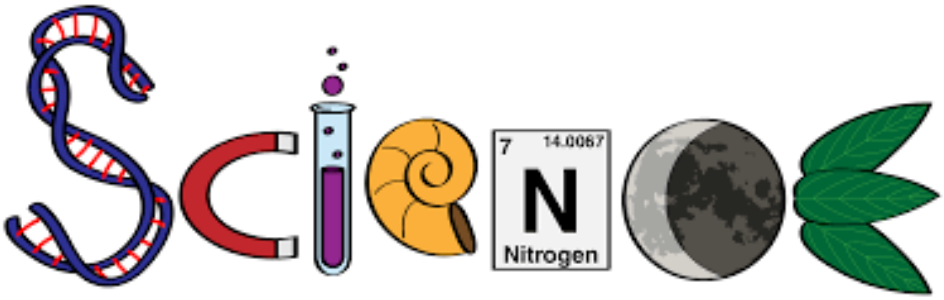
Meopham School

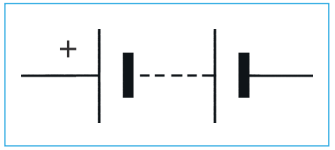
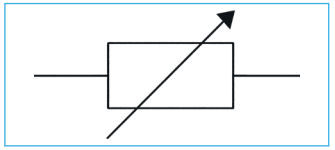
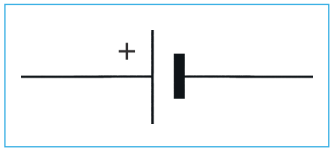
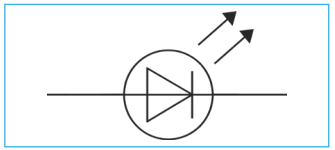
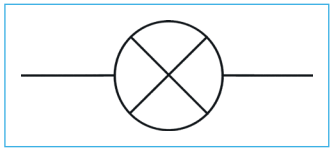
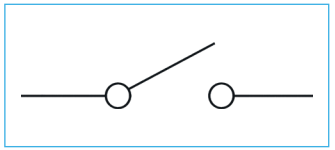
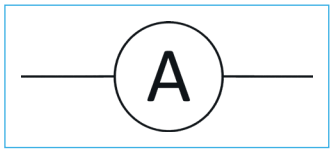
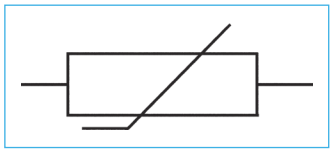
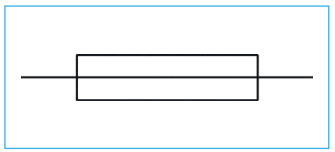
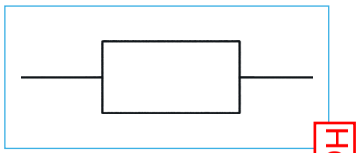
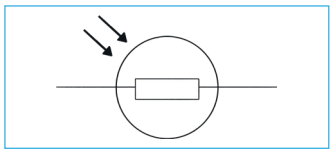
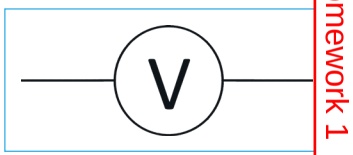
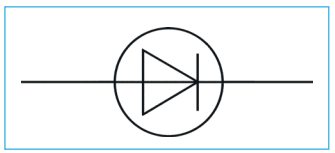
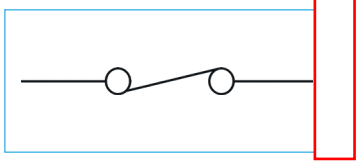


HOMEWORK BOOKLET

P2 Higher

Electricity Components and Symbols **Match and Draw**

Draw **one** line from the name of each component to the correct symbol.

ammeter		light-emitting diode (LED)	
battery		resistor	
cell		switch (open)	
diode		switch (closed)	
fuse		thermistor	
lamp		variable resistor	
light-dependent resistor (LDR)		voltmeter	

