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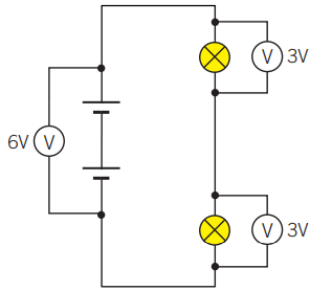
Electricity

1	I can identify some common components of electrical circuits from the circuit symbol, and give their names
2	I can name and give the symbols for the units and the components used to measure potential difference, current and resistance.
3	I can describe how to correctly connect an ammeter and a voltmeter to a circuit
4	I can describe how the brightness of a bulb will change as more are added in series or in parallel.
5	I can describe the difference between series and parallel circuits.
6	I can calculate resistance when given potential difference and current

	Keyword	Definition
1	ammeter	A device for measuring electric current in a circuit.
3	cell	A chemical store of energy, which provides the push that moves charges around a circuit.
4	current	Flow of electric charge, usually electrons, in amperes (A).
5	ohms	The units of resistance, symbol Ω .
6	parallel	If some components are in separate loops in an electric circuit.
7	potential difference	The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V).
8	resistance	A property of a component, making it difficult for charge to pass through, in ohms (Ω).
9	series	If components in a circuit are in the same loop
10	voltage	The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V).
11	voltmeter	A device for measuring potential difference (voltage).

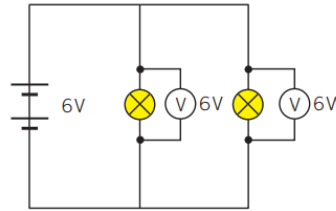
Series circuits

- **Series** circuits only have one loop
- If one component breaks, the whole circuit stops working
- Current is the same everywhere in a series circuit
- The total potential difference from the battery is shared between the components in a series circuit
- Adding more bulbs decreases the brightness of the bulbs



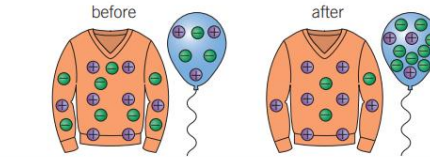
Parallel circuits

- **Parallel** circuits have more than one loop
- If one component breaks, the rest of the circuit will still work
- Current is shared between the different loops in the circuit
- The potential difference is the same everywhere in the circuit
- Adding more bulbs does not affect the brightness of the bulbs



Static electricity

- Static electricity is caused by the rubbing together of two **insulators**
- This causes electrons to be transferred, leaving one object with a positive charge, and one object with a negative charge



- Like charges will **repel**, opposite charges will **attract**



Resistance

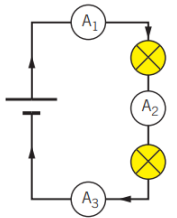
- **Resistance** is a measure of how easy or how hard it is for charges to pass through a component in a circuit
- Resistance has the unit of ohms (Ω)
- Resistance is calculated by measuring potential difference and current and using the following equation:

$$\text{resistance } (\Omega) = \frac{\text{potential difference (V)}}{\text{current (A)}}$$

- Materials with a high resistance are said to be **insulators**
- Materials with a low resistance are said to be **conductors**

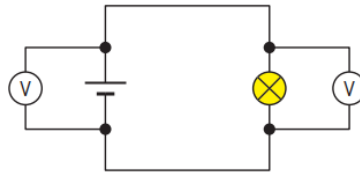
Current

- **Current** is the amount of **charge** flowing per second
- The charges that flow in a circuit are **electrons**, they are negatively charged
- **Electrons** leave the negative end of the **cell** and travel around the circuit to the positive end of the cell
- Current has the unit of Amps (A) and is measured with an **ammeter** (which is placed in series or in the main circuit)



Potential difference

- **Potential difference** is the amount of energy transferred by the cell or **battery** to the charges
- The value of potential difference tells us about the force applied to each charge and then the energy transferred by each charge to the component which it passes through
- Potential difference has the unit of volts (V) and is measured with a **voltmeter** (which is placed in parallel to the circuit)



Future Learning:

At GCSE you learn in more detail about series and parallel circuits. Resistance in circuits and how to investigate this.

Potential difference, Resistance and Current Homework Grid

Complete some of the tasks below to reach a total of _____ points over this unit of work – Highlight the box once completed.

Topic	1 Point	2 Points	4 Points	6 Points	10 Points
Circuits 	Draw and label a simple circuit. Include a bulb, cell or battery, open switch and wires in your diagram.	Find a device that is powered by batteries such as a mobile phone. Draw a picture of it and explain using keywords how the batteries power it.	Design a leaflet for a classroom that could be used to teach KS2 students about circuit symbols.	Research the history of the light bulb and produce a timeline to show the events in history.	How does electricity get to our homes? Create a flow diagram. You should include keywords such as generator, transformer and power lines.
Voltage and Resistance 	Write a tweet that describes what voltage is (140 characters)	Draw the formula triangle that relates voltage, current and resistance.	Write a poem to explain how batteries work. Use keywords such as voltage, push and current	Write two exam questions based on the resistance in a wire. At least one question should be worth three or more marks. Produce a mark scheme for your questions.	Write a letter to a scientific journal that describes the work of Alessandro Volta.
Series and Parallel Circuits. 	Name the three variables that we have used in our practical investigations. For example, what is the name of the variable that we keep the same?	Survey each room in your house. Write a list of all the appliances that use electricity. Which room uses the most electricity	Write a poem or rap that compares series and parallel circuits	Research uses of series circuits in the real world and describe how they work.	Explain why the lights in your house are in a parallel circuit. Draw a diagram of one floor of your house and suggest how the lights might be connected to complete a parallel circuit
Static Electricity 	Explain in one paragraph what static electricity is.	Design a poster to teach young children about the dangers of electricity.	Draw a labelled diagram of an atom. What are the charges on each of the subatomic particles?	Give three different examples of nuisance static electricity and explain what is happening in terms of the movement of charges.	What is a defibrillator? Can you apply your knowledge of static electricity to explain how they work?
Models of Circuits	Write a tweet that describes what current is (140 characters)	What would we <u>do</u> without electricity? Write a paragraph about how life might be different without electricity.	Design a poster for a classroom that could be used to teach KS2 students about circuits.	Create your own model to represent a circuit and describe it.	Make a model of a circuit using whatever resources you have. Find a way to label each part of the circuit and describe what it does.

