

# BUILDING ELECTRIC CIRCUITS

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**Instructions:** Use these cards to teach circuits. Each card has a different type of circuit for kids to create. You can use one or many depending on the supplies you have on hand.

**Supplies needed to complete ALL of these cards are:**

Copper wire

Zinc nails

Alligator clips

Lemons

Variety of batteries (9v, AA, Coin Cell)

LED pin lights

Tape

Paper

Pencil

Multimeter

AA battery pack

Copper tape

Old string of Christmas lights

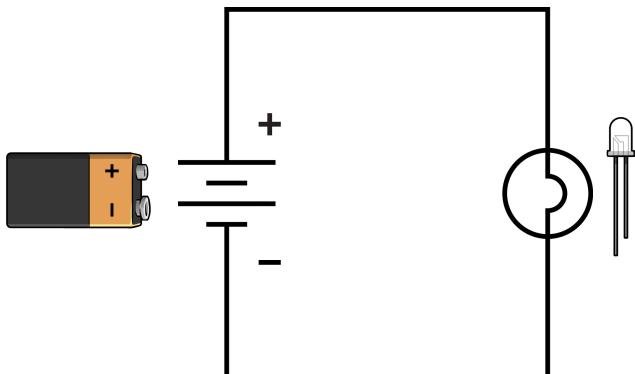
Small light bulbs

Variety of items (both metal and non-metal) to test conductivity

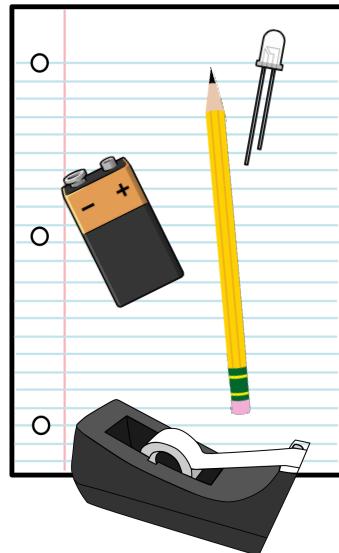
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# MAKE A GRAPHITE CIRCUIT



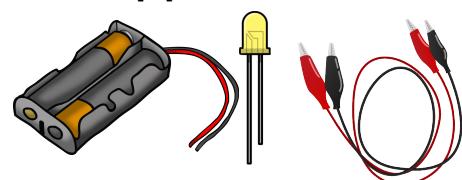
## Supplies to Use



Instructions: Draw a thick line with your pencil in the shape of the above circuit. Leave an open space in the line where the light goes. Bend the wires and tape down your light with the shorter end pointing towards the negative side and the longer end pointing towards the positive side. Place the battery down matching the positive and negative sides.

# MAKE A CONDUCTIVITY TESTER

## Supplies to Use

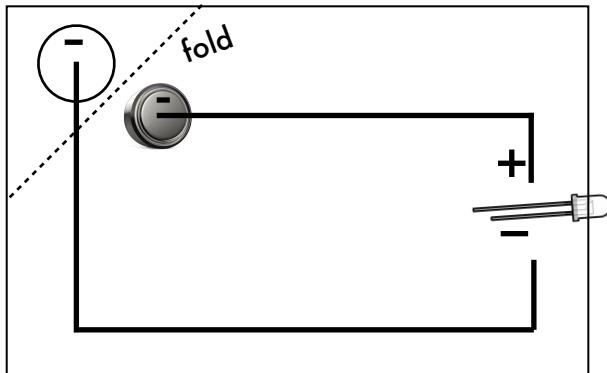


Instructions: Using 3 alligator clips a battery pack and a light, create a conductivity tester to test if items are conductive or not. Connect a battery clip to each wire of the battery pack. Red is positive and black is negative. On one side attach a light and another alligator clip, making sure to match positive and negative sides. The short wire on the light is negative and the long wire is positive. Between the other two alligator clips, test different items to see if they are negative or positive. It will make a large circle of wires with one opening. Clip each wire to the item you are testing. If the light turns on it is conductive, if it does not, it is an insulator.

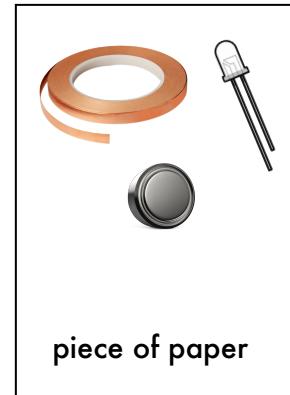
## Variety of suggested items to test:



## MAKE A PAPER CIRCUIT



### Supplies to Use

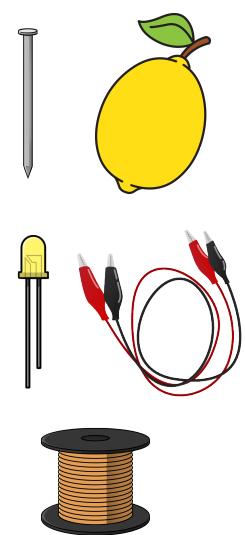


Instructions: Use paper, copper tape, a coin cell battery, and an LED light to create a simple circuit. Use two pieces of tape in the pattern shown above. Match up the negative side of the battery to the negative side of the light (the short end). You can open and close the circuit by folding the corner of the paper over to the battery.

