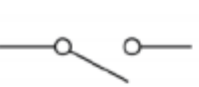





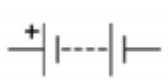





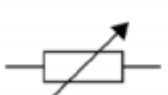



# Physics Topic 2: Electricity

## 1. Standard circuit diagram symbols

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1	Switch (open)	8	LED (light emitting diode)
2	Switch (closed)	9	Lamp (bulb)
3	Cell	10	Fuse
4	Battery	11	Voltmeter
5	Diode	12	Ammeter
6	Resistor	13	Thermistor
7	Variable resistor	14	LDR (light-dependent resistor)

## 2. Electrical charge and current

Charge flow = current x time  
 $Q = I \times t$

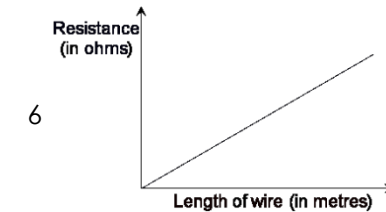
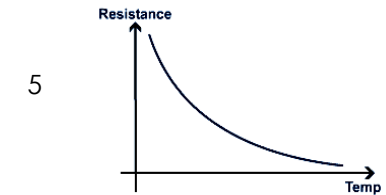
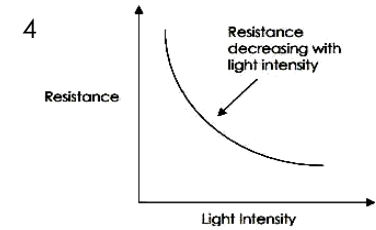
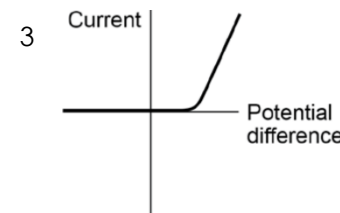
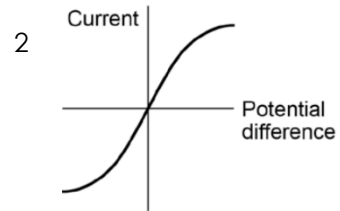
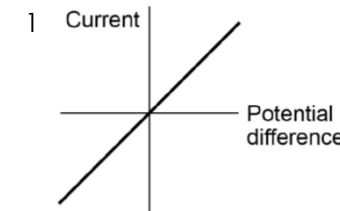
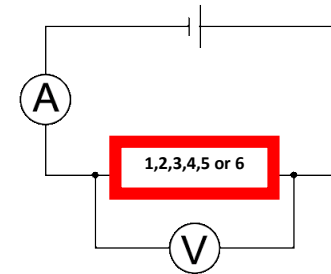
Q = Charge (in coulombs C)  
 I = Current (in amps A)  
 t = Time (in seconds s)

## 3. Resistance

Potential difference = current x resistance  
 $V = I \times R$

V = Potential difference/voltage (in volts V)  
 I = Current (in amps A)  
 R = Resistance (in ohms  $\Omega$ )

## 4. IV characteristics and required practical

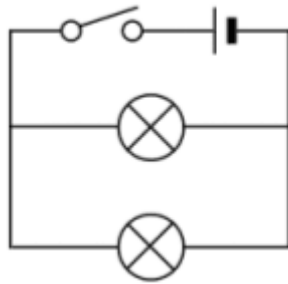


1	Ohmic resistor
2	Filament bulb
3	Diode
4	LDR
5	Thermistor
6	Resistance in a wire

## 5. Series and parallel circuits

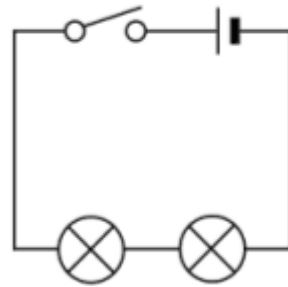
### Parallel Circuits

- The current splits at the junction.
- The voltage is the not shared.



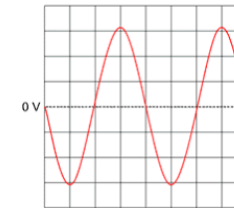
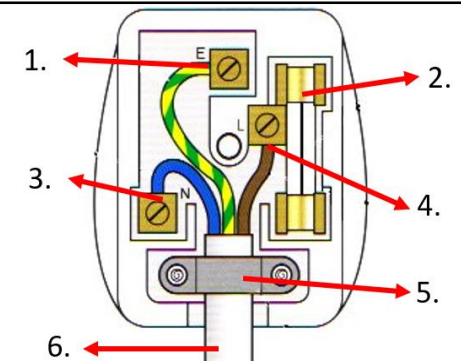
### Series Circuits

