

POS – 2021-2022

Year 7

Science – Curriculum Intent

Investigating the world around us

Our science curriculum is designed to develop the scientific minds of our students, focusing not only on the theory of the three main disciplines but also on developing their practical skills. Students start the science course in year 7, learning the basic scientific principles, and developing skills in analysis which they will build on in breadth and depth all the way up to taking their GCSEs. In Biology, students will study the life processes of plants and animals and their environment, in Chemistry they will build up knowledge on materials, matter and chemical reactions, and in physics they will study and work with forces and energy. Our aim is to develop the scientist in every student which will equip them for further study, and careers in STEM. For those students who are not considering a future in science, we focus on looking at how science is reflected in real life. For example, our individual and communal responsibility to look after our planet for future generations, the sustainability of our resources and the extinction of species. With scientific developments currently featuring more prominently in the news than ever before, we instil in our students the ability to reflect and logically critique what they see in the media. Through all this we aim to develop students who will continue to embrace the stimulating and exciting world of science as we, their teachers do.

Half Term 1	Week 1 Introduction Week 2 Introduction / Earth Week 3 Earth Week 4 Universe Week 5 Universe Week 6 Movement Week 7 Revision and assessment	<u>The Earth:</u> The structure of the earth and the composition of the atmosphere. How sedimentary rocks are made and their properties. Describe how igneous and metamorphic rocks are formed. Describe the rock cycle and carbon cycle. Explain why global warming happens. Know the advantages and disadvantages of recycling <u>Space:</u> This includes objects that can be seen in the night sky, including planets, comets, meteors, satellites, and stars. Students will explore our solar system and study the earth in more detail, including the orbit of the earth and the seasons. Students will also be able to explain the phases of the moon and how lunar and solar eclipses are produced <u>Movement</u> Pupils will learn the structure and functions of the human skeleton, to include support, protection, movement and making blood cells Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles The function of muscles and examples of antagonistic muscles.
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<p>Half Term 2</p>	<p>Week 1 Movement and assessment review</p> <p>Week 2 Cells</p> <p>Week 3 Cells</p> <p>Week 4 Plant reproduction</p> <p>Week 5 Plant reproduction</p> <p>Week 6 Variation</p> <p>Week 7 Revision, assessment and project week</p>	<p><u>Movement</u></p> <p>Pupils will learn the structure and functions of the human skeleton, to include support, protection, movement and making blood cells</p> <p>Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles</p> <p>The function of muscles and examples of antagonistic muscles.</p> <p><u>Cells:</u></p> <p>Students should know how to observe and label cells using a microscope.</p> <p><i>Higher ability students should be able to practice calculating magnification and rearrange the equation for magnification.</i></p> <p>Be able to describe an animal and a plant cell and compare and contrast the 2 types of cell.</p> <p>Students should be able to label the structures in a plant and animal cell and describe their functions. Including specialised cells.</p> <p>Be able to describe diffusion and explain factors that affect rate of diffusion.</p> <p><u>Plant reproduction:</u></p> <p>Students will learn about plant reproduction. Students will understand plant reproduction, fertilisation, germination and seed dispersal.</p> <p><u>Variation</u></p> <p>Know what variation is and how it happens between organisms. Pupils will know how variation helps to avoid extinction. They will present data and interpret types of variation.</p>
<p>Half Term 3</p>	<p>Week 1 Variation and assessment feedback</p> <p>Week 2 Human reproduction</p> <p>Week 3 Human reproduction</p> <p>Week 4 Particle model</p> <p>Week 5 Particle model</p> <p>Week 6 Separating mixtures</p> <p>Week 7 Revision and assessment</p>	<p><u>Variation</u></p> <p>Know what variation is and how it happens between organisms. Pupils will know how variation helps to avoid extinction. They will present data and interpret types of variation.</p> <p><u>B1.3 Reproduction:</u></p> <p>Students will learn about human reproduction. Students will understand human reproduction, fertilisation, and the development of a baby.</p> <p><u>Particles model</u></p> <p>Use the particle model to explain the 3 states of matter (solids, liquids and gases).</p> <p>Link the state of gas to Brownian motion.</p> <p>Use the particle model to explain changing state including boiling, evaporation, condensation and sublimation.</p> <p>Cover diffusion linked to the particle model. Use the particle model to explain gas pressure.</p> <p><u>Separating mixtures</u></p> <p>A pure substance is made from only one type of element or compound and mixtures can be separated. They will explain how substances dissolve, the process of chromatography and decide which separation process is the most applicable for a particular mixture.</p>

