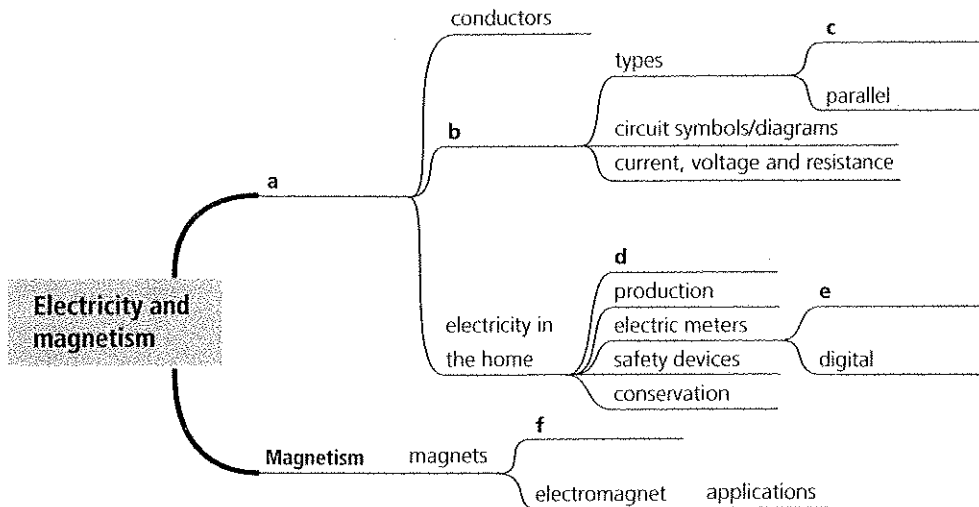


A Working with words

1 Electricity and magnetism word map

Write these words in the correct place on the word map.

analogue electricity electric circuits permanent power series



2 Voltage

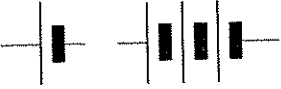
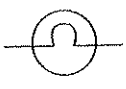
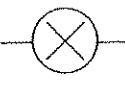

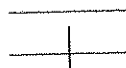
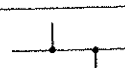


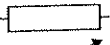


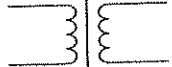
Read the text and fill in the gaps in the sentences with these words.

circuit electrons force negative parallel positive potential symbol voltage (x2) voltmeter unit

Voltage is the 1 _____ that pushes electrons through the electrical circuit. The greater the force (voltage) the greater the number of 2 _____ that pass through the circuit in one second. That is, a larger 3 _____ will increase the flow of electrons (current) through the 4 _____. The change in voltage between any two points in a circuit is called the 5 _____ difference between those points. The voltage can be measured using a 6 _____. The voltmeter must always be connected in 7 _____ to the appliance or component in the circuit across which it will measure the voltage. Also the 8 _____ terminal of the voltmeter should connect to the wires coming from the negative terminal of the battery and the 9 _____ terminal to the positive terminal of a battery. Voltage (potential difference) is given the 10 _____ V. The 11 _____ of voltage is the volt which has the symbol V. Cells and batteries available on the market usually have a 12 _____ of between 1.5 and 12 volts (1.5–12 V).

Symbols

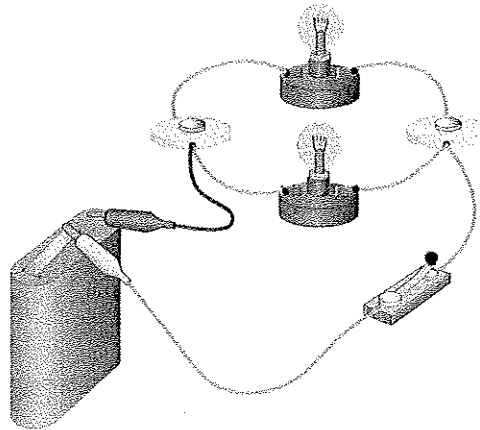
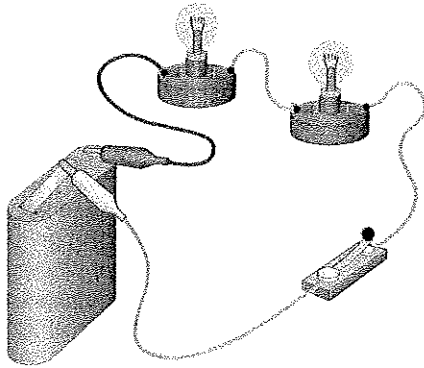
Look at the symbols and label them with the correct component. Then add the correct explanation of each component.

Component	Symbol	Explanation
a ammeter		j Gives out heat and light when current passes. The second symbol represents a bulb in a holder.
b bulb	1 _____	k Limits or controls the amount of current that passes through a circuit.
c cell (one) and battery (more than one cell)	 	l Measures the ability of the battery to push electrons through the circuit (voltage).
d connecting wires	2 _____	m Measures the rate of flow of electric current passing through a circuit or part of a circuit.
e fuse		n The long line is the positive terminal and the short line is the negative terminal.
f resistor	  <p style="text-align: center;">crossed joined</p>	o Used to turn current on and off.
g switch	3 _____	p Usually made of copper which is a good conductor, and insulated with plastic. Wires that connect different parts of a circuit are often marked with a dot where they join, to distinguish them from wires that cross without joining.
h transformer		q Consists of a thin metal wire that melts to break the circuit if too much electric current passes. Helps protect electrical appliances.
i voltmeter	5 _____	r Increases or decreases the voltage of electric current passing through a circuit.
		
