a

Draw the symbol diagrams for:

cell   resistor

battery   variable resistor

lamp (bulb)   ammeter

fuse   voltmeter

LED   diode

LDR   thermistor

b

What is electric current?
_____

State the equation that links charge, current and time.
_____

Write the symbols and units for the following:

charge: _____

current: _____

time: _____

c

A charge of 12A flows through an electric cooker for 1 hour. How much charge has been used?
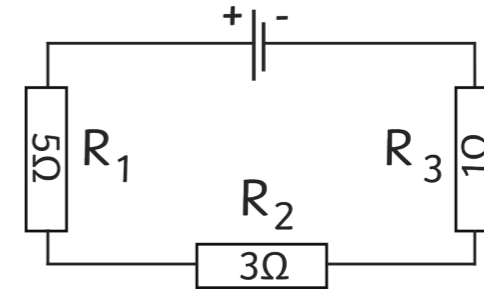_____
_____

State the equation that links current, potential difference and resistance. Remember to include units.
_____
_____

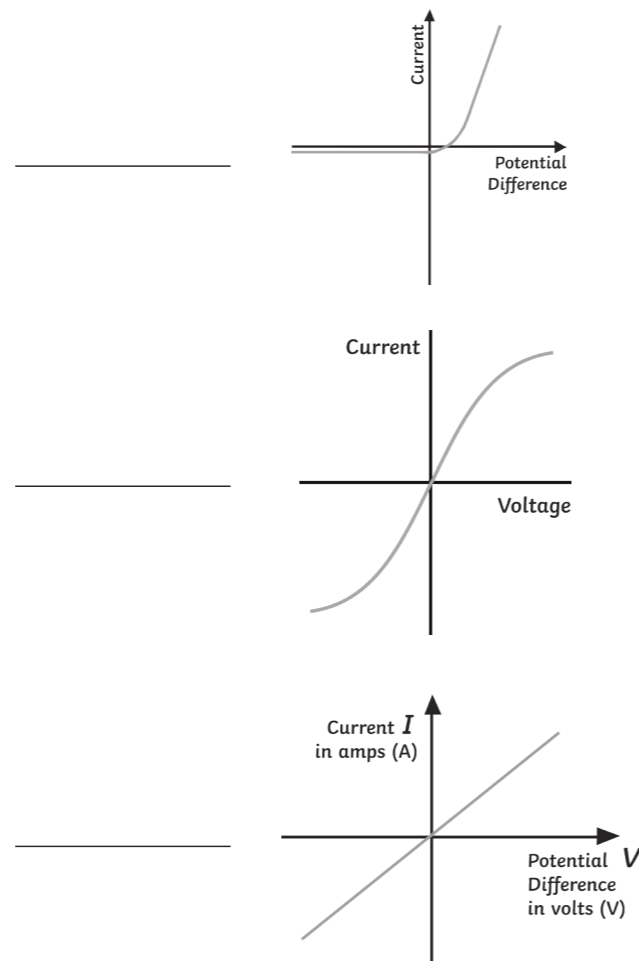A voltmeter reading is 3V and the resistance is 2Ω. What is the current?
_____
_____

d

Use the components stated below to identify the potential difference/current graphs:

filament lamp, diode, ohmic conductor

_____

[graph: Current vs Potential Difference]

_____

[graph: Current vs Voltage]

_____

[graph: Current I in amps (A) vs Potential Difference V in volts (V)]

e

Complete the table.

Type of Circuit	Potential Difference Shared or the Same?	Current Same or Split?
Series		
Parallel		

For the circuit below, calculate the total resistance.

_____

[circuit diagram: R_1 = 5Ω, R_2 = 3Ω, R_3 = 1Ω]

On the diagram, draw where a voltmeter could be positioned to measure the voltage through one of the components.

f

Complete the following sentences.

For a thermistor: as the temperature increases, the resistance _____

Used in: _____

For an LDR: as the light intensity increases, the resistance _____

Used in: _____

g

State the 2 different types of electricity supply.

1. _____

2. _____

The UK mains supply has an AC supply of _____V and a frequency of _____Hz.

h

Label the diagram of the 3 pin plug.

