

This outline provides a long-term overview of the knowledge and skills developed in this subject. More detailed short- and medium-term schemes of work, not published here, are available by contacting the Science Department.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 8	<p>Unit Title: B2.1 Tissues and Organs C2.1 Acids and Alkalis P2.1 Motion and Pressure</p> <p>Knowledge:</p> <ul style="list-style-type: none"> Describe the key components of the muscular-skeletal systems and explain how these result in movement. Describe the structure of the respiratory system and apply knowledge of pressure to explain how breathing occurs. Explain the adaptations of the alveoli to ensure efficient gaseous exchange. Evaluate the effects of asthma, smoking and drugs on the human body. Define the terms acid, neutral and alkaline solution in relation to the pH scale. Use a variety of indicators to identify the pH of common chemicals and household products. Describe the chemical reactions of acids, including neutralisation and with a variety of metals and metal compounds, through practical experimental observation and chemical word equations. Calculate speed, distance and time using the equation and apply this understanding to calculate the average speed of an object during a journey. Describe the term relative motion qualitatively and quantitatively. Explain the term acceleration in terms of rate of change of speed. Construct and interpret distance-time graphs for a variety of scenarios. Define the term pressure and calculate its value from experimental data using the equation. 		<p>Unit Title: B2.2 Respiration and Photosynthesis C2.2 Changing Substances P2.2 Magnetism P2.3 Resistance</p> <p>Knowledge:</p> <ul style="list-style-type: none"> Construct the equation for aerobic respiration and explain the significance of this for energy release. Describe the processes of anaerobic respiration and evaluate its effects on the human body as well for the production of consumables such alcohol and bread. Construct the equation for photosynthesis and investigate practically how the rate of photosynthesis can be affected by light intensity. Compare and contrast chemical and physical reactions through practical experimentation, stating the key observations showing a chemical reaction. Interpret chemical formula to name compounds. State the Law of Conservation of Mass and apply this understanding to balance chemical equations on a variety of practical experiments. Describe magnetism in relation to being a non-contact force using the terms attraction and repulsion. Draw magnetic field diagram and describe their properties. Compare the properties of permanent magnets and electromagnets, including how the later can be controlled using electrical circuits. Describe the factors that affect the strength of electromagnets and explore these concepts through practical experimentation. Explain why the Earth has a magnetic field and the 		<p>Unit Title: B2.3 Life Diversity B2.4 Nutrition C3.1 Periodic Table P2.4 Light</p> <p>Knowledge:</p> <ul style="list-style-type: none"> Define the term variation and explain how this factor is affected by both the environment and inherited factors. Describe the difference between continuous and discontinuous variation including common examples in humans. Describe the process of natural selection and how this links to evolution of species. Explain why species become extinct and the impact of humanity on this issue. Describe artificial selection and evaluate its uses. Define the term balanced diet and the function of each of the scientific food groups. Investigate practically how to identify proteins, sugars, starch and lipids in food products. Describe the key components of the digestive system and explain their specific function in the breakdown and absorption of nutrients. Explain the function of enzymes in the body with specific relation to digestion. Describe the key mineral ions that plants require for survival. Describe the atomic structure of atoms including their basic electronic configurations. Define the term isotope and identify the differences between given examples of isotopes. Describe the history behind the atomic model and the periodic table with an aim to explain why scientific theories develop over time. 	

