

**SCIENCE Scheme of Work 2023-24: YEAR 7**

Autumn Term 1: SEPT - OCT	Autumn Term 2: OCT - DEC	Spring Term 1: JAN - FEB
<p><b>Matter: The particle model and separating mixtures</b>  <b>Reactions: Metals/non-metals and Acids/Alkalis</b></p>	<p><b>Organisms: Movement and Cells</b></p>	<p><b>Energy: Energy costs and Energy Transfer</b>  <b>Waves: Sound and Light</b></p>
<p><b><u>The Particle Model</u></b>  <b>Objective: Relate the features of the particle model to the properties of materials in different states</b></p> <p>Properties of solids, liquids and gases can be described in terms of particles in motion but with differences in the arrangement and movement of these same particles: closely spaced and vibrating (solid), in random motion but in contact (liquid), or in random motion and widely spaced (gas).  Observations where substances change temperature or state can be described in terms of particles gaining or losing energy.</p> <p><b><u>Separating Mixtures</u></b>  <b>Objective: Devise ways to separate mixtures, based on their properties</b></p> <p>A pure substance consists of only one type of element or compound and has a fixed melting and boiling point. Mixtures may be separated due to differences in their physical properties.  The method chosen to separate a mixture depends on which physical properties of the individual substances are different.</p> <p><b><u>Metals/non-metals</u></b>  <b>Objective: Use experimental results to suggest an order of reactivity of various metals</b></p> <p>Metals and non-metals react with oxygen to form oxides which are either bases or acids.  Metals can be arranged as a reactivity series in order of how readily they react with other substances.  Some metals react with acids to produce salts and hydrogen.</p>	<p><b><u>Cells</u></b>  <b>Objective: Identify the principal features of a cheek cell and describe their functions</b></p> <p>Multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes.  There are many types of cell. Each has a different structure or feature so it can do a specific job.</p> <p><b><u>Movement</u></b>  <b>Objective: Explore how the skeletal system and muscular system in a chicken wing work together to cause movement</b></p> <p>The parts of the human skeleton work as a system for support, protection, movement and the production of new blood cells.  Antagonistic pairs of muscles create movement when one contracts and the other relaxes.</p>	<p><b><u>Energy Costs</u></b>  <b>Objective: Compare the running costs of fluorescent and filament light bulbs</b></p> <p>We pay for our domestic electricity usage based on the amount of energy transferred.  Electricity is generated by a combination of resources which each have advantages and disadvantages.</p> <p><b><u>Energy Transfer</u></b>  <b>Objective: Explain the energy transfers in a hand-crank torch</b></p> <p>Describe how the energy of an object depends on its speed, temperature, height or whether it is stretched or compressed.  Show how energy is transferred between energy stores in a range of real-life examples.  Calculate the useful energy and the amount dissipated, given values of input and output energy.  Explain how energy is dissipated in a range of situations.</p> <p><b><u>Sound Waves</u></b>  <b>Objective: Relate changes in the shape of an oscilloscope trace to changes in pitch and volume</b></p> <p>Sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels.  The greater the amplitude of the waveform, the louder the sound. The greater the frequency (and therefore the shorter the wavelength), the higher the pitch.</p>

<p><b><u>Acids/Alkalis</u></b>  <b><u>Objective: Devise an enquiry to compare how well indigestion remedies work</u></b></p> <p>The pH of a solution depends on the strength of the acid: strong acids have lower pH values than weak acids. Mixing an acid and alkali produces a chemical reaction, neutralisation, forming a chemical called a salt and water.</p>		<p><b><u>Light Waves</u></b>  <b><u>Objective: Use ray diagrams to model how light passes through lenses and transparent materials</u></b></p> <p>When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. The ray model can describe the formation of an image in a mirror and how objects appear different colours. When light enters a denser medium, it bends towards the normal; when it enters a less dense medium it bends away from the normal. Refraction through lenses and prisms can be described using a ray diagram as a model.</p>
<p><b>Spring Term 2: FEB - MAR</b></p>	<p><b>Summer Term 1: APR - MAY</b></p>	<p><b>Summer Term 2: JUN - JUL</b></p>
<p><b>Earth: Earth's Structure and the Universe</b></p>	<p><b>Forces: Speed and Gravity</b></p>	<p><b>Human Reproduction and plant reproduction Drugs and alcohol</b></p>
<p><b><u>Earth's Structure</u></b>  <b><u>Objective: Model the processes that are responsible for rock formation and link these to the rock features</u></b></p> <p>Sedimentary, igneous and metamorphic rocks can be inter converted over millions of years through weathering and erosion, heat and pressure, and melting and cooling.</p> <p><b><u>The Universe</u></b>  <b><u>Objective: Relate observations of changing day length to an appropriate model of the solar system</u></b></p> <p>The solar system can be modelled as planets rotating on tilted axes while orbiting the Sun, moons orbiting planets and sunlight spreading out and being reflected. This explains day and year length, seasons and the visibility of objects from Earth. Our solar system is a tiny part of a galaxy, one of many billions in the Universe. Light takes minutes to reach Earth from the Sun, four years from our nearest star and billions of years from other galaxies.</p>	<p><b><u>Speed</u></b>  <b><u>Objective: Investigate variables that affect speed</u></b></p> <p>If the overall, resultant force on an object is non-zero, its motion changes and it slows down, speeds up or changes direction.</p> <p><b><u>Gravity</u></b>  <b><u>Objective: Explain the way in which an astronaut's weight varies on a journey to the moon</u></b></p> <p>Mass and weight are different but related. Mass is a property of the object; weight depends upon mass but also on gravitational field strength. Every object exerts a gravitational force on every other object. The force increases with mass and decreases with distance. Gravity holds planets and moons in orbit around larger bodies.</p> <p><b><u>Voltage/Resistance</u></b>  <b><u>Objective: Compare the voltage drop across resistors connected in series in a circuit</u></b></p>	<p><b><u>Human Reproduction</u></b>  <b><u>Objective: Relate advice to pregnant women to ideas about transfer of substances to the embryo</u></b></p> <p>The menstrual cycle prepares the female for pregnancy and stops if the egg is fertilised by a sperm. The developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances.</p> <p><b><u>Plant Reproduction</u></b>  <b><u>Objective: Use models to evaluate the features of various types of seed dispersal</u></b></p> <p>Plants have adaptations to disperse seeds using wind, water or animals. Plants reproduce sexually to produce seeds, which are formed following fertilisation in the ovary.</p>

We can model voltage as an electrical push from the battery, or the amount of energy per unit of charge transferred through the electrical pathway.  
In a series circuit, voltage is shared between each component. In a parallel circuit, voltage is the same across each loop.  
Components with resistance reduce the current flowing and shift energy to the surroundings.

**Current**

**Objective: Compare and explain current flow in different parts of a parallel circuit**

Current is a movement of electrons and is the same everywhere in a series circuit. Current divides between loops in a parallel circuit, combines when loops meet, lights up bulbs and makes components work.