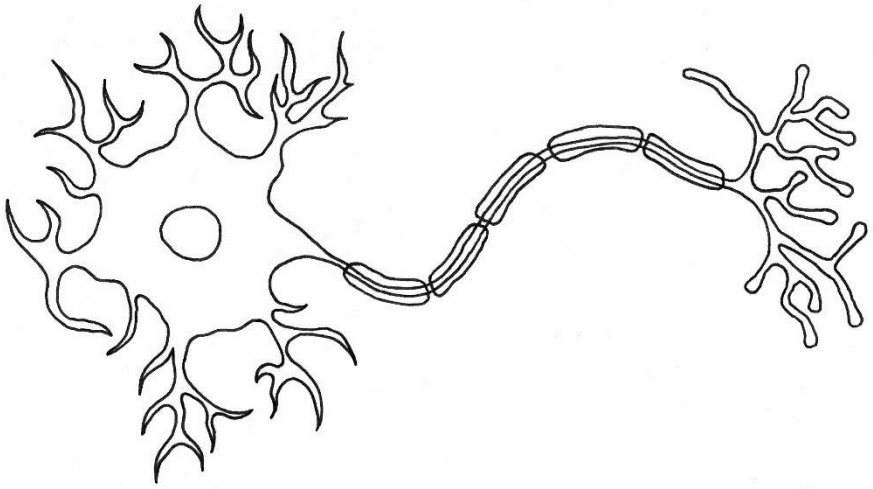
Light-Up Neuron Instructions

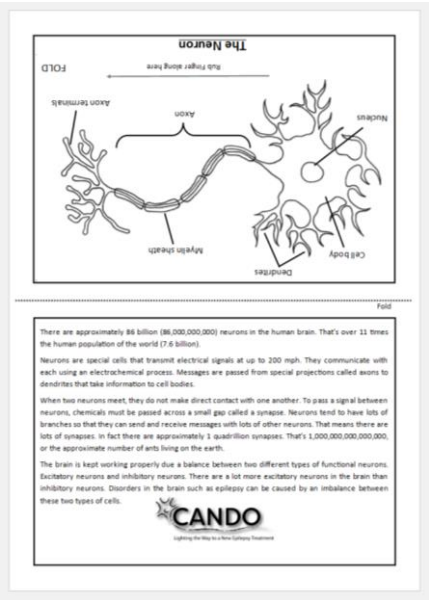


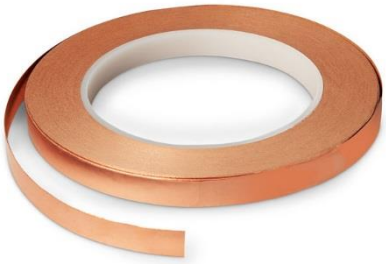
The human brain is made up of approximately 86 billion neurons, nerve cells specially adapted for the transmission of information. When neurons send signals, they transmit electrical impulses along their axons. These electrical signals start at the cell body and end at the axon terminals where the signal is passed on.

Dendrites in the neuron receive signals from other neurons and transmit them through an electrical impulse to the cell body.

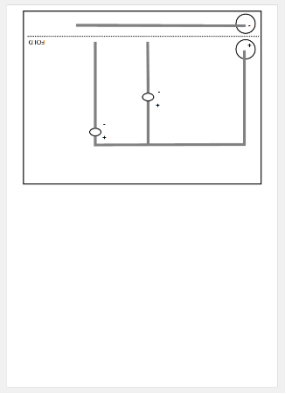
Similar to a neuron, a circuit is the path that an electric current travels on. With a few simple materials, you can build your own circuit with a blinking slide switch to better understand how a neuron sends a signal out along its axon.

Materials:





Step 1:

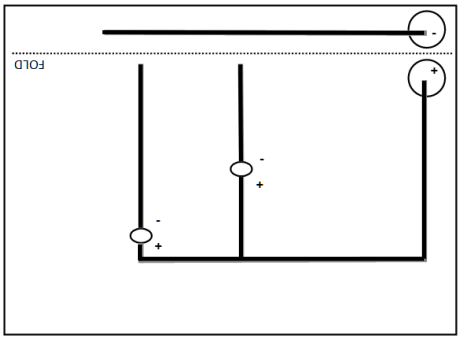


Before beginning, ensure that you have the following materials:

- One circuit template and neuron sheet (double sided)
- One coin cell battery
- One binder clip
- Copper foil tape
- Two LED stickers

To begin, place your worksheet so that the circuit diagram is facing you.

