



4th - 8th Grade

4-H PROJECT

LESSON

PLANS:

4-H Helps

YOUTH

into the

21st Century

Series **1**

"Go with the Flow"

LSU
AgCenter
Research & Extension

Dear Project Helper,

This lesson is part of an effort by the 4-H Youth Development Division of the LSU AgCenter to provide teaching activities that are fun as well as educational. We are pleased you have agreed to work with youth as they learn and grow. You will help them learn scientific concepts that they will use for many years.

These lessons address Louisiana Content Standards science benchmarks; therefore, what you do with this activity should help strengthen students for LEAP testing. We appreciate your being part of this effort.



Learning Activity:

“Go With the Flow”

Key Concepts:

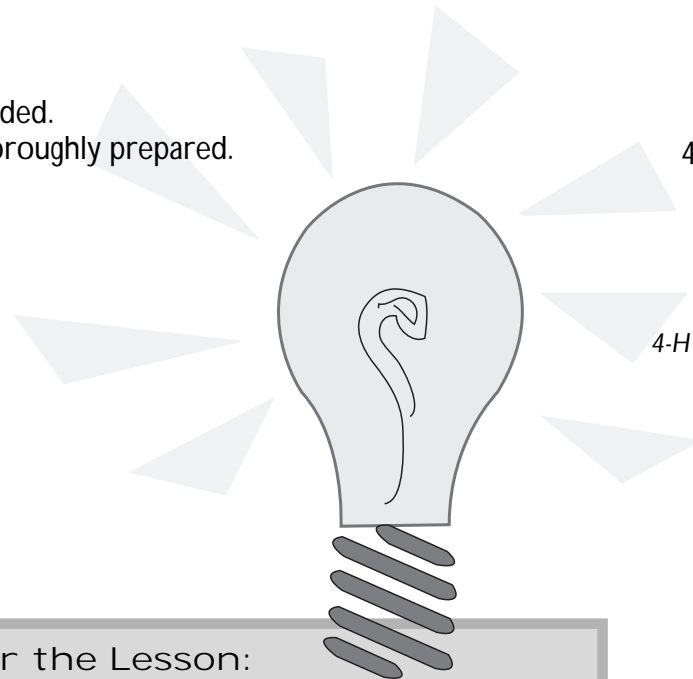
1. For electricity to flow, it must have a path for electrons to travel.
2. We call the path electrons travel a circuit.
3. Materials that carry electricity are conductors; materials that do not carry electricity are insulators.

How can members apply this information?

1. Practice safety when connecting electrical circuits.
2. Teach others what they have learned.

Getting Ready:

1. Gather all supplies needed.
2. Read lesson and be thoroughly prepared.



Track:
Science
Life Skill:
Decision making and
problem solving
Character Focus:
Responsibility
Project Skill:
Creating an electric circuit
Louisiana Content
Standards
Benchmarks:
SI-M-A6, SI-M-A7,
PS-M-B2, ELA-4-M2, ELA-
4-M6, ELA-7-M2, PS-M-C6,
PS-E-C4

Delivery Mode:
4-H club meetings, science class and
school enrichment

Time Allotted:
30-45 minutes

*Number of
Participants:*
10-30

What You Need for the Lesson:

For each pair of participants, provide:

1. 1 D cell battery (1.5 volts) (mercury-free, if possible)
2. 1 flashlight bulb (about 3-volt rating)
3. Two strips of aluminum foil, about 2 inches wide by 6 inches long.
(For older students, you may want to substitute two pieces of insulated copper wire, about 5-6 inches long.)
4. Typed list of three steps for creating the flashlight for each pair.
(See “Experience” step.)

4th-8th Grade “Go With the Flow”

What You Say:	What You Show or Do:	What Participants Do:
<p>Think of the five things you like to do best. (Possible answers: play video games, listen to music, watch TV or a DVD, go shopping.) Do any of these require electricity? (Possible answers: DVD, radio, electronic game.)</p> <p>Why are electricity and batteries so important to us? (Possible answers: provide light, heating or cooling, energy).</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and respond.</p>
<p>What does a light bulb in a flashlight need to light it?</p> <p>The light bulb in a flashlight needs electricity to light it. Electricity is the flow of electrons. Scientists have discovered that everything in the world is made of tiny particles called atoms. Atoms are made up of even smaller particles called electrons, protons and neutrons. Electrons have a negative charge, and protons have a positive charge. Electricity is produced when something upsets the balance between electrons and protons in the atoms, causing electrons to move from one atom to another. This movement of electrons creates the energy that powers your CD player or television.</p>	<p>Allow time for responses after you ask the question. Explain how the light bulb lights up.</p>	<p>Discuss and respond.</p>
<p>A battery provides a flow of electrons by pushing electrons back into the other end. The flow of electrons will happen when the electrons are given a path they can travel along.</p> <p>Please choose a partner to work with you to complete a “flashlight” project that will illustrate how electrons travel along a path.</p>	<p>Assist participants as they choose partners.</p>	<p>Discuss and respond.</p>

