

## Current Electricity

Mod.3.2

### TIME

150 minutes

### OVERVIEW

Students explore current electricity. Through experimentation, students learn how simple series and simple parallel circuits work. They write a definition for an electrical circuit.

### LEARNING OUTCOMES

Through this learning experience (LE), students will achieve specific learning outcomes (SLOs) in various subject areas. Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified.

#### English Language Arts

Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- 1.1.1 *Express Ideas* — Engage in exploratory communication to share personal responses, make predictions, and discover own interpretations.
- 1.2.1 *Develop Understanding* — Reflect on prior knowledge and experiences to arrive at new understanding.
- 1.2.2 *Explain Opinions* — Explain personal viewpoints in clear and meaningful ways and revise previous understanding.
- 1.2.3 *Combine Ideas* — Search for ways to reorganize ideas and information to extend understanding.
- 1.2.4 *Extend Understanding* — Appraise ideas for clarity and ask extending questions; select from others' experiences and ideas to extend ways of knowing the world.
- 2.3.3 *Vocabulary* — Experiment with ambiguity in language [such as puns, jokes based on multiple meanings, poetry...] in a variety of contexts.
- 2.3.5 *Create Original Texts* — Create original texts [such as letters, short stories, media broadcasts, plays, poems, video presentations, Readers Theatre...] to communicate and demonstrate understanding of forms and techniques.
- 5.2.1 *Cooperate with Others* — Assist group members to maintain focus and complete tasks; identify and solve group process issues.

#### Science

Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- SLOs related to Scientific Inquiry or the Design Process in Cluster 0: Overall Skills and Attitudes.
- 6-3-01 Use appropriate vocabulary related to their investigations of electricity.  
*Include: positive charge, negative charge, current electricity, static electricity, electrical circuit, insulator, conductor, switch, series circuit, parallel circuit, electromagnet, magnetic field, motor, generator, transformation, electrical energy, renewable, non-renewable, energy consumption.*
- 6-3-03 Explain current electricity, and compare the characteristics of current and static electricity, by using a model.

- 6-3-06 Develop a definition of an electrical circuit, based on classroom explorations.  
*Include: an electrical circuit is a continuous path for charges and must contain a power source and a conductor.*
- 6-3-07 Experiment to classify a variety of materials as insulators or conductors.
- 6-3-09 Construct and diagram simple series circuits and simple parallel circuits.

### **ICT LITERACY SKILLS AND COMPETENCIES**

Consider the intent of this LE and your choice of instructional and assessment strategies to determine which skills and competencies students may achieve, in addition to those identified below:

- basic operating skills
- inquiry using electronic sources

### **SUGGESTED LEARNING RESOURCES**

#### **Software**

- spreadsheet
- *Crocodile Clips Elementary*

**Note:** This software is available on the CD-ROM version of the *Inventions, Innovations, and Discoveries* interdisciplinary unit.

#### **Internet**

- IMYM Links Database: <<http://www.edu.gov.mb.ca/ks4/tech/imym/resources/links.html>>

#### **Video**

- Manitoba Hydro. *Creating and Controlling Current Electricity*. Videocassette. Winnipeg, MB: Manitoba Hydro, 1991. (VHS, 13 min.)

#### **Print**

- Appendix C: Index of Teaching and Learning Strategies and Tools
- Manitoba Education and Training. *Grades 5 to 8 Science: A Foundation for Implementation*. Winnipeg, MB: Manitoba Education and Training, 2000.
- Manitoba Hydro. *Experiments with Electricity*. Winnipeg, MB: Manitoba Hydro, n.d.
- ---. *Producing Electricity*. Colour brochure. Winnipeg, MB: Manitoba Hydro, n.d.

#### **BLM**

- Mod.1.3c#1: Compare and Contrast Frame

#### **TBLM**

- TBLM Mod.3.1#1: Conducting a Fair Test: Observation Checklist

#### **Materials**

- 4.5-volt batteries
- plastic-coated wires (ends stripped)
- paperclips or alligator clips
- light bulbs and bulb holders
- common classroom objects (e.g., pencil, key, eraser, utensil, ruler, chalk)

## **SUGGESTIONS FOR INSTRUCTION**

### **Preparation and Set-up**

- Assemble all materials listed in the Suggested Learning Resources.
- Access appropriate websites listed in the IMYM Links Database for this LE. Bookmark the websites on the class computers, or ask students to do so before beginning this LE.
- Contact another Grade 6 teacher to plan an email exchange of students' experiments and observations during the LEs in Module 3: Explore Electricity: The Backbone of Modern Inventions (see ICT.3: Riddle This).
- Download the *Crocodile Clips Elementary* software on the class computers.

### **Activating Strategies**

- **Note:** Explain and demonstrate proper handling techniques and safety procedures for equipment throughout this LE.
- Provide collaborative groups of students with a battery, two wires, and a light bulb. Students use the materials to try to make the bulb light up. Students discuss what worked, and why.
- Using a computer and a projection system, introduce students to *Crocodile Clips Elementary* or a similar application. Use appropriate vocabulary when describing what is happening and remind students to do the same.
- Assemble a simple circuit for students, explaining each step during the demonstration. Before completing the circuit, ask students to hypothesize what might happen when the circuit is completed, and why. Record their suggestions on a class Hypothesis Chart.
- Complete the simple circuit to verify whether students were correct in their predictions. Discuss what worked, what did not work, and why.

### **Acquiring Strategies**

- Based on their previous discussion of simple circuits, collaborative groups of students experiment with the circuits found in *Crocodile Clips Elementary*. They draw, on paper, one of the circuits they created online that was successful in lighting a bulb. Students post their drawings on the classroom wall.
- Differentiate between simple series and simple parallel circuits. Students label each of their group's drawings on the classroom wall using appropriate vocabulary.
- In pairs, students build circuits that replicate the diagrams they drew from *Crocodile Clips Elementary*.

### **Applying Strategies**

- Students design and build a circuit that can light up one or more bulbs. They draw the working circuit, label it "series" or "parallel," and display their diagram on the classroom wall, post it on the class website, or email it to their key pals.
- Students draft a definition of an "electrical circuit." They share their drafts, discuss the wording, and write a class definition. They add the definition to the class Vocabulary Database (see OLE.2: Daily Edit).

### **Variations/Extensions**

- Students compare the characteristics of static and current electricity, using BLM Mod.1.3c#1: Compare and Contrast Frame.
- Watch the video *Creating and Controlling Current Electricity* (Manitoba Hydro).

## **SUGGESTIONS FOR ASSESSMENT**

- Observe students' work habits and proper handling of equipment, using TBLM Mod.3.1#1: Conducting a Fair Test: Observation Checklist.

- Assess students' labelled drawings of a circuit. Check for gaps in understanding. Confer with students to make suggestions or to clarify concepts when needed.

**CONNECTION TO INVENTION CONVENTION**

- Students' experimentation with electricity helps them understand electricity as an important force behind major inventions and helps them think about how they can use electricity in developing their own invention.