

## Experiment 1: Electric Light and Switch

### Goal

This is a simple circuit that will turn a light on and off using a switch. It is one of the easiest circuits you can build. Before looking at the list below, ask yourself: “What components will I need to build this circuit?”

### Components

You will need the following components:

1. Lamp. When electricity flows through the lamp, it will light up.
2. Switch. This will turn the electricity flow on and off.
3. Battery. The electricity to light the lamp must come from somewhere! The battery pack is the power supply of the circuit.
4. Connectors. Electricity needs some way to flow between the components. We use connectors of various lengths to connect up the battery, the switch, and the lamp.

### Build it!

First, place the main components, that is the lamp, the switch, and the battery.



Now connect them all up with connectors.



### In Action

When you close the slide switch, electric current flows from the battery, through the lamp, and back to the battery again. As the current flows through the lamp, it lights up. We say that by closing the switch, you have “completed the circuit”.

When you open the switch, there is a break in the circuit. Current can no longer flow out of the battery, around in a loop, and back to the battery again. In electronics, this is called an “open circuit”. So no current flows in the circuit at all, and the lamp does not light.

### Change it around

Instead of the slide switch, try using the push-button switch, like in the picture below.



Now when you push the button, you are completing the circuit. Current can flow around the circuit, and light the lamp. Take away your finger, and you create an open circuit, so the lamp goes out.

If you have other switches in your Electronic BrainBox kit, try them out too. They all allow you to complete the circuit, but in different ways.

## **Real World**

You can find many circuits like this in the real world. For example, the lights on a Christmas tree work in the same way. Power for the Christmas tree lights comes from the wall socket (“the mains”) instead of from a battery.

On/off switches are all around us. When you press the light switch on the wall, you are completing a circuit that lets current flow through the lights on the ceiling. Or when you switch on your TV, you are completing a circuit inside the TV and allowing current to flow, so that you can watch your favourite programme.

**WARNING:** Do not attempt to power this circuit or any of the Electronic BrainBox circuits using the mains! The mains voltage is much more powerful than the battery voltage, and would be deadly.