Half Term 4	<p>Week 1 – Separating mixtures. Assessment review and reteach</p> <p>Week 2 – Forces</p> <p>Week 3 – Forces</p> <p>Week 4 – Pressure</p> <p>Week 5 – Pressure</p> <p>Week 6 – Revision and assessment</p>	<p><u>P1.1 Forces:</u> Explain what forces do and describe interaction pairs. Explain how forces can stretch and squash objects. Know what friction is and why it is important. Know the difference between contact and non-contact forces, be able to describe gravity. Know the difference between mass and weight. Describe in different situations whether forces are balanced or unbalanced</p> <p><u>Pressure</u> Pupils will know that pressure acts in all directions and increases in fluids due to increase in depth. They will learn about upthrust, sink and swim. They will use the equation $\text{Pressure} = \text{force}/\text{area}$</p>
Half Term 5	<p>Week 1 – Assessment review and reteach and periodic table</p> <p>Week 2 – Periodic table</p> <p>Week 3 - Elements</p> <p>Week 4 – Elements and interdependence</p> <p>Week 5 – Interdependence and assessment</p>	<p><u>Periodic table</u> Pupils will learn about the position of the metals and non metals in the periodic table. They will learn about group 1,7 and 0 and the trends within these groups.</p> <p><u>Elements</u> Pupils will name compounds and understand chemical formulas. They will understand most substances are not pure and contain compounds or mixtures of atoms of different elements. They will understand these compounds will have different properties.</p> <p><u>Interdependence</u> Describe the difference between food webs and food chains. Describe how organisms are interdependent on each other, describe an ecosystem and identify niches. Identify communities, understand sampling techniques, biodiversity and gene banks.</p>
Half Term 6	<p>Week 1 – Assessment review and reteach</p> <p>Week 2 – Sound</p> <p>Week 3 – Sound</p> <p>Week 4 – Light</p> <p>Week 5 – Light and revision/reteach</p> <p>Week 6 – Revision Assessment</p> <p>Week 7 – Reteach and review</p>	<p><u>Sound</u> They will be able to explain that sound is caused by vibrations which travel at different speeds in different medium. Students will be able to explain how the sound changes pitch and loudness. They will understand the structure function of the ear and how echoes and ultrasound are produce and used.</p> <p><u>Light:</u> Students will understand how light travels and interacts with different medium. They will be able to explain, using ray diagrams, the principle of reflection, refraction, how the eye and camera work. They will also gain a basic understanding on the different colours of light and how filters work.</p>
Notes	Time should be taken to embed practical skills and focus on fundamentals that will support a secure understanding .	

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Year 8

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Half Term 1	Week 1 – Introduction and Health and lifestyle Week 2 Health and lifestyle Week 3 Health and lifestyle Week 4 The periodic table Week 5 The periodic table Week 6 The periodic table Week 7 Revision and assessment	B2.1 Health and Lifestyle: Students need to be able to define a healthy lifestyle and the factor which affect the quality of a person health. They will be able to describe the effect of diet, exercise, drugs, alcohol and smoking on a person health and the non-communicable diseases that are caused by an unhealthy lifestyle. C2.1 The periodic table: Describe the differences between metals and non-metals and explain the trends in the periodic table. Describe and explain the properties of group 1,7 and group 0 elements. Be able to describe atomic structure and the difference between an element and a compound. Draw the electronic structures of atoms. Describe the different ways that elements behave in terms of bonding.
Half Term 2	Week 1 Reteach following assessment/ Electricity and Magnetism Week 2 Electricity and Magnetism Week 3 Electricity and Magnetism Week 4 Ecosystem Processes	P2.1 Electricity and Magnetism: Explain how objects become charged. Describe what is meant by an electric field. Make a working circuit and use a range of circuit symbols.

	<p>Week 5 Ecosystem Processes</p> <p>Week 6 Ecosystem Processes</p> <p>Week 7 Revision and assessment</p>	<p>Use circuits to describe and calculate current, potential difference and resistance.</p> <p>Draw magnetic field diagrams.</p> <p>Describe what an electromagnet is and when they are used.</p> <p>Be able to describe the Earth's magnetic field</p> <p><u>B2.2 Ecosystem Processes:</u></p> <p>Describe the process of the photosynthesis and the structure and function of components of a leaf.</p> <p>Understand respiration, the equations and the differences between aerobic and anaerobic respiration.</p> <p>Describe the difference between food webs and food chains.</p> <p>Describe how organisms are interdependent on each other, describe an ecosystem and identify niches.</p> <p>Identify communities, understand sampling techniques, biodiversity and gene banks.</p>
Half Term 3	<p>Week 1 - Assessment review and reteach</p> <p>Week 2 - Separation Techniques</p> <p>Week 3 - Separation Techniques</p> <p>Week 4 – Separation techniques/Food and fuels</p> <p>Week 5 - Food and fuels</p> <p>Week 6 - Food and fuels</p> <p>Week 7 – Revision and assessment</p>	<p><u>C2.2 Separation Techniques:</u></p> <p>Students will be able to explain a mixture and the process of dissolving using the particle model.</p> <p>Students will gain an understanding of all the different techniques for separating solids and liquids and the different situations they are used in.</p> <p><u>P2.2 Energy: Food and fuels.</u></p> <p>Understand the conservation of energy .Know the difference between heat and temperature.</p> <p>Energy transfer in terms of conduction, convection and radiation.</p> <p>Energy and Power. Energy resources.</p> <p>Be able to describe internal energy.</p>
Half Term 4	<p>Week 1 - Assessment review and reteach</p> <p>Week 2 - Metals and acids</p> <p>Week 3 - Metals and acids</p> <p>Week 4 - Adaptation and Inheritance</p> <p>Week 5 - Adaptation and Inheritance</p> <p>Week 6 – Revision and assessment</p>	<p><u>C2.3 Metals and Acids:</u></p> <p>Describe the reaction between metals and acids, metals and oxygen and metals and water.</p> <p>Explain and describe the trend in displacement reaction.</p> <p>Explain what metal ores are.</p> <p>Be able to describe polymers and ceramics.</p> <p>Be able to describe metal and non-metal oxides in respect to acidity.</p>

