

# Badgery Science Fun 20

## Electricity at the Hide

When Durham Badger Group built the hide, we decided that it would be really useful to have electrical lighting, so that visitors would be able to see the badgers even when it was pitch dark. (We wondered whether this would upset the badgers, but they've just ignored them.)

One of our biggest problems was that there was no electricity cable for some distance. (Anyway, we didn't want to use mains electricity if we could avoid it, to help the environment.)

We managed to get a solar panel, which charges a large battery. That did the trick! Now we can watch the badgers in comfort, knowing that we aren't adding to our carbon footprint!

Firstly, a bit about electricity:

Electricity is an electrical current. An electrical current is created when an *electric charge* flows along a wire. This electric charge is made up of electrons.

### What is Current?

Current is the flow of electric charge (electrons).  
Current is measured in amperes.  
An ammeter is used to measure the current in a circuit.

### What is Voltage?

Voltage is the energy required to push a current through a circuit.  
Voltage is measured in volts.  
A voltmeter is used to measure the voltage in a circuit.

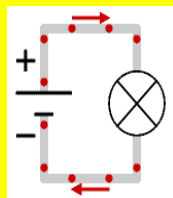


### Which way does electricity flow?

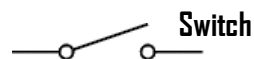
We say that electricity flows from the positive (+) terminal of a battery to the negative (-) terminal of the battery. We can imagine particles with positive electric charge flowing in this direction around the circuit, like the red dots in the diagram.

This flow of electric charge is called **conventional current**.

This direction of flow is used throughout electronics and it is the one you should remember and use to understand the operation of circuits.



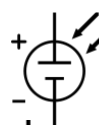
These are the circuit symbols for the different components we needed:



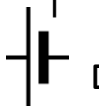
Switch



Lamp



Solar panel



Cell (Battery)

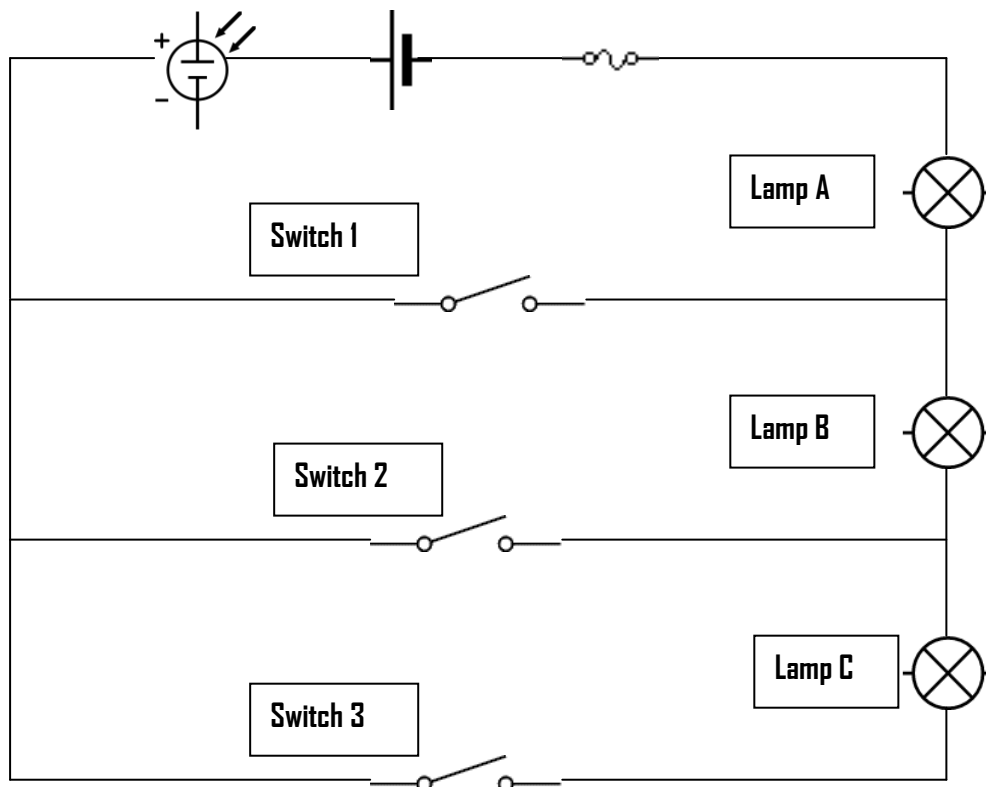


Fuse



Wire

On the next page, we've drawn a circuit diagram of the electricity circuit at the hide. Can you work out the answers to the questions? (We'll be really impressed if you can!)



Fill in the table below to show which switches we must close to use a combination of our lights:

Lamps lit	Which switches must be closed?
Lamp A	Switch 1 only
Lamp A and B	Switch 1 and 2
Lamp C only	Switch 3 only
Lamp B only	Switch 2 only

What does a fuse do in a circuit? **Breaks the circuit if the circuit is overloaded.**

This is the symbol for an ammeter. If we had one in our circuit, what would it measure? **Amps.**



**Current is the flow of electric charge. Current is measured in amps.**

A voltmeter symbol looks like the one below. What does a voltmeter measure? **Volts.**



**Voltage is the energy required to push a current through a circuit.**