What is the purpose of:

the neutral wire?
_____
_____

the live wire?
_____
_____

the earth wire?
_____
_____

Science

a

Describe how each of the appliances below transfers energy.

Kettle

Energy is transferred electrically from chemical energy store in the power station to the _____ energy store of the heating element of the kettle.

Hairdryer

Energy is transferred electrically from chemical energy stores in the power station to the _____ energy store of the motor and the _____ energy store of the heating element of the hairdryer.

b

What is the equation linking energy transferred, power and time?

_____

what are the units for:

energy? _____

power? _____

time? _____

c

Most devices have a power rating. Describe the relationship between the power rating and the changes in stored energy when a device is used.

_____
_____
_____
_____

d

State the equation that links power, current and potential difference.

_____

A 2.4kW kettle is connected to the mains power supply (230V). Calculate the current through the kettle.
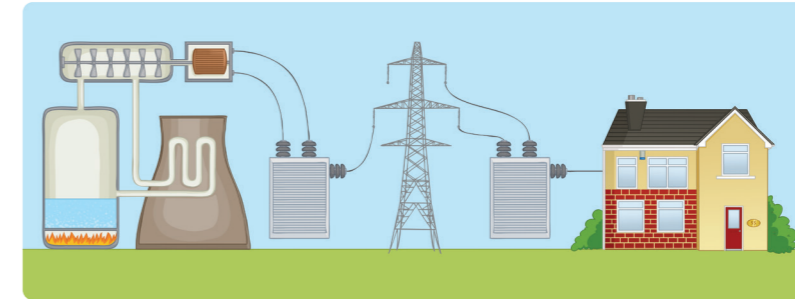
Remember 1000W = 1kW

You will need to rearrange your equation above.

_____
_____
_____
_____
_____

e

True or false:

• The current in a circuit can be altered by a variable resistor. _____

• A voltmeter is connected in parallel with a component. _____

• An ammeter is connected in parallel with a component. _____

f

Label the National Grid diagram.

Give two examples of when the demand for electricity is likely to be high.

1. _____

2. _____

g

Why is energy transferred at such high voltage in cables?

_____
_____
_____
_____

Describe how the following work:

step-up transformer.

_____

step-down transformer.

_____

h

Describe an experiment to show how the length of a wire affects its resistance.

Equipment: metre ruler, ammeter, voltmeter, cell, switch.

Hint: it may help to draw a diagram of how to set up the apparatus.

_____
_____
_____
_____
_____
_____
_____
_____

Science

a

Draw the symbol diagrams for:

cell	resistor
battery	variable resistor
lamp (bulb)	ammeter
fuse	voltmeter
LED	diode
LDR	thermistor

b

What is electric current?
The flow of electrical charge.

State the equation that links charge, current and time.
charge = current × time

Write the symbols and units for the following:

charge: **(Q) coulombs, C**

current: **(I) amperes, A**

time: **(t) seconds, s**

c

A charge of 12A flows through an electric cooker for 1 hour. How much charge has been used?
Convert hours to seconds: 60 mins = 3600 secs
12 × 3600 = 43200 C

State the equation that links current, potential difference and resistance. Remember to include units.
potential difference (V) = current (A) × resistance (Ω)

A voltmeter reading is 3V and the resistance is 2Ω. What is the current?
current = potential difference ÷ resistance
3 ÷ 2 = 1.5A

d

Use the components stated below to identify the potential difference/current graphs:

filament lamp, diode, ohmic conductor

diode

filament lamp

ohmic conductor

e

Complete the table.

Type of Circuit	Potential Difference Shared or the Same?	Current Same or Split?
Series	shared	same
Parallel	same	split between branches

For the circuit below, calculate the total resistance.
9Ω

On the diagram, draw where a voltmeter could be positioned to measure the voltage through one of the components. The voltmeter should be drawing using a V within a circle as the correct symbol and can be drawn across any of the components within the circuit.

f

Complete the following sentences.

For a thermistor: as the temperature increases, the resistance **decreases**

Used in: **thermostats**

For an LDR: as the light intensity increases, the resistance **decreases**

Used in: **street lights**

g

State the 2 different types of electricity supply.

