

SCIENCE – YEAR 8

AUTUMN TERM

Pupils will have the opportunity to develop the following skills;

Continue building on the Year 7 Working Scientifically skills and include:

- Use appropriate techniques, apparatus, and materials laboratory work, paying attention to health and safety
- Make and record observations and measurements for different investigations; and evaluate the reliability of methods and suggest improvements
- Apply mathematical concepts and calculate results
- Present reasoned explanations, including explaining data in relation to predictions and hypotheses
- Evaluate data, showing awareness of potential sources of random and systematic error
- Identify further questions arising from results
- Use and derive simple equations and carry out appropriate calculations

Pupils will have the opportunity to develop their knowledge about:

Chemical Reactions including Acids and Alkalis

- chemical reactions as the rearrangement of atoms
- representing chemical reactions using formulae and using equations
- exothermic and endothermic chemical reactions (qualitative).
- combustion, thermal decomposition, oxidation
- reactions of acids with metals to produce a salt plus hydrogen
- defining acids and alkalis in terms of neutralisation reactions
- the pH scale for measuring acidity/alkalinity; and indicators
- reactions of acids with alkalis to produce a salt plus water

Motion and Forces

- speed and the quantitative relationship between average speed, distance and time ($\text{speed} = \text{distance} \div \text{time}$)
- the representation of a journey on a distance-time graph
- relative motion: trains and cars passing one another.
- forces as pushes or pulls, arising from the interaction between two objects
- using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces
- moment as the turning effect of a force
- forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water
- forces measured in Newtons, measurements of stretch or compression as force is changed
- force-extension linear relation; Hooke's Law as a special case (WS)
- work done and energy changes on deformation
- non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity.
- opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface.

	<ul style="list-style-type: none"> • forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) • change depending on direction of force and its size. •
<p>SPRING TERM</p>	
<p>Pupils will have the opportunity to develop the following skills; Continue building on the Year 7 Working Scientifically skills for KS3 and include:</p> <ul style="list-style-type: none"> • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety • Make and record observations and measurements for different investigations; and evaluate the reliability of methods and suggest improvements • Apply mathematical concepts and calculate results • Present reasoned explanations, including explaining data in relation to predictions and hypotheses • Evaluate data, showing awareness of potential sources of random and systematic error • Identify further questions arising from results • Use and derive simple equations and carry out appropriate calculations 	<p>Pupils will have the opportunity to develop their knowledge about:</p> <p>Waves – Light and Sound</p> <p>Compare the similarities and differences between light waves and waves in matter</p> <ul style="list-style-type: none"> • Study light waves travelling through a vacuum; speed of light • Investigate the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface • Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye • Consider light as transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras • Research colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. <p>Photosynthesis and Environmental Interactions</p> <ul style="list-style-type: none"> • Study how plants make carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots. • Research reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. • Identify the reactants in, and products of, photosynthesis, and a word summary for photosynthesis • Explain the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere • Describe the adaptations of leaves for photosynthesis.

	<ul style="list-style-type: none"> • Explain the role of leaf stomata in gas exchange in plants. • Analyse the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops • Explain the importance of plant reproduction through insect pollination in human food security • Study how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.
<p>SUMMER TERM</p>	
<p>Working scientifically – pupils will have the opportunity to develop the following skills: Continue building on the Year 7 Working Scientifically skills and extending the skills to include:</p> <ul style="list-style-type: none"> • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety • Make and record observations and measurements for different investigations; and evaluate the reliability of methods and suggest improvements • Apply mathematical concepts and calculate results • Present reasoned explanations, including explaining data in relation to predictions and hypotheses • Evaluate data, showing awareness of potential sources of random and systematic error • Identify further questions arising from results • Use and derive simple equations and carry out appropriate calculations 	<p>Pupils will have the opportunity to develop their knowledge of:</p> <p>Chemical Reactions 2 including and the Periodic Table Reactivity Series and Rates of Reaction</p> <ul style="list-style-type: none"> • Research the varying physical and chemical properties of different elements • Consider the principles underpinning the Mendeleev Periodic Table • Study the Periodic Table: periods and groups; metals and non-metals • Recognise how patterns in reactions can be predicted with reference to the Periodic Table • Describe the properties of metals and non-metals • Investigate displacement reactions • Explore what catalysts do (rates of reactions) <p>Electricity and Electromagnetism</p> <ul style="list-style-type: none"> • Review electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge • Study potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current • Measure differences in resistance between conducting and insulating components (quantitative). • Explain static electricity as the separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects • Consider the idea of electric field, forces acting across the space between objects not in contact. • Describe magnetic poles, attraction and repulsion

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| | <ul style="list-style-type: none">• Measure magnetic fields by plotting with compass, representation by field lines and link to Earth's magnetism, compass and navigation• Investigate the magnetic effect of a current, electromagnets, D.C. motors (principles only).• |
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