Homework 1

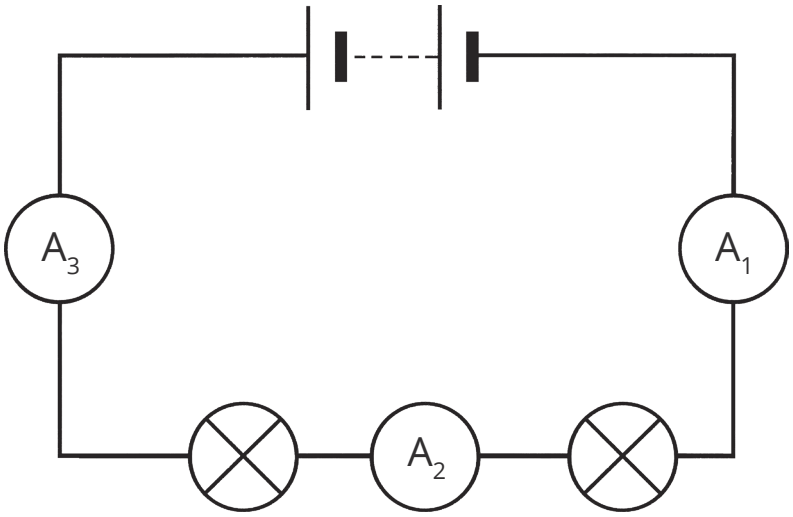
Homework 2

Electrical Charge and Current

1. What is electric current?

_____

2. The circuit below contains two bulbs and three ammeters.



The current shown on ammeter A_1 is 6A.

Write down the current shown on the other two ammeters.

ammeter A_2 _____

ammeter A_3 _____

3. The symbol of the unit of charge flow is C.

Name the unit of charge flow.

_____

4. Charge flow, current and time are linked by the equation:

charge flow = current × time

The current in a circuit is 4A.

Calculate the charge that flows through the circuit in 5 minutes.

_____

_____

_____

charge = _____ C

5. A fuse is a safety feature of a circuit. The fuse wire melts when 1.5C of charge flows through the fuse in 0.6 seconds.

   Calculate the current at which the fuse wire melts.

current = _____ A

6. A charge of 24C flows through a circuit in 2 minutes.

   Calculate the current in the circuit. Give your answer in mA.

current = _____ mA

7. The current in a circuit containing a bulb is 3A.

   Calculate the time taken for 135C of charge to pass through the bulb.

time = _____ s

8. The current in a circuit containing a buzzer is 300mA.

   Calculate the time taken for 36C of charge to pass through the buzzer. Give your answer in minutes.

time = _____ minutes

Homework 3

Current, Resistance and Potential Difference

Potential difference can be calculated using the equation:

potential difference = current × resistance

1. What is the potential difference if a current of 3A flows through a resistance of 20Ω?

potential difference = _____V

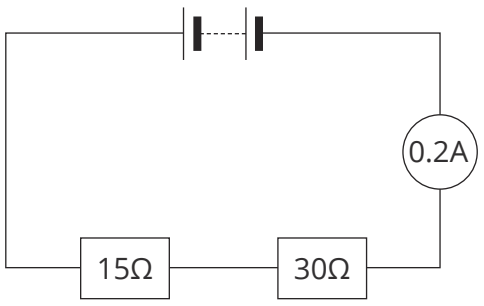
2. A current of 150mA passes through a 10Ω resistor.

   Calculate the potential difference across the resistor.

potential difference = _____V

3. **Figure 1** shows a series circuit.

Figure 1



Calculate the potential difference across the battery.

potential difference = _____V

4. A 6V battery is connected across a filament lamp with a resistance of 40Ω.

   Calculate the current through the lamp.

   current = _____A

5. A 1.5V battery is connected across a 50Ω resistor.

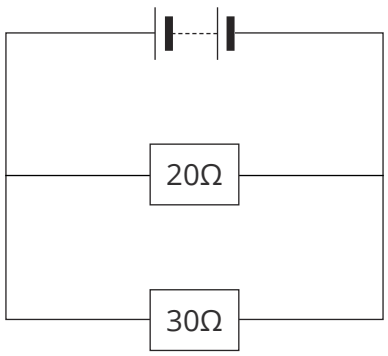
   Calculate the current through the resistor.

   Give your answer in mA.

   current = _____mA

6. **Figure 2** shows a parallel circuit.

Figure 2



The potential difference across the battery is 6V.

