



Unit 1: Introduction to Electricity

This unit will take approximately 2-3 weeks. The pace is always determined by the ability of your students. Some areas can be skipped or used as enrichment, while other areas include more challenges to those more advanced students.

This timeline is based on 55-minute periods.

Outline	Teacher Notes:
<p>Day 1 Today's Objective: This introduces a context for learning basic electricity. Activity: Framing Questions - Whiteboard Lab: Getting Charged Lab Due: None</p>	<p>Whiteboard Framing Questions, but don't spend a lot of time. You want students to begin thinking about electricity. Identify new vocabulary. Make sure to look at the Student Misconceptions Electricity Page. You might identify some common misconceptions that you'll be dealing with throughout the unit.</p>
<p>Day 2 Today's Objective: To identify the charges that are involved in static electricity and how they relate to each other. Lab: Getting Charge Lab - Revisited Practice 1.1 Electrical Charges Due: None</p>	<p>Have students' whiteboard their observations. Review the Reading Page: What is Static Electricity after students discuss their findings from the Getting Charged Lab. If you want to take it farther, there is a link to explain more about charging by Conduction and Induction at the bottom page 2 of the lab.</p>
<p>Day 3 Today's Objective: To identify the components required to complete a circuit. Activity: Review Getting Charge Lab-Revisited Lab: A Bulb, A Battery and A Wire Practice 1.2 The Bulb Challenge Due: Practice 1.1</p>	<p>Review the Practice 1.1 Electrical Charges. You can do this through class discussion, or whiteboarding. In either case, don't spend a lot of time on it as you will want to do the next Lab. Be sure to cover the learning objectives from the Teacher Guide. Assign the Reading Pages along with the Practice 1.2 as homework.</p>
<p>Day 4 Today's Objective: To convert physical diagrams to circuit elements. To identify which materials are conductors and which are insulators. Activity: Review the components required to produce a complete circuit. Lab: Electrical Materials Lab Due: A Bulb, A Battery and A Wire</p>	<p>Have students display their answers from Practice 1.1 on their whiteboards from their tables. This is a more informal but faster method to review homework yet still reinforce the student objectives. Show student how circuit elements can be used to draw a circuit. In their groups, students should discuss and design a lab to identify which materials can (or can not) conduct electricity. This may be the first formal lab write up and may take more class time depending on the detail you expect from the students.</p>



Outline	Teacher Notes:
<p>Day 5 Today's Objective: To complete the Electrical materials lab if you didn't finish. To review everything covered throughout the week. Activity: Review content covered throughout the week through group discussion and/or class discussion Due: Electrical Materials Lab</p>	<p>Review their Student Summary Page, and everything they have learned thus far. Electricity Quiz #1. Use questions from the labs covering charges and static electricity, components of a light bulb, contact points, circuit elements, conductors and insulators. Make a point to identify that we haven't discovered how electricity travels through a circuit.</p>
<p>Day 6 Today's Objective: To discover how electricity travels through a circuit. Lab: The Buzzer and the Motor Lab Practice 1.3 Flow Challenge – in Class Practice 1.4 Current through Devices Due: None</p>	<p>This lab identifies that electricity does have a flow or current and a direction as it travels through a circuit, but it cannot identify which way it travels, ie.. From the positive side of the battery through the circuit to the negative side or visa versa. The Reading Page: "What is Charge? What is Current?" will clear that up. After reviewing the Flow Challenge, Assign the Practice 1.4 Current through Devices as homework.</p>
<p>Day 7 Today's Objective: To construct a circuit using a switch and identify the applications of several different switches. Activity: Whiteboarding 1.3 Flow Challenge Lab: Bulbs and Switches Lab Practice 1.5: Circuits with a Switch Due: The Buzzer and the Motor Lab, Practice 1.3, and Practice 1.4</p>	<p>Review the Practice 1.3 Flow Challenge. In their groups, have students' whiteboard their answers from problem #2. You will be introducing a variety of switches. Throughout class, you'll want to have students identify the applications of these various switches. At the end of the lab, review the Reading Page: The Switch. The practice page appears lengthy, but it's relatively easy.</p>
<p>Part 3 is optional. This can get confusing to design, but it has a practical application that can be discussed in class.</p>	<p>Depending on the ability of your class, you may want to skip part 3, or simply discuss how switches can be used in stairways, hallways or front/back door buzzers.</p>
<p>Day 8 Today's Objective: To determine how LED's and photoresistors work and their function in every day life. Lab: Electrical elements Application Lab Due: Practice 1.5 Circuits with a Switch</p>	<p>Practice 1.5 is a fairly easy assignment and shouldn't require any review. Because the use of LED's and photoresistors are very common, and there are many of practical applications. Now is a good time for Electricity Quiz #2. The next lab activity may take a few days and after which the unit is finished. Use questions from Practices 1.3,1.4 and 1.5 as well as the lab questions</p>



Outline	Teacher Notes:
<p>Day 9 Today's Objective: To identify all the materials required in assembling a fruit or vegetable battery. To accurately measure the voltage using a multimeter. Lab: The Everyday-Stuff Battery Lab Part 1 and 2 Due: Electrical Elements Application Lab</p>	<p>As a class, go through Part 1 making sure that everyone understands how to properly use the multimeter. In part 2, use common electrodes such as Copper, Aluminum, and Brass (all found at a hardware or welding supply store), and Zinc (galvanized nails). As a class, list out all the different combinations of electrodes you can produce. Common electrolyte materials are apples, potatoes, oranges, lemons, onions, etc.</p>
<p>Day 10 Today's Objective: Part 3 of the Everyday-Stuff Battery Lab. Lab: Part 3 Due: None</p>	<p>Since students have done Part 1, the second part should go a lot smoother. The same principles apply here, only the electrolyte will be changed. These can be soda, saltwater, Gatorade, lemonade, tap water, etc. In this lab, students will only use the best combination of electrodes discovered in Part 1.</p>
<p>Day 11 Today's Objective: Part 4 of the Everyday-Stuff Battery Lab Lab: Everyday-Stuff Battery Lab Part 4 Practice 1.6 Battery Challenge Due: Everyday-Stuff Battery Lab</p>	<p>It's usually best to do Part 4 of this lab as a class. Getting several people involved (in series) can be very informative. Use questions from the previous practice pages and include questions about what they discovered about batteries.</p>
<p>Day 12 Today's Objective: To review batteries, their components and how they work. Activity: Review the Reading Page: How Do Batteries Work? Practice 1.6 Battery Challenge Due: Everyday-Stuff Battery Lab</p>	<p>Show students the Reading Page: How Do Batteries Work? Insert practical applications and why there are so many different sizes and types of batteries. This is also a good time to show an open 6V lantern battery and a 9V battery.</p>
<p>Day 13 Today's Objective: To review Unit 1: Intro to Electricity Activity: Class discussion Due: 1.6 Battery Challenge</p>	<p>Whiteboard the Practice 1.6. Students may still have some misconceptions about batteries and this is a good time to clear them up. Use the rest of the hour to review the unit.</p>
<p>Day 14 Today's Objective: Unit Assessment</p>	<p>Test on Unit 1: Intro to Electricity</p>