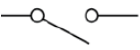
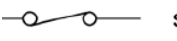

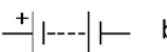

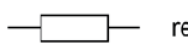
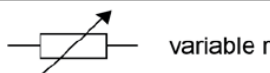


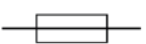
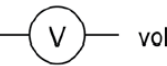


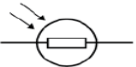


**AQA P2a Electrical circuits**  
**Higher Combined - Physics**

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

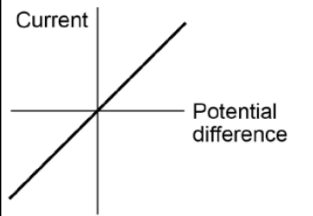
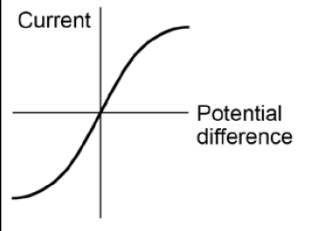
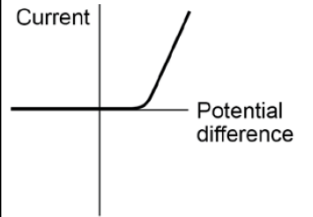
 switch (open)	Breaks circuit; stopping the current
 switch (closed)	Completes circuit; allows current to flow
 cell	Store of chemical energy
 battery	Two or more cells
 diode	Only allows current to flow one way
 resistor	Fixed resistance reduces current
 variable resistor	Changeable resistance reduces 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
<b>charge</b>	The number of electrons. Measured in coulombs (C)
<b>current</b>	Flow of charge (the speed of electrons). Measured in amps (A)
<b>potential difference</b>	(often abbreviated to p.d.) Energy per electron. Measured in volts (V)
<b>resistance</b>	The amount an object reduces the current. Measured in ohms ( $\Omega$ )

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

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

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

	<b>Fixed resistor I-V graph</b> Called 'ohmic' because the resistance does not change. Current is directly proportional to p.d.
	<b>Filament lamp I-V graph</b> Resistance increases as temperature increases. Current increases as p.d. increases but the increases becomes less and less.
	<b>Diode I-V graph</b> 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.