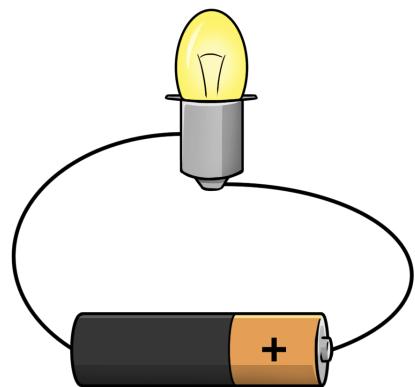
## MAKE A CIRCUIT WITH LEMONS

### Supplies to Use

Instructions: Use an LED light, 4 lemons, 5 alligator clips, 4 zinc nails, and 4 pieces of copper wire to create a circuit that turns on a light! Roll the lemons on a hard surface to break apart the juice pockets. In each lemon, place a nail on one side and a piece of copper wire on the other. Make sure they do not touch each other. Connect the nail on one lemon to the copper wire on the lemon next to it. Continue this pattern in a circle except for the last two. For the last two, one clip will connect to a copper wire on one end and the light on the other. The other clip will attach to a nail on one end and the other side of the light on the other end.



# MAKE A SIMPLE CIRCUIT

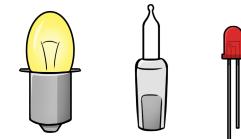


## Supplies to Use

Choose a Power Source



Choose a Light

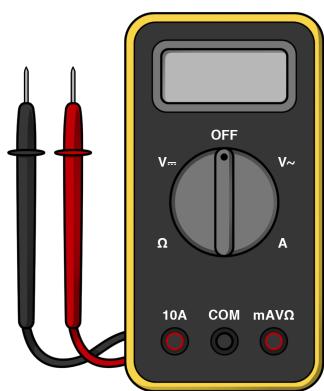


Choose a Connector

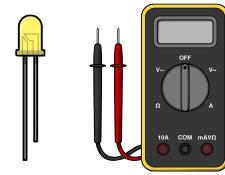
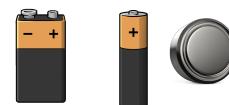


Instructions: A simple electrical circuit is a path through which electricity will flow. It is closed at each end making it a loop. Create your own simple circuit using your choice of connectors, lights and a battery.

# MEASURE ELECTRICITY

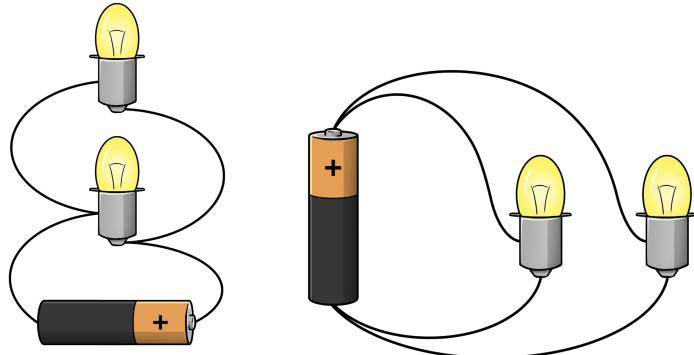


## Supplies to Use



Instructions: A multimeter is a tool to measure electricity. It measures volts (V), currents (A for ampere) and resistance ( $\Omega$  for ohms - Greek symbol for omega). Attach a multimeter in a series or parallel circuit to take measurements. The red end is positive and the black end is negative.

# MAKE A PARALLEL CIRCUIT

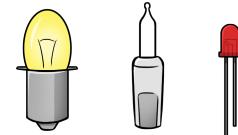


## Supplies to Use

Choose a Power Source



Choose a Light

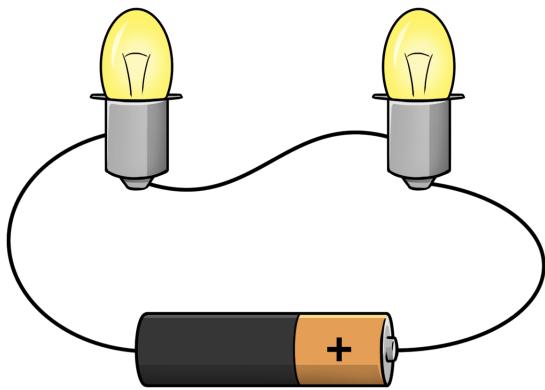


Choose a Connector



Instructions: A parallel circuit has more than one light and is arranged with many paths for the electricity to follow. Create your own parallel circuit using your choice of connectors, lights and a battery.

# MAKE A SERIES CIRCUIT

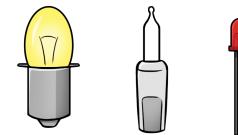


## Supplies to Use

Choose a Power Source



Choose a Light



Choose a Connector



Instructions: A series circuit has more than one light but it is arranged with only one path for the electricity to follow. Create your own series circuit using your choice of connectors, lights and a battery.