Electricity and magnetism

Task 1: Electrostatics

1 Put these sentences in order to explain how hair can become charged when it is combed.

	Order
The comb is pulled through the hair.	1
The comb has more negative charge than positive charge.	
Negative charges move from the hair onto the comb.	
The hair has less negative charge than positive charge.	
This means the hair becomes positively charged overall.	
This means the comb becomes negatively charged.	

2 Predict how two charged objects will behave when placed next to each other. Fill in the grid below. (Tick = attract, cross = repel)

	+	−
+		
−		

Task 2: Current and potential difference

Look at the circuit your teacher has set up. It includes equipment to measure current and potential difference.

Complete this table using the following phrases:

ammeter connected in series **amount of charge flowing per second**

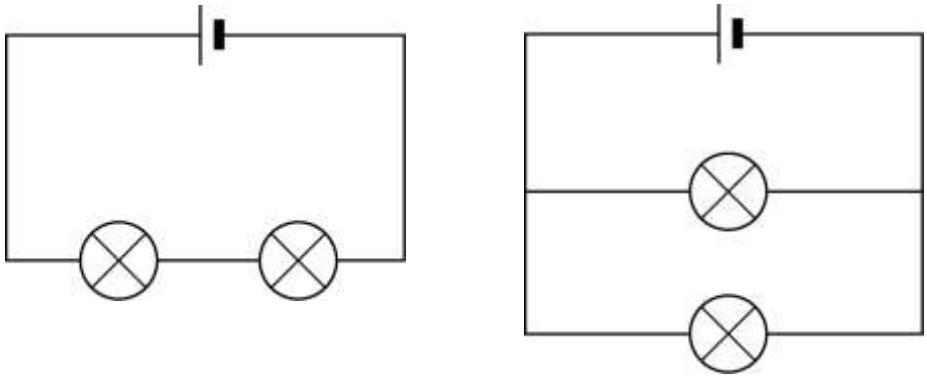
how much energy is transferred to the charge

voltmeter connected in parallel

	Current	Potential difference
What it is measured with		
Definition		

Task 3: Series and parallel circuits

The two circuits below show different ways circuit components can be connected. Label the components in these circuits and state whether they are series or parallel circuits. Explain your answer.



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_____

Task 4: Resistance

1 Complete the following paragraph to describe resistance using the words given below. Words can be used more than once.

ohms **resistance** **V** **A** **Ω** **component** **charges**

Each circuit _____ has a different _____. This tells you how easy or difficult it is for the _____ to pass through the component. Resistance is measured in _____, which has the symbol _____. Resistance can be calculated using the equation:

$$\text{resistance (\_\_\_\_\_)} = \frac{\text{potential difference (\_\_\_\_\_)}}{\text{current (\_\_\_\_\_)}}$$

2 State the rules for current and potential difference in a series circuit.

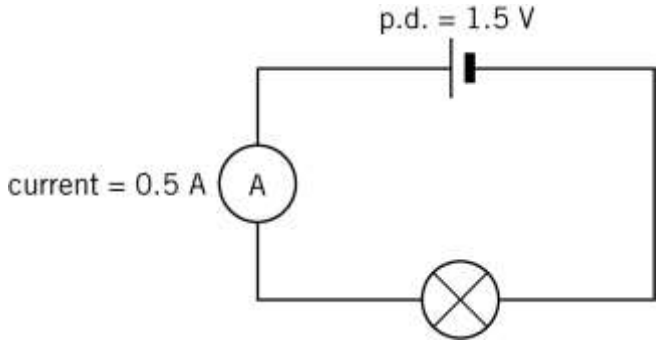
3 For a bulb with current = 0.2 A and potential difference = 1 V in a series circuit, its resistance is:

Resistance = potential difference ÷ current

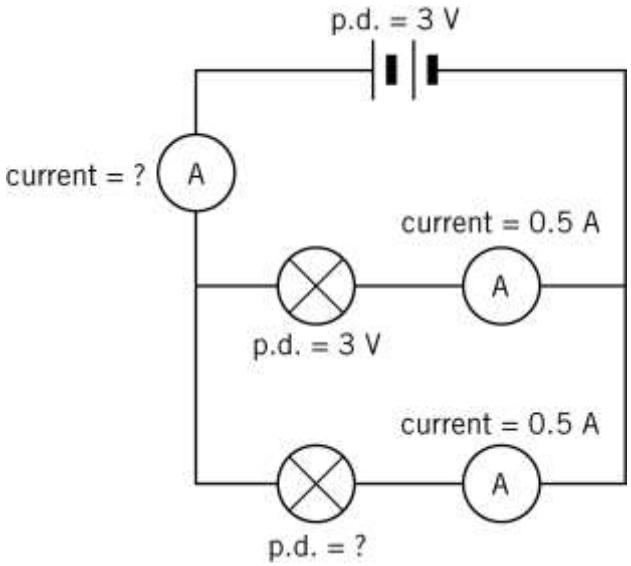
= 1 V ÷ 0.2 A

= 5 Ω

Calculate the resistance of one bulb in the following series circuit.
Show your working.



4 Using the rules you have written for parallel circuits, complete the missing values for current and potential difference in the diagram below:



5 State whether connecting wires in a circuit are made from conductors or insulators. Predict what happens to the resistance of the circuit if the wires are made from the other material.

6 Predict what will happen if a bulb rated 6 V was used in a circuit with 10 V. Explain your answer using the term 'rating'.

Task 5: Magnets

1 Draw magnetic field lines around the magnets below.

2 Describe how a magnetic field differs from an electric field.

3 Two magnets are placed together as in the diagram below. Explain whether these will attract or repel.

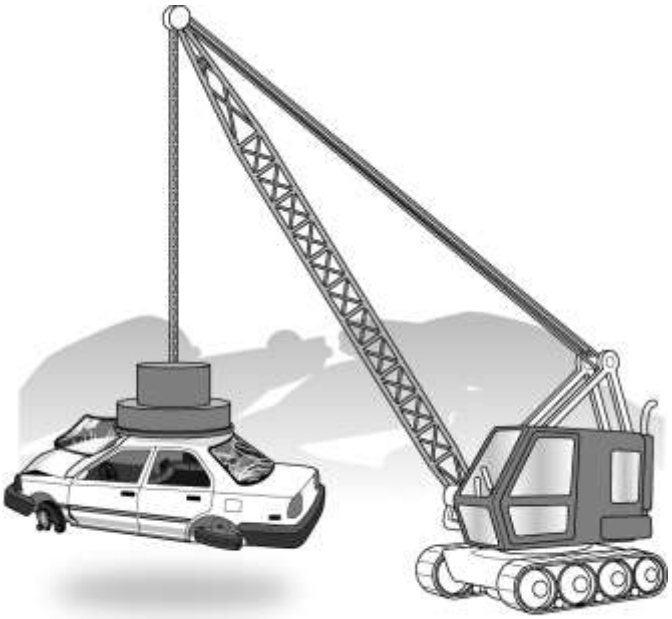
4 Describe how to make an electromagnet.

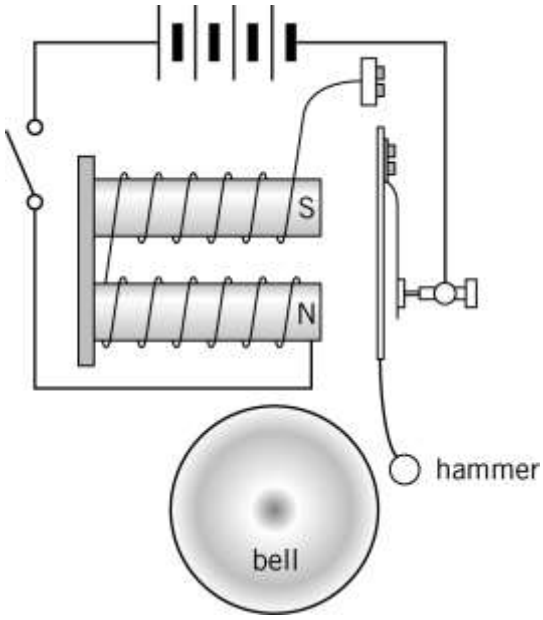
Use the following words and phrases:

power supply **coil of wire** **current, iron core**

5 Describe two ways to make an electromagnet stronger.

6 Two uses of electromagnets are shown below. Describe how electromagnets are used in BOTH cases. Use the diagram provided to describe





Task 6: Motor

Put the following sentences in order to explain how the motor works.

	Order
A coil of wire is placed between two magnets.	1
The electromagnet spins in between the magnets.	
The current flows in the coil of wire.	
The coil of wire is connected to a battery.	
The coil of wire becomes an electromagnet.	