Calculate the current through the 20Ω resistor.

current = _____A

7. A 12V battery causes a current of 3A to flow through a circuit.

   Calculate the resistance of the circuit.

   resistance = _____Ω

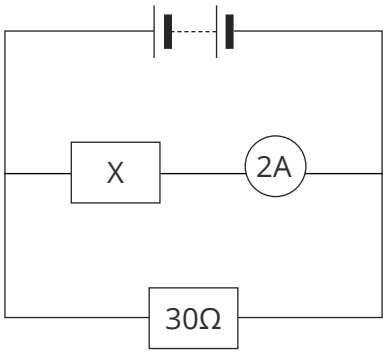
8. A potential difference of 6V causes a current of 200mA to flow through a circuit.

   Calculate the resistance of the circuit.

   resistance = _____Ω

9. **Figure 3** shows a parallel circuit.

Figure 3



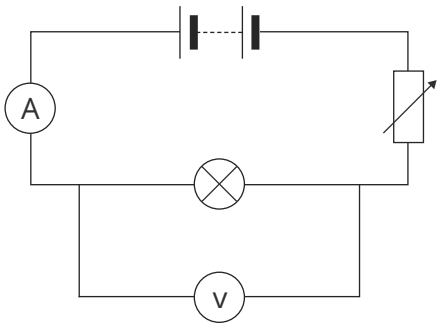
The potential difference across the battery is 9V.

Calculate the resistance of resistor **X**.

resistance = _____Ω

10. A student set up the circuit in **Figure 4**.

Figure 4



Describe how the student could use the circuit in **Figure 4** to investigate how the current through the lamp affects its resistance.

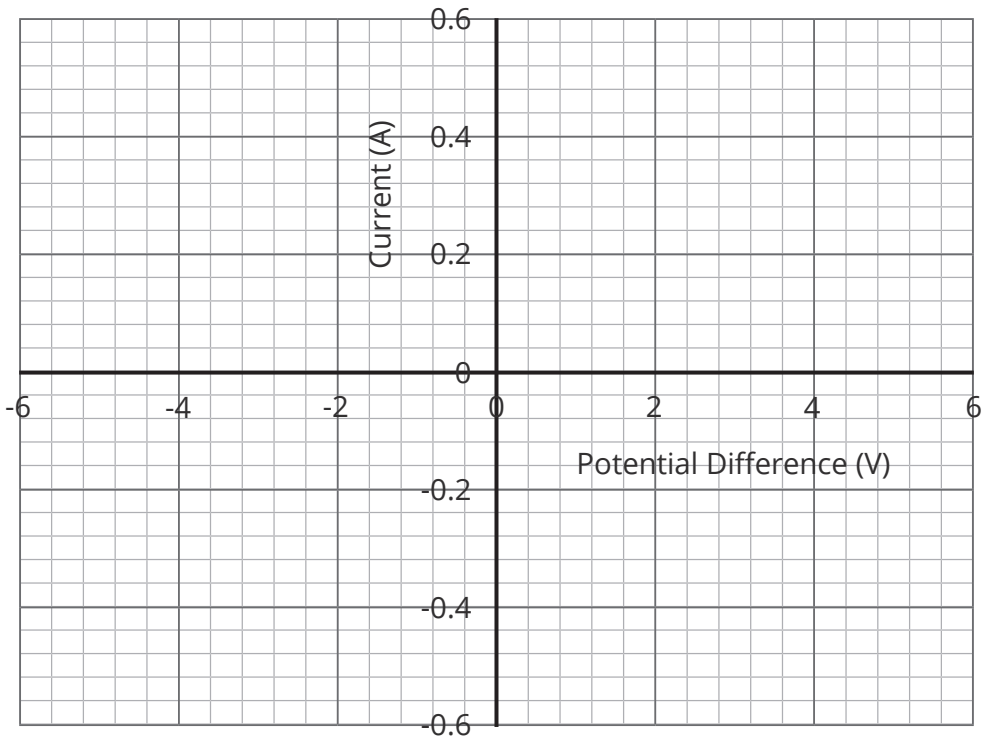
Homework 4

Current-Potential Difference Graphs

Resistor

Use the data in the table below to plot a graph of current against potential difference for a fixed resistor.

