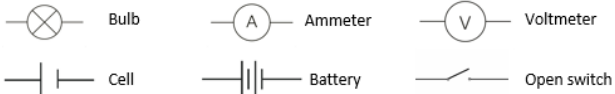
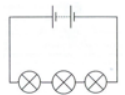
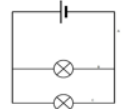


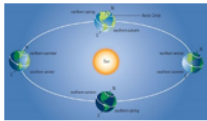
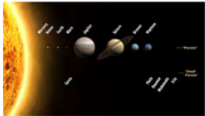



Electrical Circuits

<p>Electrical Circuits</p>	<ul style="list-style-type: none"> <li>•A circuit is made up of components joined together by wires</li> <li>•Components do different jobs in the circuit, e.g. a bulb transfers electrical energy into light (and heat) energy.</li> <li>•A circuit has to be complete for electricity to flow</li> <li>•Different components are represented by symbols</li> </ul> 	<p>Voltage (Potential Difference)</p> <ul style="list-style-type: none"> <li>•Voltage, or potential difference, is the energy transferred in a component by each electron (or unit of charge).</li> <li>•The symbol for potential difference is V.</li> <li>•Potential difference is measured in Volts, V</li> <li>•A voltmeter is used to measure the potential difference and is connected in parallel across a component.</li> <li>•Increasing the potential difference in a circuit will mean that more energy is transferred per unit of charge</li> <li>•Different sized batteries have different potential differences.</li> <li>•Mains voltage is about 230V.</li> </ul>
<p>Conductors and Insulators</p>	<ul style="list-style-type: none"> <li>•A conductor is a material that current flows through.</li> <li>•Conductors are usually metals e.g. Copper, iron, gold.</li> <li>•An insulator is a material that current can't flow through.</li> <li>•Insulators are usually non-metals e.g. glass, plastic, wood</li> <li>•Insulators have a very high resistance so it is very hard for much current to flow through them.</li> </ul>	<p>Electrical Safety</p> <ul style="list-style-type: none"> <li>•Electricity can be very dangerous and can cause serious injury.</li> <li>•People can receive an electric shock if using damaged electrical appliances or using electricity in an unsafe way.</li> <li>•High voltage electricity can flow through a person's body</li> <li>•This can cause the heart to beat incorrectly or to stop completely (cardiac arrest) and severe burns.</li> </ul>
<p>Current</p>	<ul style="list-style-type: none"> <li>•Current is a flow of electrons (charge).</li> <li>•The electrons don't get used up, they are part of the conductor.</li> <li>•The symbol for current is I</li> <li>•The size of the current depends on how many electrons (charges) move past a point per second: Lots of electrons per second = high current.</li> <li>•An ammeter is used to measure the size of the current in Amperes, A.</li> <li>•Ammeters are placed in series with the component you want to measure the current through.</li> </ul>	<p>Static Electricity</p> <ul style="list-style-type: none"> <li>•Parts of atoms cause electrons can build up or be rubbed away onto surfaces.</li> <li>•This build up of charge (electrons) on the surface of a material is called static electricity.</li> <li>•Friction is the force responsible for causing electrons to transfer from one surface to another.</li> <li>•If an insulated object touches a charged object, it also becomes charged.</li> <li>•Like charges repel, opposite charges attract</li> </ul>
<p>Series Circuits</p> 	<ul style="list-style-type: none"> <li>•In a series circuit, the components are connected one after the other. There is only one loop.</li> <li>•Current is the same everywhere in a series circuit</li> <li>•Potential difference is shared between the components in a series circuit, but adds up to the total potential difference given by the power supply.</li> </ul>	<p>Power and Paying For Electricity</p> <ul style="list-style-type: none"> <li>•The power rating of an appliance tells us how much energy it transfers per second.</li> <li>•Appliances with higher power ratings transfer more energy per second.</li> <li>•When we pay for electricity, we are paying for the electrical energy transferred by the appliance.</li> <li>•Using more efficient appliances is a way to pay less for electricity, as well as using less electricity overall.</li> </ul>
<p>Parallel Circuits</p> 	<ul style="list-style-type: none"> <li>•In a parallel circuit, there is more than one loop so the current can take different paths in the circuit.</li> <li>•Potential difference is the same everywhere in a parallel circuit and is given by the potential difference of the power supply.</li> <li>•Current is shared between components connected in parallel circuits.</li> </ul>	<p>Electricity Calculations</p> <ul style="list-style-type: none"> <li>•Charge = Current x Time</li> <li>•Potential Difference = Current x Resistance</li> <li>•Power = Current x Potential Difference</li> <li>•Energy = Power x Time (this can be used when energy is measured in Joules and in kWh).</li> </ul>