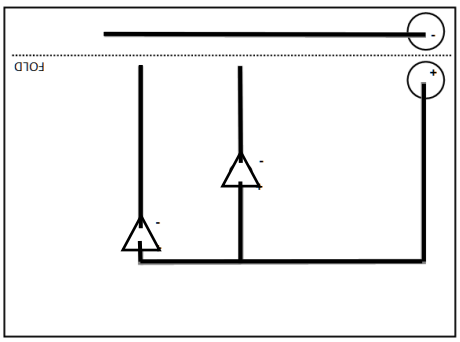
Step 2:



Place the copper foil tape on the circuit template over the grey lines. Make sure to leave space in between the positive and negative side of the ovals. This space should be small enough that the gap can be covered by the LED stickers, but wide enough that the foil is not touching.

When applying the copper tape, try as much as possible to apply it as a continuous piece, folding carefully to bend the tape around corners. When the tape cannot be used in a continuous piece, it is ok to cut the foil and have the copper foil overlap with other pieces. The adhesive on the bottom of the foil tape will lead to a weaker connection if separate pieces are used, so some lights may not be appear as bright as others.

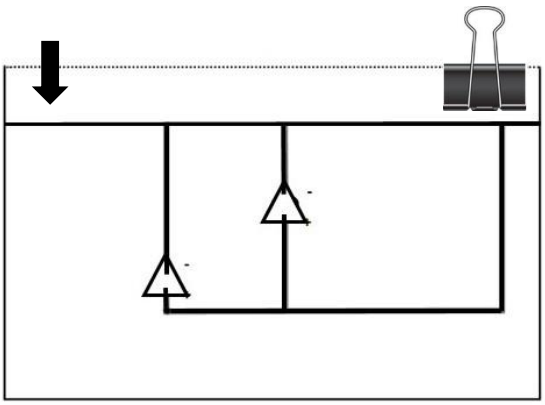
Step 3:



Once all of the grey lines have been covered with copper foil, place the LED stickers on the ovals.

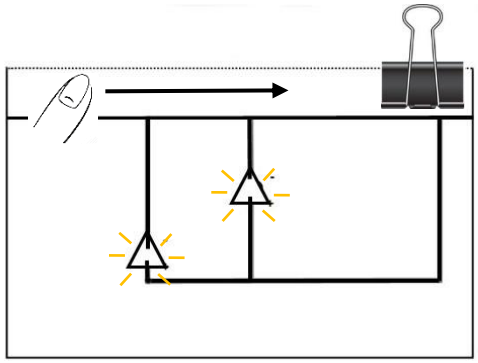
Make sure that the positive side (the larger side of the triangle) is at the top of the oval. The stickers should be placed so that both the positive and negative sides of the LED stickers overlap with the foil.

Step 4:



Crease along the FOLD line along the top so that the two circles are on top of one another. Place the battery within the fold with the positive side down on the paper. Make sure the copper foil tape is touching the battery on both the positive and negative side. Hold the battery in place using the paper or binder clip.

Step 5:

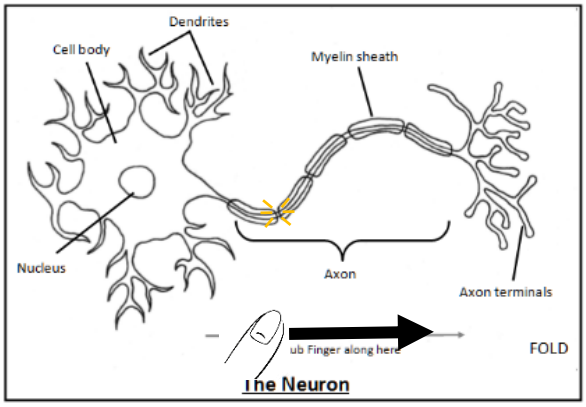


Run your finger across the slide switch to make sure the lights are properly working.

If you are having problems getting the switch to work, try one of the following:

- Make sure the positive side of the battery is face down.
- Make sure the copper foil tape touches both sides of the battery.
- Make sure there are no breaks in the copper tape.
- Make sure the LED stickers are facing the correct direction. If the stickers have been placed on upside down, turn the battery over so the negative side faces down.
- Make sure the LED stickers overlap on the copper foil tape on both the negative and positive ends.
- Make sure all the LED stickers are facing the same direction.
- Make sure the copper foil tape overlaps in places where it could not be folded or bent.
- Make sure the copper foil tape along the bottom of the FOLD line touches the three lines of copper foil tape above the FOLD line.

Step 6:



Once the slide switch is operational, fold the sheet in half so that the neuron image is on top of the circuit. Use the boxes to line up your circuit and neuron if necessary. Run your finger from left to right along the slide switch through the neuron paper to make your neuron light up.

To make your neuron more interesting, why don't you colour in your neuron.

Engage with CANDO:

Send a picture of your finished neuron to us via twitter using our handle @candoNCL or by using the hashtag #CANDO.

Learn more about the CANDO project on our website www.cando.ac.uk.

CANDO is a collaboration between Newcastle University, Newcastle upon Tyne Hospitals NHS Foundation Trust, University College London and Imperial College London.

It is jointly funded by Wellcome and EPSRC.