Potential Difference (V)	Current (A)
-5	-0.5
-4	-0.4
-3	-0.3
-2	-0.2
-1	-0.1
0	0
1	0.1
2	0.2
3	0.3
4	0.4
5	0.5



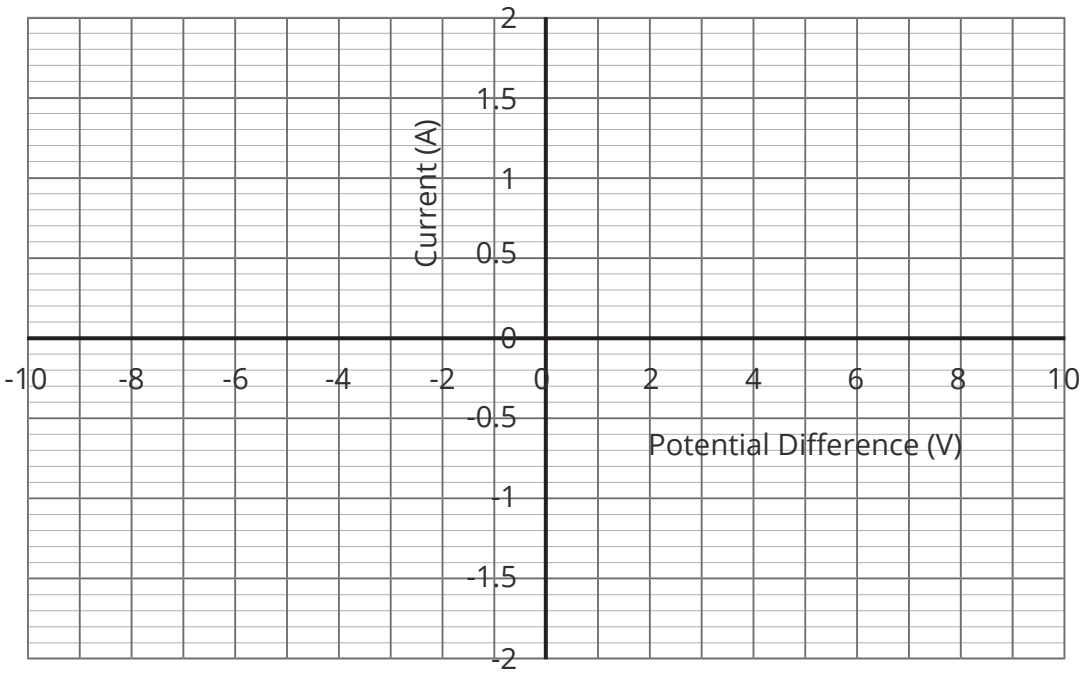
Describe the relationship between the current through the resistor and the potential difference across it.

Homework 4

Filament Lamp

Use the data in the table below to plot a graph of current against potential difference for a filament lamp.

Potential Difference (V)	Current (A)
-9	-1.46
-8	-1.41
-7	-1.36
-6	-1.25
-5	-1.15
-4	-1
-3	-0.78
-2	-0.5
-1	-0.25
0	0
1	0.25
2	0.5
3	0.78
4	1
5	1.15
6	1.25
7	1.36
8	1.41
9	1.46

