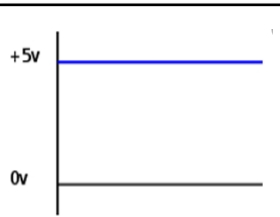


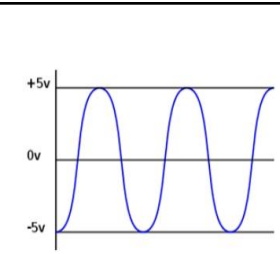
**AQA P2b Electricity in the home**  
**Higher Combined - Physics**

There are no RPs in this topic



**Direct current (D.C.)**

Current flows in one direction. Batteries and solar cells produce p.d. and so direct current in a circuit with a fixed p.d.



**Alternating current (A.C.)**

Current repeatedly changes direction. How often these changes happen is called frequency. UK mains electricity has an alternating current of 230V and a frequency of 50Hz

**National grid**

- Is the cables and transformers that connects the power stations to the consumers (houses etc)

**step up transformers**

Increase p.d. ( and decrease the current) in cables. Increases efficiency as it reduces energy lost as heat from cables.

**step down transformers**

Decrease p.d (and increases current) so it is safer to use in homes etc.

**Appliances** – Power is energy transferred per second. Devices with high power ratings transfer energy faster than lower power devices. Devices designed to produce heat have high power ratings.

|  |                   |   |
|--|-------------------|---|
|  | 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 |

| wire    | colour           | p.d. | function                                       |
|---------|------------------|------|--|
| live    | brown            | 230V | Carries current from power supply.             |
| neutral | blue             | 0V   | Completes the circuit                          |
| earth   | Green and yellow | 0V   | Safety wire – stops device from becoming live. |

**Potential difference and current**

Potential difference causes a current to flow. Power supplies provide a p.d. Current will always flow from a high p.d. to a low p.d.

**Electric shocks**

If you touch something with a high p.d., current will pass through you into the ground (0 V p.d.). A live wire is still a shock risk even if switch is open.

| Symbol equation | Word equation                                      |
|-----------------|--|
| $P = I V$       | power = current x potential difference             |
| $P = I^2 R$     | power = current <sup>2</sup> x resistance          |
| $E = P t$       | energy transferred = power x time                  |
| $E = Q V$       | energy transferred = charge x potential difference |

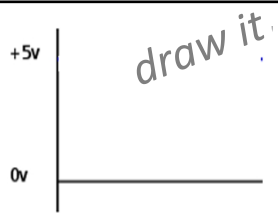
**Knowledge required from previous topic**

|                   |   |
|-------------------|---|
| <b>resistance</b> | The amount an object reduces the current. Measured in ohms ( $\Omega$ ) |
|-------------------|---|

|                             |   |
|-----------------------------|---|
| <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> | Energy per electron. Measured in volts (V)                    |

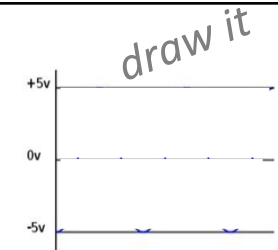
*Describe it*

**RETRIEVAL ACTIVITIES**



**Direct current (D.C.)**

*Describe it and give examples*



**Alternating current (A.C.)**

*Describe it and give the frequency and p.d. of mains*

**Step up transformers**

*What do they do and why?*

**Step down transformers**

*What do they do and why?*

**Appliances –**

*What is power and which devices use higher power?*

*Draw it* switch (open)

*Draw it* switch (closed)

*Draw it* cell

*Draw it* battery

*Draw it* diode

*Draw it* resistor

*Draw it* variable resistor

*Draw it* LED

*Draw it* lamp

*Draw it* fuse

*Draw it* voltmeter

*Draw it* ammeter

*Draw it* thermistor

*Draw it* LDR

*Describe*

*what*

*they*

*do*

| wire    | colour              | p.d.        | function                    |
|---------|---------------------|-------------|-----------------------------|
| Live    | <i>What colour?</i> | <i>p.d?</i> | <i>and what does it do?</i> |
| Neutral |                     |             |                             |
| Earth   |                     |             |                             |

**Potential difference and current**

*Describe the link between them*

**Electric shocks**

*Describe how they happen*

| Symbol equation | Word equation          |
|-----------------|------------------------|
| ?               | Power = ?              |
|                 | Power = ?              |
|                 | Energy transferred = ? |
|                 | Energy transferred = ? |

**Knowledge required from previous topic**

|            |                                      |
|------------|--------------------------------------|
| resistance | <i>Describe it and give the unit</i> |
|------------|--------------------------------------|

|                      |                                      |
|----------------------|--------------------------------------|
| charge               | <i>Describe it and give the unit</i> |
| current              | <i>Describe it and give the unit</i> |
| potential difference | <i>Describe it and give the unit</i> |