." **RESUME** video.

STOP video when a child raises a hand to elicit an answer (lightning). "Lightning is electricity, too." Remind them that "in nature an electric eel and a firefly also produce some electrical energy."

"Now to review: what did we learn today? Does anyone remember how to make a switch? What are the dangers of electricity? What are some uses? Why do we need to conserve or save electricity?"

Post-Viewing Activities

"Now that we know about a circuit, we will be making a circuit containing a switch in groups of two. Please work with the person next to you. Each group will need a zip lock bag. Please check to see if it contains the following: two pieces of wire, a piece of cardboard, two paper fasteners, a battery, a light bulb, a centimeter or inch ruler, and a paper punch."

"First, just use the two wires, the battery, and the light bulb. See if you can make your bulb light."

"If you are successful with that, you may go ahead and construct your switch. But first, you must punch your holes in the piece of cardboard." (The cardboard must be the size of a 3" by 5" note card or you will need to measure your own pieces and predetermine the new measurements.) "Check to see if your group has an inch or a centimeter ruler. If you have an inch ruler, punch one hole 1 1/2 inches from each end of the card. If you have a centimeter ruler, punch one hole 3 1/2 cm. from one end and 4 cm. from the other end." If your class is not comfortable with measuring, do a quick mini lesson here to review. This is a real life reason to measure. "Put one paper fastener in each hole and fasten. Open a paper clip by unbending one end to make the switch. Can you make your bulb go on and off using your new switch?"

Assessment :

If each team can light the light bulb and then successfully construct and use the switch, they have completed the assignment. If time permits, have each person draw a diagram of the completed circuit complete with switch.

Action Plan

1. Have the class visit a local power company office for a field trip or invite someone from the company to come to speak to the class. Some topics could be electrical safety, how power is produced in your community, how to save energy, etc.
2. Make posters on the importance of saving energy at school and post them in the halls for others to see.

Extensions

1. **Science:** See other videos on electricity. Read books on the subject. Do some more of the electrical experiments using batteries, bulbs, and circuits in the resources. For example, use just one wire to light a bulb. Buy a simple motor at a store such as Radio Shack. See if you can make the motor run. Can you make it run backwards? The GEMS activity guide is excellent.
2. **Art:** Make a poster similar to the one on the video. Paste pictures of things that use electricity on the poster. Or, make your own poster by drawing or with water colors.
3. **Language Arts:** Look up in the newspaper about jobs in the power field. Write a list of qualifications needed to work in that field. Write your own newspaper ad listing a job in the electrical arenas.
4. **Science/Language Arts:** Make a lighthouse like the one the girl made on the video. Write a story about your lighthouse. Read a lighthouse book such as *Keep the Lights Burning* , Abbie. Does your bulb light?
5. **Math:** Do an assignment similar to the one the girl was doing in the video as she was making a bar graph of how much electricity (in watts) each thing in her home used. You will have to do some research first. Check with your power company. They may have a chart of wattage usages.

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