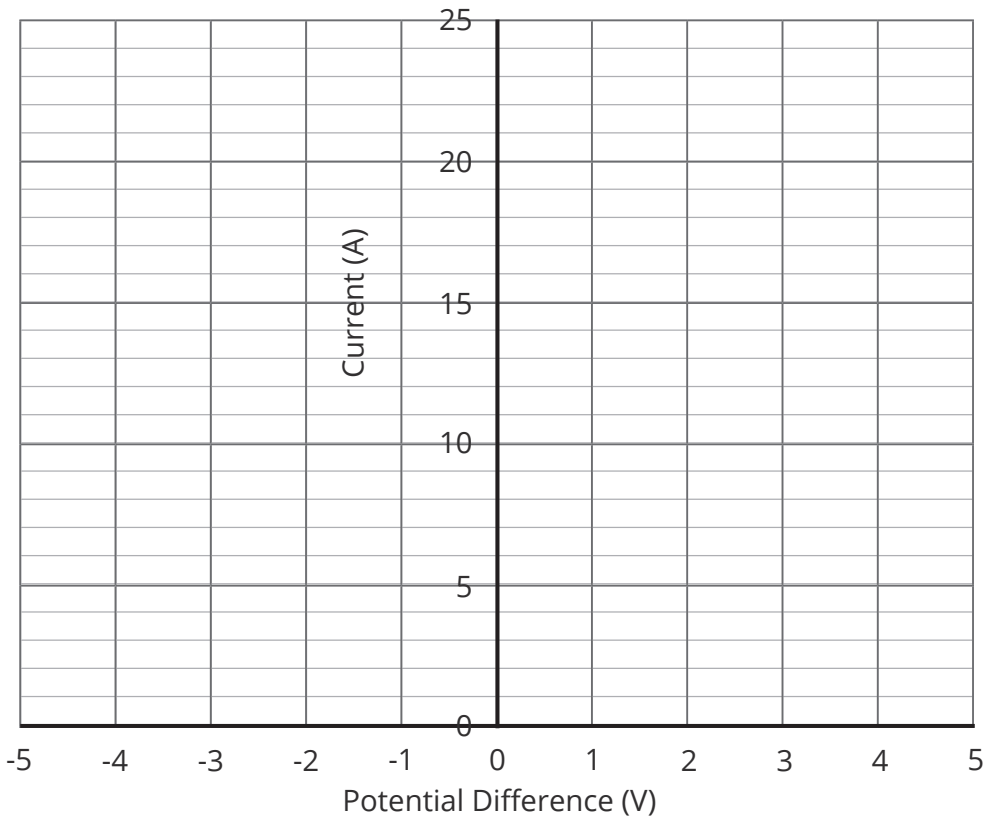


Explain the relationship between the current through the filament lamp and the potential difference across it.

Diode

Use the data in the table below to plot a graph of current against potential difference for a diode.

Potential Difference (V)	Current (A)
-5	0
-4	0
-3	0
-2	0
-1	0
0	0
1	0
2	1
3	3
4	8
5	20

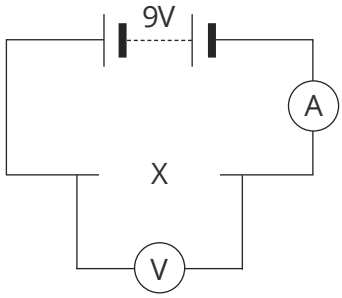


Explain the relationship between the current through the diode and the potential difference across it.