1. **alternating current**

2. **direct current**

The UK mains supply has an AC supply of **230**V and a frequency of **50**Hz.

h

Label the diagram of the 3 pin plug.

Earth — Fuse — Cable grip — Neutral — Live

What is the purpose of:

the neutral wire?
It completes the circuit and carries away the current.

the live wire?
It provides alternating potential difference.

the earth wire?
It is a safety feature to prevent the application from becoming live.

a

Describe how each of the appliances below transfers energy.

Kettle

Energy is transferred electrically from chemical energy stores in the power station to the **internal (thermal)** energy store of the heating element of the kettle.

Hairdryer

Energy is transferred electrically from chemical energy stores in the power station to the **kinetic** energy store of the motor and the **internal (thermal)** energy store of the heating element of the hairdryer.

b

What is the equation linking energy transferred, power and time?

energy transferred = power × time

what are the units for:

energy? **joules**

power? **watts**

time? **seconds**

c

Most devices have a power rating. Describe the relationship between the power rating and the changes in stored energy when a device is used.
A device with a higher power rating will transfer stored energy to other types of energy at a faster rate.

d

State the equation that links power, current and potential difference.
power (W) = potential difference (V) × current (A)

A 2.4kW kettle is connected to the mains power supply (230V). Calculate the current through the kettle.

Remember 1000W = 1kW

You will need to rearrange your equation above.

2.4 × 1000 = 2400

Current = power ÷ potential difference
= 2400 ÷ 230
= 10.43A

e

True or false:

- The current in a circuit can be altered by a variable resistor. **True**

- A voltmeter is connected in parallel with a component. **True**

- An ammeter is connected in parallel with a component. **False**

f

Label the National Grid diagram.

pylon

power station   step-up   step-down
                       transformer   transformer
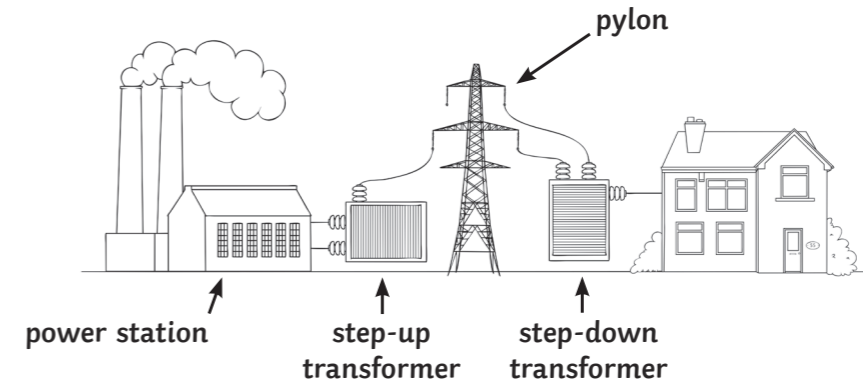
Give two examples of when the demand for electricity is likely to be high.

1. **At half-time or the end of large sporting events.**

2. **First thing in the morning when people are getting up, or later when arriving home.**

g

Why is energy transferred at such high voltage in cables?
High voltage means that the energy is transferred at low currents. This results in less resistance, therefore less energy is lost as heat, so the transmission is more efficient.

Describe how the following work:

step-up transformer.

Potential difference is increased.
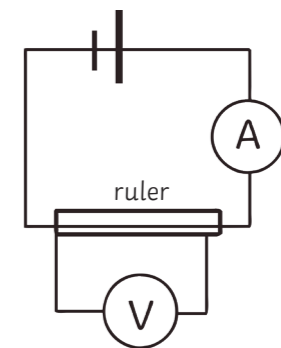
step-down transformer.

Potential difference is decreased.

h

Describe an experiment to show how the length of a wire affects its resistance.
Equipment: metre ruler, ammeter, voltmeter, cell, switch.

Hint: it may help to draw a diagram of how to set up the apparatus.

A

ruler

V

Set up the apparatus as shown.
Attach the first crocodile clip at 0cm.
Attach the second crocodile clip at 10cm.
Record the potential difference and the current.
Connect the second crocodile clip at different lengths (20cm, 30cm) and repeat the process.
Use the results to calculate resistance at different lengths, using the formula:
resistance = potential difference ÷ current

Science