	<p>Skills: Use a range of equipment, analyse patterns, discuss limitations, draw conclusions, present data, communicate ideas, construct explanations, critique ideas/opinions, justify ideas/opinions, collect data, devise questions, plan variables, test hypothesis, estimate risks, examine consequences, review theories & interrogate sources.</p>		<p>reasons behind the different North Poles (magnetic, geographic).</p> <ul style="list-style-type: none"> Describe the term electrical resistance and use Ohm's Law to demonstrate its relationship with current and potential difference. Investigate the resistance of a wire using practical experimentation explaining how lengths of wire will affect this value. Apply understanding resistance to series and parallel circuits studied in year 7. <p>Skills: Use a range of equipment, analyse patterns, discuss limitations, draw conclusions, present data, communicate ideas, construct explanations, critique ideas/opinions, justify ideas/opinions, collect data, devise questions, plan variables, test hypothesis, estimate risks, examine consequences, review theories & interrogate sources.</p>	<p>Explain why the periodic table is arranged into groups and periods based on the properties of elements and their electronic structures.</p> <ul style="list-style-type: none"> Describe light in terms of wavelengths. Explain the terms refraction and reflection whilst investigating their properties through practical experimentation. Construct ray diagrams to show the how materials affect the angle of refraction and reflection. Describe the basic structure of the eye and how the shape of the lens and cornea affect the focusing of light on the retina. Compare the lens of a camera and the human eye including how they focus light rays to produce an image. Explain the relationship between the primary colours and white light with applications to how our bodies interpret these colours. <p>Skills: Use a range of equipment, analyse patterns, discuss limitations, draw conclusions, present data, communicate ideas, construct explanations, critique ideas/opinions, justify ideas/opinions, collect data, devise questions, plan variables, test hypothesis, estimate risks, examine consequences, review theories & interrogate sources.</p>		
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Year 7	<p>Unit Titles: A1.1 Introduction to Science B1.1 Cells C1.1 Particles P1.1 Forces</p> <p>Knowledge:</p> <ul style="list-style-type: none"> Gain a key understanding core experimental procedures including variables, methods and analysis as well as a key understanding of laboratory safety. Describe the key structure in a variety of plant and animal cell types including specialised cells. Use microscopes to view cells and make appropriate estimations of cellular sizes using micrographs. Describe the properties of different states of matter and be able to explain why changes of state occur. Describe the processes of diffusion, gas pressure and density through practical experimentation relating to real world contexts. Explain what forces are and the effects of resultant force through diagrams. Investigate the forces of 		<p>Unit Titles: B1.2 Reproduction C1.2 Atom, Elements and Compounds P1.2 Space</p> <p>Knowledge:</p> <ul style="list-style-type: none"> Gain an understanding of how organisms reproduce both sexually and asexually both at the cellular level and in larger organisms. Describe the processes of the menstrual cycle and the key stages in the development of an embryo. Explain how plant cells reproduce and why plants have to use vectors to reproduce. Develop an accurate conceptual understanding of the nature of matter. Explain that the properties of a substance are directly linked to the type and arrangement of particles that make it up. Define atoms, elements, compounds and molecules as well as recognise different types of atom by learning about the periodic table and its structure. Describe the properties of metals and non-metals. Describe the key 		<p>Unit Title: B1.3 Interdependence C1.3 Mixtures P1.3 Energy P1.4 Electrical Circuits</p> <p>Knowledge:</p> <ul style="list-style-type: none"> Describe using food chains/webs producers, predators and prey in given examples. Describe the levels of organisation within an ecosystem and how to sample this practically. Explain the term interdependence and how competition is vital for the survival of a species within the environment. Describe the difference between mixtures and solutions. Describe practical techniques to separate mixtures through filtration, evaporation, distillation and chromatography. State that energy can be measured in Joules and describe how energy can be stored and carried. Calculate the energy content of different foods using practical experimentation. Explain why energy can be 	

	<p>elastic potential and friction through practical experimentation.</p> <p>Skills: Use a range of equipment, analyse patterns, discuss limitations, draw conclusions, present data, communicate ideas, construct explanations, critique ideas/opinions, justify ideas/opinions, collect data, devise questions, plan variables, test hypothesis, estimate risks, examine consequences, review theories & interrogate sources.</p>	<p>observations of a chemical reaction through practical experiments.</p> <ul style="list-style-type: none"> • Develop understanding of the force of gravity and explain between mass and weight using their understanding of gravitational field strength through mathematical calculation. Describe how gravity keeps objects in orbit and the composition of the solar system. Describe the difference between natural and artificial satellites. Describe how the Earth's orbit and tilt effects the seasons and the reasoning behind eclipses. <p>Skills: Use a range of equipment, analyse patterns, discuss limitations, draw conclusions, present data, communicate ideas, construct explanations, critique ideas/opinions, justify ideas/opinions, collect data, devise questions, plan variables, test hypothesis, estimate risks, examine consequences, review theories & interrogate sources.</p>	<p>wasted in a system especially with regards to efficiency.</p> <ul style="list-style-type: none"> • Describe how electrical circuits are constructed using components and circuit diagrams. Explain the difference between series and parallel circuits as well as construct these circuits practically using equipment provided. Describe the terms current, charge and potential difference whilst measuring their values using practical equipment. <p>Skills: Use a range of equipment, analyse patterns, discuss limitations, draw conclusions, present data, communicate ideas, construct explanations, critique ideas/opinions, justify ideas/opinions, collect data, devise questions, plan variables, test hypothesis, estimate risks, examine consequences, review theories & interrogate sources.</p>
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Key/Legend/Notes:

KS3 Unit Codes:

- A – All
- B – Biology
- C – Chemistry
- P – Physics