Thermistors

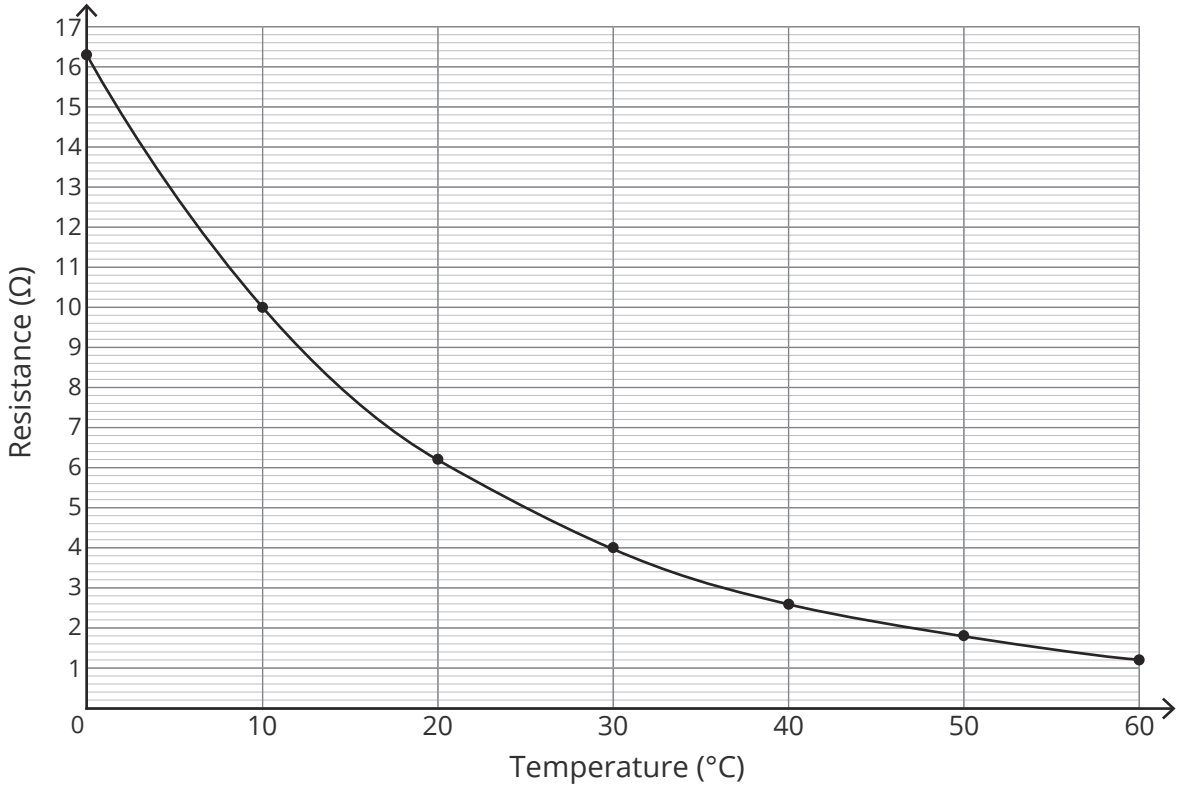
Homework 5

The circuit below has a thermistor in position X



1. Draw the circuit symbol for a thermistor.

The graph shows how the resistance of the thermistor changes with temperature.



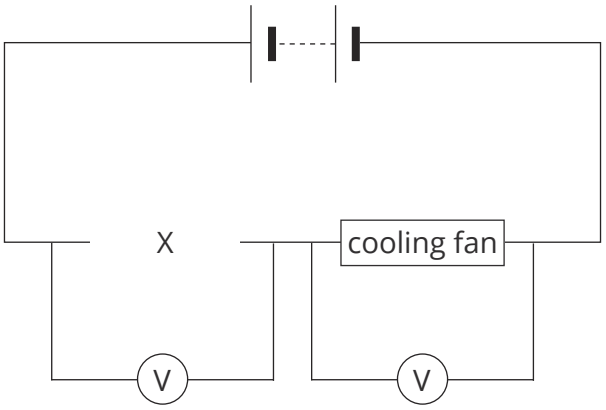
2. Calculate the current flowing through the thermistor at 30°C.

   Give your answer to 2 significant figures.

current = _____A

3. Describe, in as much detail as you can, the effect of temperature on the resistance of the thermistor. You should include data from the graph in your answer.

The thermistor (X) is used in a thermostat to control the temperature of a fridge.



4. Explain how the thermostat works to keep the fridge cold.

POWER CALCULATIONS

Homework 6

1. Write down the equation that links energy transferred, time and power.

2. A kettle takes 300 seconds to boil some water. During this time, the kettle transfers 825 000 J of energy.

   Calculate the power of the kettle.

   power = _____ W

3. A microwave transfers 900 kJ of energy in 600 seconds.

   Calculate the power of the microwave.

   power = _____ W

4. A person sprints for 2 minutes. The energy transferred from the person to the surroundings during the sprint is 84 960 J.

   Calculate the power output of the person during the sprint.

   power = _____ W

5. A person spends 8 minutes in a 9000 W electric shower.

   Calculate the energy transferred during this time.

   energy transferred = _____ J

6. A person used 908 W to lift a 100 kg mass in 50 seconds.

   Calculate the work done during the lift.
   Write your answer in kilojoules.

   work done = _____ kJ

7. A 1100 W toaster transfers 198 kJ of energy toasting some bread.

   Calculate the time it takes.

   time = _____ s

8. A 1700 W washing machine transfers 9180 kJ of energy during a cycle.

   Calculate the time of the cycle.
   Write your answer in hours.

   time = _____ hours

9. A 70 kg person ran to the top of some stairs. The height of the stairs was 180 cm. It took the person 1.4 s to reach the top.

   Calculate the power of the person.
   gravitational field strength = 9.8 N/kg

   power = _____ W