

The Journey InsideSM: Circuits and Switches Student Handout: Fun With Circuits

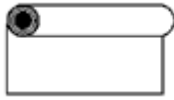
Fun With Circuits

The essential parts of a circuit are the conducting path, the electrical load, the power source, and a switch. The conducting path can be made from any material that conducts electricity. A switch can be made using a simple paper clip and small metal tabs. For this activity, you will be using some unusual parts to create your circuits.

Step One

To make conducting strips you will need some 12-inch wide aluminum foil and masking tape.

1. Tear off a piece of aluminum foil about 6 inches long.



2. Tear strips of masking tape to a length about the width of the foil. The strips do not need to be exact.



3. Place strip after strip of masking tape next to each other on the foil until the surface is covered. This tape will strengthen the foil so it doesn't tear easily.



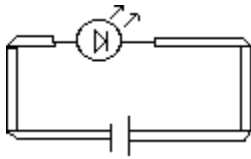
4. Cut the aluminum foil into strips along the lines of the masking tape. You may end up with more pieces than you actually use.



Step Two

To create the circuit with your pieces, you will first need to have a circuit pattern. You will need a piece of cardboard about 12 inches by 12 inches and a roll of transparent tape.

1. Take the pattern that is provided below and sketch the pattern onto the cardboard. Make this pattern small enough to comfortably fit on your cardboard and still be large enough to easily use.



2. One at a time, bend foil strips into the pattern matching the design you have on your cardboard. Lay the foil strips directly onto the pattern and tape them into place. Be careful not to place the tape close to the ends of the strips because the ends are needed as connection points.

Step Three

This job calls for placing an LED in the circuit. You may need to substitute with a small bulb.

1. Bend the legs of the LED slightly apart so they will extend along the foil connectors.
2. Place the LED into the circuit and tape the ends of the wires against the foil strips using the transparent tape.

Step Four

You have only one part left to add: the power source. You will need to use a 9-volt battery or create a battery pack that will work. To create a C-cell battery pack, tape some batteries together so that the positive end of one has a solid contact with the negative end of another. Adding rubber bands to help hold them tight is also helpful. Experiment to determine how many C-cell batteries you need to light an LED. You might want to explore to see if the same number is needed if you are using a bulb instead of an LED.

1. Place the power source into the circuit path and connect the ends by bending the foil strip up to contact the ends of the battery. Be very careful the foil strips on the posts of the 9-volt battery do not touch each other. If they do, you could ruin your battery.
2. Fasten the foil to the batteries using a rubber band to hold them.

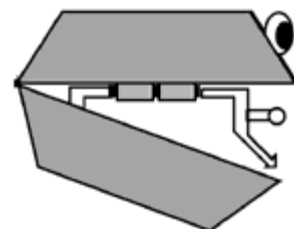
Step Five

1. Does your circuit work as expected? If not, troubleshoot the circuit until the LED is lit when the circuit is complete.
2. At the moment this circuit has no switch. How can you turn the circuit on and off?
3. Do some experimenting to see if you can create a switch to insert into your circuit.

Step Six

This simple circuit can be used to produce some fun projects. You might want to modify the approach to your circuit construction to see if you can create one of the following.

1. If you have a small container such as a sandwich container from a fast food place, you can use it to create a simple puppet with a glowing LED or bulb nose.



2. On a piece of cardboard, create a map that shows where you live or where your school is located. Cut a small hole to indicate where your house or school is. Mount the circuit on the back of the cardboard used to make your map and let the tip of the LED or bulb show through this hole. When the circuit is completed, this light shows where you live or go to school.