The Solar System and Beyond

<p>The Earth</p> 	<ul style="list-style-type: none"> <li>•Human beings live on Earth.</li> <li>•The Earth is a planet in the Solar System.</li> <li>•The Sun is at the centre of the Solar System.</li> <li>• The Earth orbits (moves around) the Sun.</li> <li>•One complete Earth orbit around the Sun takes about 365 days. This is called a year.</li> <li>•A leap year is 366 days. Leap years occur every four years and happen because an Earth orbit is actually 365 and a quarter days so we collect the four quarters together in an extra day.</li> <li>•The Earth rotates (spins) on a tilted axis. Each rotation takes 24 hours. This is called a day.</li> <li>•The Moon orbits the Earth.</li> </ul>	<p>Galaxy</p>	<ul style="list-style-type: none"> <li>•A galaxy is a collection of billions of stars orbiting a central point</li> <li>•Our Sun is part of a galaxy called the Milky Way. Other stars in the Milky Way are Alpha Centauri, Rigel and Betelgeuse.</li> <li>•There are billions of galaxies in the Universe.</li> </ul>
<p>Day and Night</p>	<ul style="list-style-type: none"> <li>•The part of the Earth facing the Sun is in daytime. The part facing away is in night time.</li> <li>•Sunrise and sunset happen as the Earth rotates on its axis. The Sun seems to take a curved path across the sky</li> <li>•The Sun appears to rise in the East and set in the West as the Earth rotates anticlockwise on its axis.</li> </ul>	<p>Life Cycle of a Star</p> 	<ul style="list-style-type: none"> <li>•Stars go through a life cycle</li> <li>• For stars the same size as our Sun, the life cycle is : nebula → protostar → main sequence star → red giant → white dwarf → black dwarf</li> <li>•For stars much more massive than the Sun, the sequence is: nebula → protostar → main sequence star → red supergiant → supernova → neutron star or black hole</li> <li>•The Sun will eventually become a black giant</li> </ul>
<p>Longitude and latitude</p>	<ul style="list-style-type: none"> <li>•These are imaginary lines that we use to split up the Earth.</li> <li>•Latitude lines go around the Earth</li> <li>•Longitude lines go from the North pole to the South pole. They split the Earth into time zones</li> </ul>	<p>Seasons</p> 	<ul style="list-style-type: none"> <li>•The Earth has seasons because of the tilt in its axis.</li> <li>•In summer, there are more hours of sunlight and it is warmer. The Earth is tilted towards the Sun.</li> <li>•In Winter, there are fewer hours of daylight and it is colder. The Earth is tilted away from the Sun.</li> <li>•The Northern Hemisphere has opposite seasons to the Southern Hemisphere, i.e. when it is Winter in the Northern Hemisphere, it is Summer in the Southern Hemisphere.</li> <li>•At the North Pole, the Sun doesn't set for part of the Summer and doesn't rise for part of the Winter</li> </ul>
<p>The Solar System</p> 	<ul style="list-style-type: none"> <li>•The Solar System is made up of the Sun orbited by eight planets</li> <li>•The planets in order are Mercury, Venus, Mars, Earth, Jupiter, Saturn, Uranus and Neptune</li> <li>•Comets and asteroids also orbit the Sun</li> <li>•The further away from the Sun a planet is, the lower the temperature on its surface.</li> <li>•The further away from the Sun a planet is, the longer its orbit takes.</li> </ul>	<p>Light Year</p>	<ul style="list-style-type: none"> <li>•A light year is a unit of distance used to measure the huge distances in space.</li> <li>•It is how far light travels in one year. One light year is 9.46 trillion km!</li> </ul>
<p>Stars</p>	<ul style="list-style-type: none"> <li>•A star is a ball of hydrogen that gives out heat and light due to nuclear reactions happening inside it</li> <li>•Our Sun is a star</li> <li>•Stars appear to move across the night sky because of the Earth's rotation on its axis.</li> <li>•Stars form patterns in the sky called constellations, e.g. Orion</li> </ul>	<p>The Moon</p> 	<ul style="list-style-type: none"> <li>•The Moon orbits the Earth</li> <li>•It is a natural satellite</li> <li>•The Moon appears to change shape over a cycle of around 28 days. We call this the phases of the moon.</li> <li>•We see the moon because it reflects light from the Sun</li> <li>•We see different phases because different parts of the Moon are lit up by the Sun as it orbits the Earth.</li> <li>•new moon → waxing crescent → first quarter → half moon → waxing gibbous → full moon → waning gibbous → last quarter → waning crescent</li> <li>•When the Earth passes between the Sun and the Moon, we call it a lunar eclipse</li> </ul>