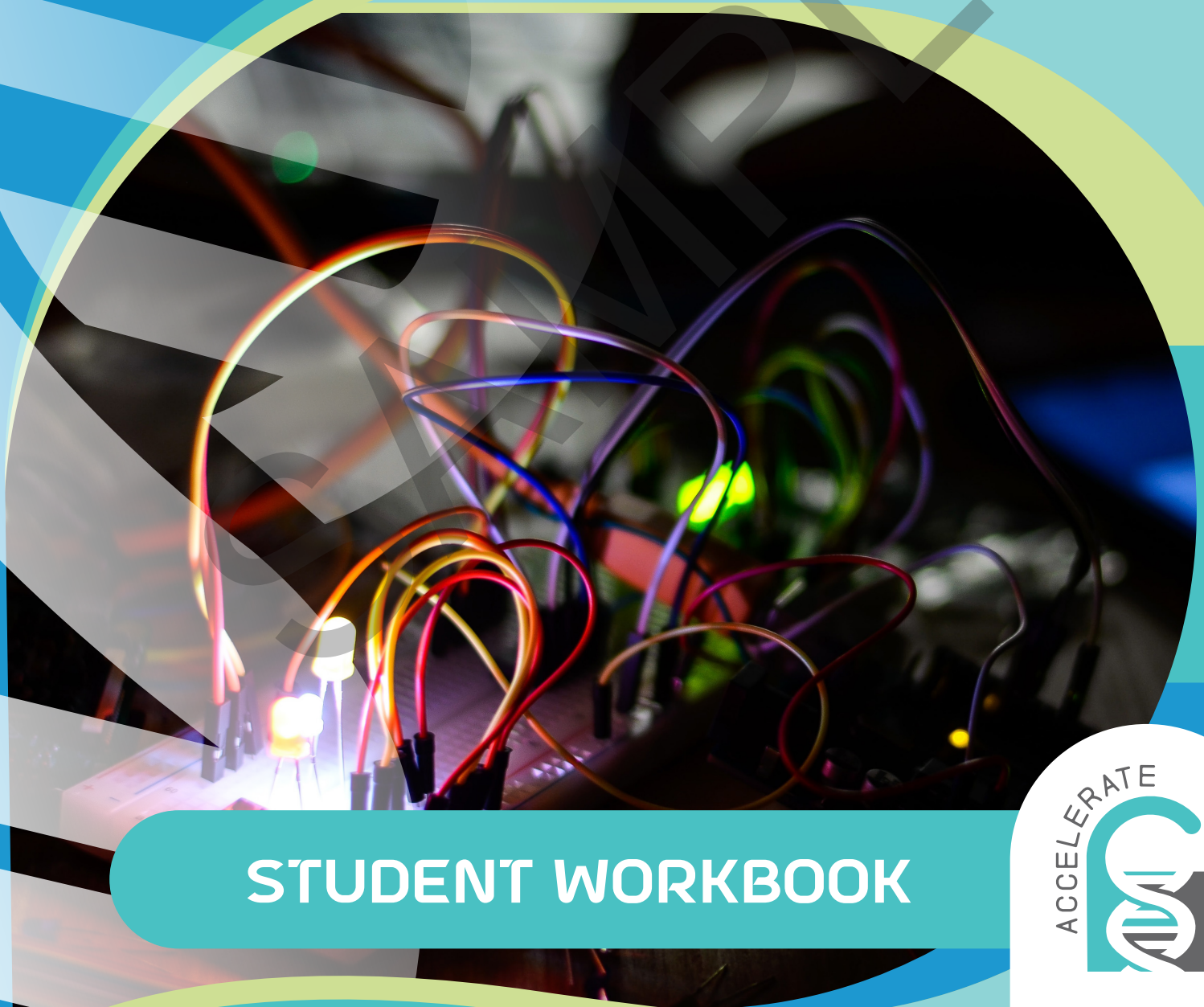


# NO WIRES NECESSARY



STUDENT WORKBOOK

ACCELERATE



# MYSTERY CIRCUIT PHENOMENON

You probably flip on light switches every day, but do you know what causes the light to turn on? Let's experiment with electricity using a couple different designs.

## I

## LIGHT THE PATH

### Exploring the Circuit

First, you will get a feel for the devices used in your circuit. After you know how all of the parts work, you will make predictions about the changes you make to a circuit. A **circuit** is a path through which electricity flows.

### WHAT YOU NEED:

#### FROM THE KIT:

- Battery, 9-volt
- Battery connector, 9-volt
- Black permanent marker
- Construction paper, white
- LED, green
- LED, red
- LED, yellow
- Modeling dough

