AQA P2a Electrical circuits
Higher Combined - Physics

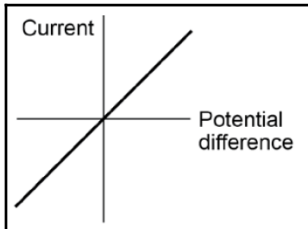
RPs in this topic: ① resistance of wire ② resistors in series and parallel ③ I-V characteristics

switch (open)	Breaks circuit; stopping the current
switch (closed)	Completes circuit; allows current to flow
cell	Store of chemical energy
battery	Two or more cells
diode	Only allows current to flow one way
resistor	Fixed resistance reduces current
variable resistor	Changeable resistance reduces current
LED	Emits light
lamp	Emits light
fuse	Breaks circuit when current too high
voltmeter	Measures potential difference
ammeter	Measures current
thermistor	Resistance decreases as temperature increases
LDR	Resistance decreases as light intensity increases

Key word	Definition
charge	The number of electrons. Measured in coulombs (C)
current	Flow of charge (the speed of electrons). Measured in amps (A)
potential difference	(often abbreviated to p.d.) Energy per electron . Measured in volts (V)
resistance	The amount an object reduces the current. Measured in ohms (Ω)

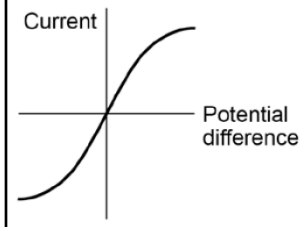
Symbol equation	Word equation
Q = I t	Charge flow = current x time
V = I R	Potential = current x resistance difference

Series circuit	A single closed loop. Electrons pass through every component in turn.
Parallel circuit	Two or more closed loops.



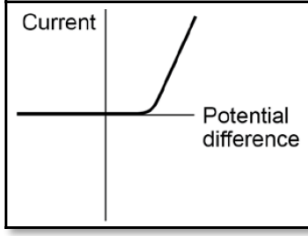
Fixed resistor I-V graph

Called 'ohmic' because the resistance does not change. Current is directly proportional to p.d.



Filament lamp I-V graph

Resistance increases as temperature increases. Current increases as p.d. increases but the increases becomes less and less.



Diode I-V graph

In one direction as p.d. increases the current increases. But when the p.d. is reversed the current remains zero when the p.d. increases

Thermistor - Resistance decreases as temperature increases so current increases. Used to change the current in circuits e.g. thermostat automatically controls the temperature at home.

Light dependent resistor - Resistance decreases as light intensity increases so current increases. Used to change the current in circuits e.g. street lights automatically switch on when it gets dark.

	Series circuit rules	Parallel circuit rules
current	Same current through each component in the circuit	Add current in each loop and it will **EQUAL** the total current going into or out of the battery
potential difference	P.d. of the power supply is shared by all the components	P.d. along **EACH** loop is **EQUAL** to the p.d. of the battery.
resistance	Add the resistance of each component and it will **EQUAL** the resistance of the whole circuit. So, $R_{total} = R_1 + R_2$	Each extra loop with resistance will **reduce** the overall resistance of the entire circuit.