**Physics Topic 2: Electricity**

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| **Definitions** | | | | **Equations** | | | |
| 1 | Current | The rate of flow of electric charge (how many electrons are moving through a circuit every second) | | 1 | *Charge flow = current x time* | | ***Q = I t*** |
| 2 | *Potential difference = current x resistance* | | ***V = I R*** |
| 3 | *Power = potential difference x current* | | ***P = V I*** |
| 2 | Potential difference (AKA voltage) | The energy carried by the electrons in the circuit **OR** The difference between the energy carried by the electrons at 2 points in the circuit. | | 4 | *Power = (current)2 x resistance* | | ***P = I2 R*** |
| 5 | *Energy transferred = power x time* | | ***E = P t*** |
| 6 | *Energy transferred = charge flow x potential difference* | | ***E = Q V*** |
| **Diagrams** | | | |
| 3 | Resistance | The ability of a component to resist the flow of electricity. | | **Current – PD graph for a fixed resistor**  Resistance constant at all PDs  This component is an ohmic conductor | | **Current – PD graph for a bulb**  Resistance increases at high PD because of high temperature | |
| 4 | Direct current | Current that always flows in the same direction | |
| 5 | Alternating current | Current that repeatedly changes direction back and forth | |
| 6 | Thermistor | Has high resistance when temperature is low | |
| 7 | LDR | Has high resistance when light levels are low | |
| Transmitting and Using Electricity | | | |
| Step Up Transformer  PC8_gfx_transformer_stepup   * More turns on secondary coil than on primary, therefore increases voltage. * Increasing voltage with a step up transformer decreases the current in the wires. * Lower current in wires means less resistance. * Less resistance means less energy lost as heat. * Therefore it is more efficient to transmit electricity at high voltage. | | | Step Down Transformer  PC8_gfx_transformer_stepdown   * Fewer turns on secondary coil than on primary, therefore decreases voltage. * Reducing the voltage makes it safer to use in the home. | **Parallel Circuit**   * The potential difference across each component is the same * The total current through the whole circuit is the sum of the currents through the separate components * The total resistance of two resistors is less than the resistance of the smallest individual resistor. | | **Circuit symbols (just the harder ones)** | |
| [http://www.frankswebspace.org.uk/ScienceAndMaths/physics/physicsGCSE/bytesize%20images/wiringPlugs1.gif](http://www.google.co.uk/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwi2yZiPzv_NAhUMCsAKHYJKBPQQjRwIBw&url=http://www.frankswebspace.org.uk/ScienceAndMaths/physics/physicsGCSE/wiringPlug.htm&bvm=bv.127178174,d.ZGg&psig=AFQjCNEkhpax3l9DRSAbIZG5UJZ1oKdIVw&ust=1469020539967266)Live wire carries the current  Neutral completes the circuit  Earth prevents electric shocks | **Series Circuit**   * There is the same current through each component * The total potential difference of the power supply is shared between the components * The total resistance of two components is the sum of the resistance of each component. | | **Current – PD graph for a diode**  Resistance very high in one direction.  Current only flows in one direction | |