	6 _____	
	  <p style="text-align: right;">fixed variable</p>	
	7 _____	
		
	8 _____	
		
	9 _____	

B Working with sentences

4 Circuits

Read the text and sort the sentences under the correct illustrations.



Series circuit

- 1
- 2
- 3
- 4

Parallel circuit

- 5
- 6
- 7
- 8
- 9

When there are several components in an electric circuit, they can be connected in series or in parallel.

- a all the components in the circuit are connected together in one loop and there is only one route through which the current can travel.
- b Also a defective or disconnected component in one part of a parallel circuit will not stop the flow of current to the remaining branches in the circuit.
- c If one of the components should become defective or disconnected, no electric current will flow through the circuit.
- d In a parallel circuit,
- e In a series circuit,
- f The current need not be the same in each of the branches.
- g The same current will flow through each part of the circuit.
- h there is more than one route through which current can travel around and back to the battery.
- i Therefore the current 'splits up' to supply each branch of the circuit with electric current.

Activity 4 Ohm's law

Listen to the text.

doubled	current	ratio	resistor
directly proportional	Ohm's law	doubled	voltage

In 1826 the scientist Georg Simon Ohm carried out experiments in which he varied the voltage across a [] and measured the current flowing through it. He found that the current which flowed was [] to the voltage across the resistor. This means that if the voltage is [], the current is []; if the voltage is reduced to one quarter, the current is reduced to one quarter, and so on. This result is now known as []. It states that at a fixed temperature the current flowing in a resistor is directly proportional to the [] across it. The [] of the voltage to the current V/I is called the resistance. Its unit is the ohm and its symbol is Ω (the Greek letter omega). In SI units, a voltage of one volt across a resistance of one ohm produces a [] of one ampere.

5 Saving electricity

Match the beginnings and endings of the sentences.

Beginnings

- 1 Install ceiling and wall insulation and keep curtains closed during winter
- 2 Use awnings to shade windows
- 3 Turn off appliances, including lights,
- 4 Set the fans of air conditioners at high speed
- 5 Avoid opening the fridge door too much
- 6 Defrost the freezer before the ice builds up
- 7 Only use the dishwasher when there is a full load,
- 8 Use cooking pots and kettles with flat, wide bottoms
- 9 Keep lids on pans, pots and kettles while they are in use
- 10 Do not open the oven door regularly while in use
- 11 The oven and hot plates can be turned off before cooking is finished,
- 12 When boiling water,
- 13 Use fluorescent tubes and lights instead of incandescent light bulbs,

Endings

- a as cooler air will enter from outside.
- b as the ice prevents the efficient transfer of heat.
- c as the washer does not use less energy for smaller loads.
- d as these will use the heat most efficiently.
- e as this increases the amount of energy required to cool the inside.
- f because they use only one-quarter of the electricity and last up to four times longer.
- g do not boil more water than you need.
- h for greater efficiency.
- i so that heat does not escape into the air.
- j to make use of the residual heat.
- k to reduce heat gain in rooms that are being cooled.
- l to reduce heat loss.
- m when they are not in use.

- 1 2 3 4 5 6 7 8 9 10 11 12 13

C Working with texts

6 Electric current

Read the text and sort the different materials into the table.

All things on Earth are made up of tiny particles called atoms. There are many kinds of atoms, but they all consist of a dense central structure called the nucleus around which negatively charged particles called electrons orbit. The flow of these negatively charged electrons within a material is called an electric current. Not all materials conduct electricity. Substances such as metals and graphite, a form of carbon, have some electrons that can move freely between atoms. This means they can flow as an electric current through the materials. These substances are called electrical conductors. Metals such as copper and aluminium are excellent conductors of electricity and so are commonly used to make electrical wires. Some materials, such as paper, plastic, rubber and glass, do not allow an electric current to pass through them because their electrons are unable to move around freely. These materials are called insulators or non-conductors. Electrolytes are substances which contain charged particles called ions. When they are in solution or molten, they are free to move around and can carry an electric current. Sodium chloride (common salt) solution is an example of an electrolyte. Many of our body fluids are electrolytes, which is why the human body is a good conductor of electric current. We can get an electric shock if we touch an electric current so that it flows through our bodies.

Conductors	Insulators	Electrolytes

HOMEWORK

Choose the correct answers. Then click 'check' to see if you are correct.

Watt is a unit for measuring

- the potential difference of an electric current.
- the amount of flow of an electric current.
- electrical power.

A battery is an object that

- measures electricity.
- produces light when connected to an electricity supply.
- supplies something, such as a car, with electricity.

A non-conductor is a material that

- changes the voltage of a flow of electricity.
- reduces the heat, cold or sound that can pass through it.
- does not allow an electric current to pass through it.

A thermostat is a piece of equipment

- that measures the temperature of something.
- that uses the Sun's energy to produce electricity.
- that controls the temperature in a building or engine.

A circuit is

- the continuous movement of something.
- the complete path that an electric current flows around.
- a flow of electricity.

Ohm is a unit for measuring

- resistance in an electrical circuit.
- the amount of flow of an electric current.
- electrical power.