Snappy Circuits
Student Worksheet

ANSWER KEY

Part	I notice…	I wonder…	I learned…
Battery			
LED			
Buzzer			
Alligator Clips			

Answers will vary

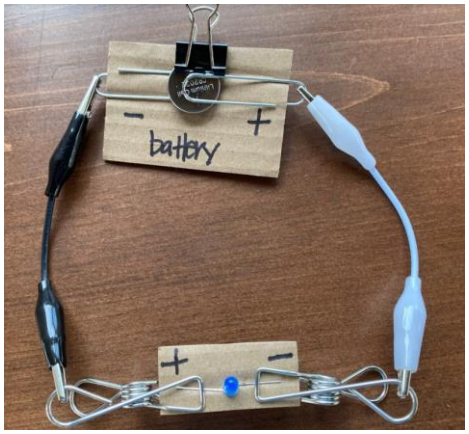
Project 1: LED Light and Battery

Directions: Build a circuit with one LED light and one battery.

1. When the circuit is open, the light is **OFF**

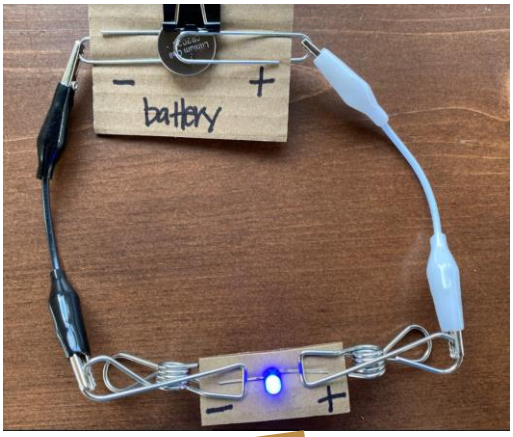
2. In which picture should the light be on? **B**

A.



?

B.



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Why? Electrons flow in one direction, very similar to water in a hose or a car on a one-way street. In picture B, the positively charged electrons from the battery are flowing toward the positive LED light. Electrical flow is in one direction- positive to positive. Because of this, energy turns the LED on and the electrical energy is transformed into light. In picture A, the positively charged electrons from the battery would not light the LED because it is not flowing in one direction.

Project 2: LED Light, Battery and Switch
Directions: Build a circuit with an LED light, battery and switch.

1. If the switch is open, the light is **OFF**

2. What happens if you switch the direction of the LED light?
   The LED light will not work unless electrons flow in one direction. If you switch the direction of the light it will not work.

Project 3: Buzzer and Battery
Directions: Build a circuit with a buzzer and battery.

1. What happens to the light if the red wire from the buzzer is connected to the positive end of the battery? **ON**

2. What happens to the light if the red wire from the buzzer is connected to the negative end of the battery? **OFF**

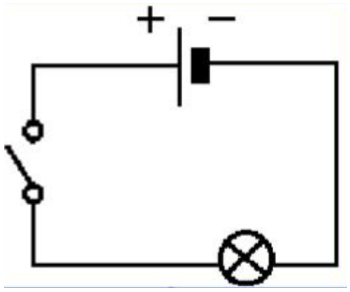
3. What charge is the red wire? **Positive**

Project 4: Buzzer, Battery and Switch
Directions: Build a circuit with a buzzer, battery and switch.

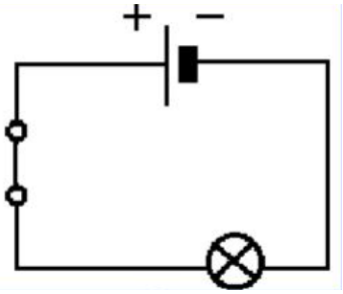
1. If the switch is closed, the buzzer is **ON**

2. The diagram below is known to engineers as a ***schematic***. These special diagrams use symbols to show how electricity flows through a circuit. The "X" represents a light, and the two circles with the line show a switch. Look at the schematic below. Which circuit will turn the light on? **B,** It is a closed circuit and electrons can flow through it.

A.



B.

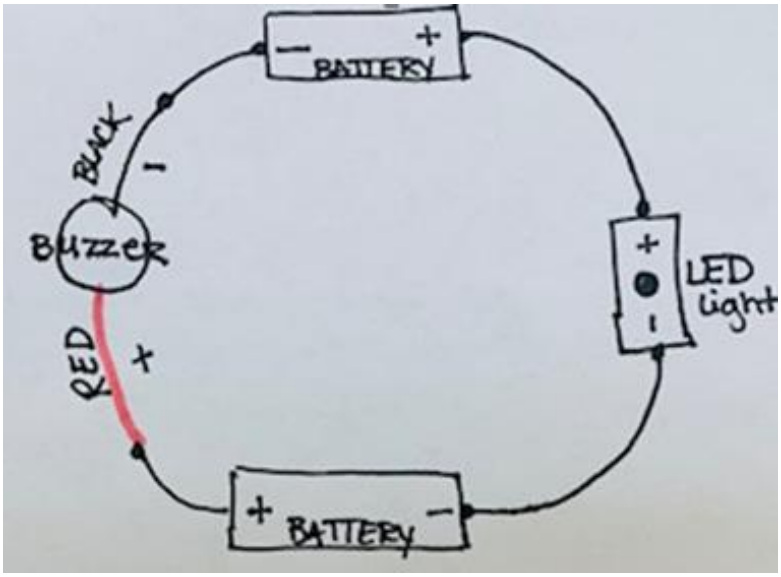


3. How could you make the buzzer louder? Explain: You could add another battery. The extra power of a battery will make your buzzer louder.

Project 5: Series Circuits

Directions: Build a circuit with an LED light, buzzer and batteries.

1. Draw a diagram of your circuit once everything is working. Label the light, buzzer, battery, and positive and negative charges. Responses could vary.



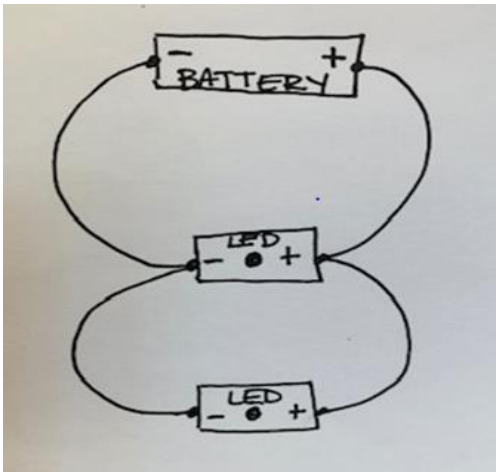
2. Describe how the electrons are flowing through the circuit:

   Electrons move through a circuit in one direction. They will move from the positive side of a battery through alligator clamps, and into that same charge of either a Buzzer or a LED light.

Project 6: Parallel Circuits

Directions: Build a parallel circuit. Must include at least one battery and two LED lights.

1. Draw a picture of your parallel circuit once it is working. Label each part.



2. How many paths are there for electrons to flow?
   2 paths

Optional Extension: Scrappy Clips

1. You were given alligator clips to connect your bricks into circuits. Why do you think alligator clips were used?
   Alligator clips are durable and reliable…and are very good conductors. See pages 27-31 of *Scrappy Circuits*.

2. Imagine alligator clips were not available. What is another material you could use to connect your bricks? If time allows, test your idea. Did it work?
   Answers will vary. Wire, aluminum foil, paper clip chain-Page 31 of *Scrappy Circuits* shows a chart of the pros/cons of different types of clips.