- The current does not split and is the same everywhere
- The voltage is shared
- $R_{TOTAL} = R_1 + R_2 + R_3 \dots$

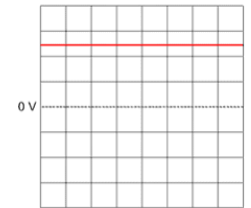


## 6. Mains electricity keywords

1. Earth wire	Prevents danger from short circuits
2. Fuse	Melts if current gets too high
3. Neutral wire	Carries the current away from plug
4. Live wire (230v)	Carries current to plug
5. Cable grip	Prevents a loose wire if cable is pulled
6. Double insulated cable	Prevents electric shock
7. Alternating current (AC)	Current which changes direction 50 times a second (50 Hz). Found in the mains.
8. Direct current (DC)	Current that only travel in one direction. Found in batteries.



7.



8.

## 7. Electrical power

power = current<sup>2</sup> x resistance

$$P = I^2 R$$

power = current x potential difference

$$P = IV$$

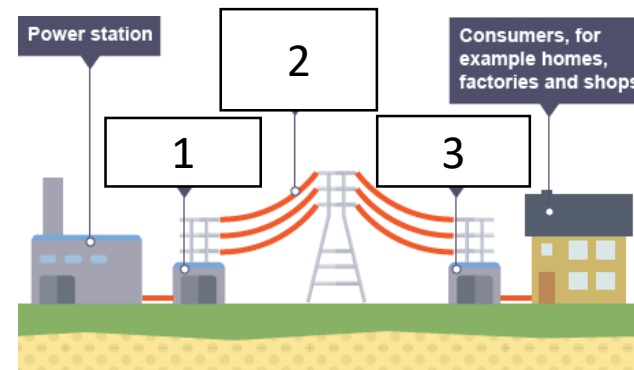
energy transferred = charge flow x potential difference

$$E = QV$$

### Symbols and their units

Symbol	Meaning	Unit	Meaning
V	Potential difference	V	Volts
I	Current	A	Amps
R	Resistance	$\Omega$	Ohms
Q	Charge	C	Coulombs
P	Power	W	Watts
E	Energy	J	Joules

## 8. The National grid



1. Step up transformer	Increase the voltage of the AC
2. High voltage transmission cables	High voltage reduces energy loss
3. Step down transformer	Decreases the voltage of the AC

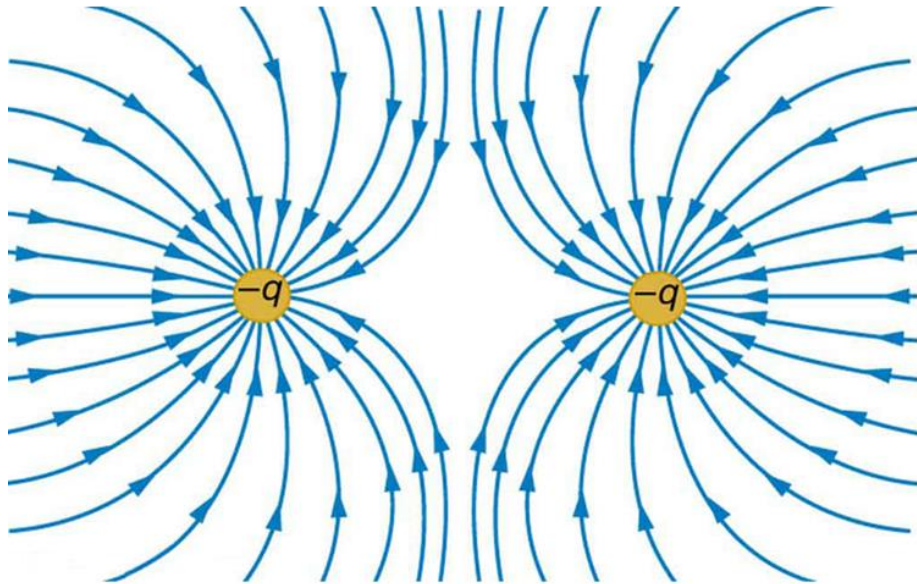
### 9. Static electricity keywords (TRIPLE ONLY)

Insulator	Material which holds electrical charge and does not conduct it
Friction	Force which transfers electrons from one insulator to the other
Electrons	Negatively charged particles in atoms. They are the only charges that can move
Electrostatic force	The force between two charges
Van der Graaff generator	Machine used to generate static electricity

### Electrostatic force rules (TRIPLE ONLY)

Charges	Force	Diagram
- and -	repel	(a)
+ and -	attract	(b)
+ and +	repel	(a) But with positive charges

(a)



(b)