4th-8th Grade "Go With the Flow"

What You Say:	What You Show or Do:	What Participants Do:
<p>(Experience) Metal makes a good path for electrons to travel on, which is why we will use aluminum as we build a working flashlight using only a battery, a bulb and a piece of aluminum foil.</p> <p>Working together, use the battery, the bulb and the aluminum foil to create a working flashlight. Follow these steps:</p> <ol style="list-style-type: none"> 1. Your aluminum foil is 2 inches by 6 inches. Fold it over along the long edge, until you have a piece that is 6 inches long, but only a quarter of an inch wide. 2. Touch one end of the battery to the bottom end of the bulb, and then connect the side of the bulb to the strip of the aluminum foil. 3. Connect the strip of foil to the other end of the battery. 	<p>You may want to have the three steps printed on a slip of paper with each set of materials that you give to participants.</p> <p>Allow time for discussion and work.</p>	<p>Discuss and build a working flashlight.</p>
<p>(Share) What equipment did you need to make the bulb light? (Answer: battery and metal conductor (aluminum foil).) What was the source of electricity to make the bulb light? (Answer: battery) You built a circuit. The word circuit comes from the word circle. It means electrons have a closed path to follow—they can "go with the flow." A circuit needs three things. What are they? (Answer: 1. Something to push electrons (a battery) 2. A path for the electrons to follow (aluminum foil and light bulb)</p>	<p>Allow time for discussion and responses for each question.</p>	<p>Discuss and respond.</p>

4th-8th Grade "Go With the Flow"

What You Say:	What You Show or Do:	What Participants Do:
<p>3. Something for the electrons to do (light up the light bulb)</p> <p>Can you imagine the flow of electricity from the battery, through the bulb filament and back to the battery? Draw a picture in your mind of the path the electricity follows to the light bulb.</p>		
<p>(Process)</p> <p>How is your imitation flashlight different from one you would buy at a store?</p> <p>(Possible answer: It did not have a case or container to keep all the parts together, it did not have an off/on switch, etc.)</p> <p>Why is it important to understand how electricity works?</p> <p>(Possible answers: To be able to make connections and keep electrical-powered equipment operating; to handle electrical equipment safely.)</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and respond.</p>
<p>(Generalize)</p> <p>When is another time you experimented to solve a problem?</p> <p>(Possible answers: science projects, 4-H projects, when I needed something I did not have to complete a task, etc.)</p> <p>Describe another time when your brainstorming helped solve a problem.</p> <p>(Answers will vary.)</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and respond.</p>
<p>(Apply)</p> <p>When faced with a new problem, like fixing a flashlight, describe some ways you could figure out the answer.</p> <p>(Possible answers: Look at what is available to work with and apply principles I have</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and respond.</p>

4th-8th Grade "Go With the Flow"

What You Say:	What You Show or Do:	What Participants Do:
<p>already learned; look for help in project books or ask someone who knows to help me; try different ways of putting things together to find which way works.)</p> <p>Describe how technology can help us organize and solve problems.</p> <p>(Possible answers: Look for solutions on the Internet, look for directions and step-by-step instructions for solving a problem, use testing gauges.)</p>		
<p>When faced with a problem you cannot seem to solve, be a responsible person and try to find the solution. Use all the resources available to you. Brainstorming, researching and experimenting can all help us to solve problems. Asking people who can help us helps us solve problems; however, never ask someone else to do for you what you can do for yourself. Do not give up easily; stay with the task until it is resolved.</p>		

Ways to Help Members Learn More

1. Install a switch on the circuit. Discuss open circuit and closed circuit.
2. Using items found around the house, make a flashlight that is easier to use than the one done in this activity.
3. Think about what other things electrical circuits do other than light up flashlights. Where do we find other circuits? Be prepared to teach others how electric circuits run many of the things we use.

Resources:
www.radioshack.com
Mouser Electronics –
www.mouser.com

Acknowledgments:
Louisiana Content Standards, published by Louisiana State Department of Education.
Magic of Electricity, CCS, 4-H Cooperative Curriculum System, © 1997, Regents of the University of Minnesota.

Authors:
Kenneth Guidry, County Agent, and Coleen Laiche, Extension Agent, St. James Parish
Coordinators:
Terril Faul, State 4-H Division Leader, and Sarah Williams, Extension Associate, 4-H Youth Development

Visit our Web site: www.lsuagcenter.com

This material is based on work supported by the Technology Assisting Louisiana Youth (TALY) project funded in part by the United States Department of Education through Online Louisiana, Inc.

Louisiana State University Agricultural Center, William B. Richardson, Chancellor
Louisiana Agricultural Experiment Station, David J. Boethel, Vice Chancellor and Director
Louisiana Cooperative Extension Service, Paul D. Coreil, Vice Chancellor and Director

Pub. 2889-E

(Online)

7/04

Issued in furtherance of Cooperative Extension work, Acts of Congress of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. The Louisiana Cooperative Extension Service provides equal opportunities in programs and employment.