**WARNING! CHOKING HAZARD - Small parts.**  
Not for children under 3 years.



**WARNING! Contains chemicals that may be harmful if misused.**  
Do not eat or drink. Wash your hands after use.

**WARNING! Batteries can be dangerous.**  
Store away from metal objects.  
Only use with an adult's supervision.

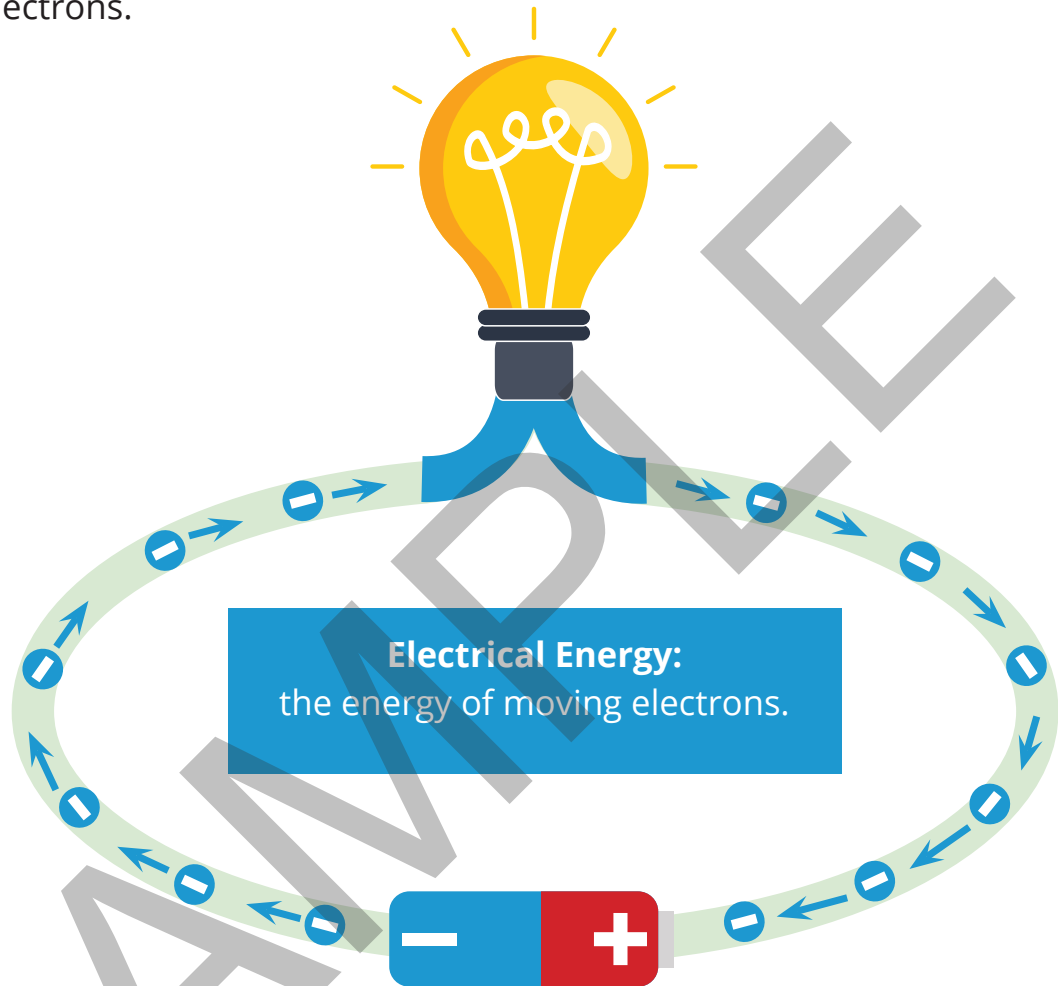
### WHAT TO DO:

#### STEP 1

Remove half of the modeling dough from the container, save the other half of the dough for future activities with the lid on tight. Form the dough into 4 small balls.

### Electron Dance

In each of the situations you just tried, the power source was the same: the 9-volt battery. Batteries contain a chemical reaction that releases electrons, which flow through chemicals and metals inside the battery. The electrons leave the negative end of the battery and move as **electrical energy** through the circuit, or the energy of moving electrons.



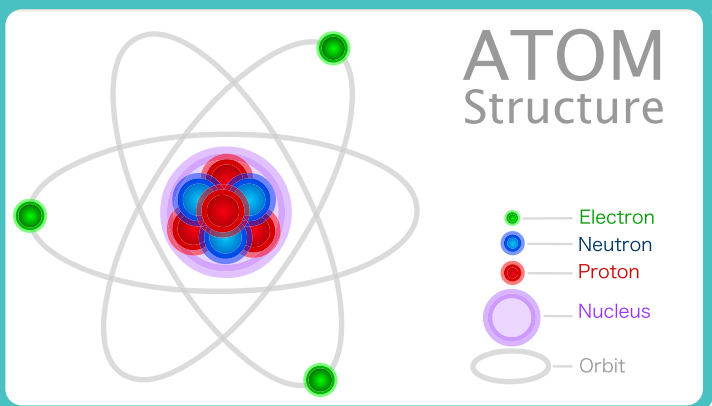
### MULTIPLE AGES AND ABILITIES:

All matter is made of atoms.

Electrons, protons, and neutrons make up an atom.

An **electron** is a negatively charged part of an atom. Electrons in an atom are moving very quickly around the nucleus.

**Energy** is the ability to make something move or change. Electrons can be influenced by an electromagnetic charge.



## Test Your Circuit

It's time to test your circuit and switch!

### WHAT TO DO:

#### STEP 1

Make sure the switch can be turned on without needing to be held in place.

#### STEP 2

Watch the circuit for 10–20 seconds to make sure that all the devices stay on.

### CRITERIA CHECKLIST

Did you use a 3-volt battery?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Did the fan stay on for at least 10 seconds?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Did the LEDs stay on for at least 10 seconds?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
How many LEDs did you use? _____		

## REFLECT AND REVISE



### REFLECT

1. Think about how well your circuit performed. How well did your circuit design meet the challenge?

2. Describe how well your circuit design met the criteria and constraints of this challenge.



# SCIENCE UNLOCKED

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Kit	SU-NOWIRE
Instructions	IN-NOWIRES
Revision Date	3/2022