Electronics Lesson 1

**Overview**

The first lesson is to setup the foundations for the rest of the course. We will introduce the basic concepts of electricity, the arduino and code.

**Class Hook**

**Instructor:** At the start of the class the instructor will show a demo of a traffic light or a blinking yellow light built using the ardiuno.

To students: What real world thing is the demo demonstrating?

Expected Answer: It is a traffic light. For a blinking yellow light – one answer could be it is a warning sign to slow down.

Big Concept #1: Electricity is a flow of charged particles

To students: Can anyone give me examples of devices that you can turn on and off?

Teaching Tip: Give hints like pointing at the lights in the classroom. Call on students who are quiet. Make sure students who know the answer don’t call out or take over the class.

Expected Answer: Lamps, Computers, Phones, Cars, Refrigerators, AC…

To students: What do they all have in common?

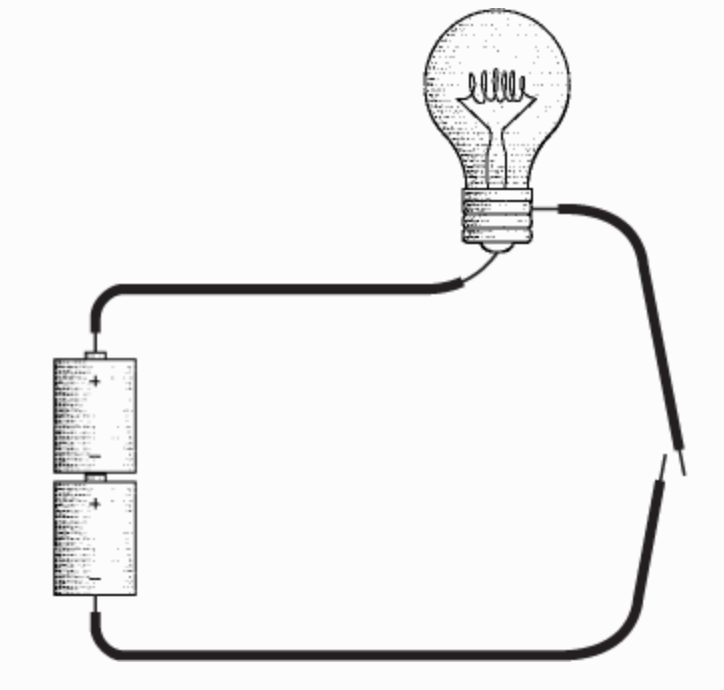
Expected Answer: All of these devices require power or electricity!

To students: Electricity is the flow of charges particles called electrons. In other words: *tiny things with lots of energy moving around!*

Activity 1: Hot potato

This activity will demonstrate how electricity works in a circuit. We will using a ping pong ball to represent a tiny thing with lots of energy.

1. Have everyone form a circle (standing up) with a neutral face.
2. The ping pong ball is like a hot potato. When a student gets the ball, he or she should smile and jump down.
3. The student should then pass the ball to the right until it reaches the last person. The last person should drop the ball on the floor.
4. In order for the ball to be passed around in circle, we need something to create electrons. Introduce the concept of the battery. Explain that a battery creates new electrons. Have an assistant act like a battery and pass three balls to the left. At least three students should be jumping up and down.
5. Next remove one student. Demonstrate that no balls can pass through now. This is called an open circuit. Put the student back. This is called a closed circuit.
6. The last component of the circuit is the light. Ask a student if you were to jump up and down 100 times, how would you feel? You would feel hot. Explain that when a thin paper gets hot, it will glow. Have an assistant act like a light using a paper (yellow on one side and black on the other side). Show that when electrons pass through it, the light will glow. Likewise if no electrons pass through, the light will be black.
7. Ask the class what might happen if the paper gets too hot? The answer is the light will burn out.
8. Finally remove a student from the circuit; the assistant with the light should be black/not glow. Put the student back, the light will glow now. This is called a switch.
9. Have everyone return to his or her seats.

Draw a circuit with a wire, a battery and a light bulb to bring all the concepts we learned from the activity together.

To students: In the drawing above, electrons flow from negative to positive.