Half Term 5	<p>Week 1 – Adaptation and inheritance</p> <p>Week 2 - Adaptation and inheritance</p> <p>Week 3 – The Earth</p> <p>Week 4 – The Earth</p> <p>Week 5 – Revision and assessment</p>	<p><u>B2.3 Adaptation and Inheritance:</u> Describe and explain the adaptations of different organisms. Explain how environmental change affects adaptation. Know what variation is and how it happens. Describe and explain the adaptations of different organisms. Explain how our ideas about inheritance have developed. Describe evolution by natural selection and extinction and how we can protect against it.</p> <p><u>C2.4 The Earth:</u> The structure of the earth and the composition of the atmosphere. How sedimentary rocks are made and their properties. Describe how igneous and metamorphic rocks are formed. Describe the rock cycle and carbon cycle. Explain why global warming happens. Know the advantages and disadvantages of recycling</p>
Half Term 6	<p>Week 1 – Assessment review and reteach</p> <p>Week 2 – Forces in action</p> <p>Week 3 – Forces in action</p> <p>Week 4 – Reteach all units</p> <p>Week 5 – Revision and assessment</p> <p>Week 6 – Reteach</p> <p>Week 7 - Reteach</p>	<p><u>P2.3 Forces in action:</u> Calculate speed using the speed equation Describe relative motion including that of passing trains and cars. Choose equipment to make appropriate measurements for time and distance to calculate speed . Describe how atmospheric pressure changes with height. Describe how liquid pressure changes with depth. Be able to draw distance-time graphs. Predict quantitatively the effect of changing area and/or force on pressure Explain what is meant by a turning forces.</p>
Notes	Time should be taken to embed practical skills and focus on fundamentals that will support a secure understanding .	

POS – 2020-2021

Year 9

Science – Curriculum Intent

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<p>Half Term 1</p>	<p>Week 1 - Cells</p> <p>Week 2 Cells</p> <p>Week 3 Cells/atomic structure</p> <p>Week 4 Atomic structure</p> <p>Week 5 Atomic structure/ Energy</p> <p>Week 6 Energy</p> <p>Week 7 Revision and assessment</p>	<p>Cells: Cells are the basic unit of all forms of life. Understanding of new technology. Describe different transport methods within animals and plants Variation and evolution.</p> <p>Atomic structure: A simple model of the atom, symbols, relative atomic mass, electronic structure and isotopes. Including transition element. Describe different separation techniques.</p> <p>Energy: Energy changes in a system. Idea of stores of energy rather than types. Changes in energy (elastic, kinetic, gpe and thermal). Link between power and energy Cells, atoms and energy assessment</p>
<p>Half Term 2</p>	<p>Week 1 Assessment review and reteach</p> <p>Week 2 Organisation</p> <p>Week 3 Organisation/ The periodic table</p> <p>Week 4 The periodic table</p> <p>Week 5 Energy transfers</p>	<p>Organisation: Principals of organisation, Animal tissues, organs and organ systems. Cell division Growth and differentiation Stem cells Stem cells dilemma</p> <p>The periodic table:</p>

	<p>Week 6 Energy transfers</p> <p>Week 7 Revision and assessment</p>	<p>Students should understand how each stage in the development of the periodic table was facilitated by new evidence becoming available. They should also be able to identify the importance of an inherent pattern to the elements and how this guided Mendeleev's thinking. Students should also develop their understanding of electronic structures from the previous unit Atomic structure, and apply this to the arrangement of the periodic table and the chemical properties of Group 0, Group 1, and Group 7 elements.</p> <p><u>Energy transfers:</u> Students will develop their understanding of the heating and cooling processes, which transfer energy within a material or from one object to another. They will investigate thermal conductivity and the differences in the processes of thermal conduction in metals and non-metals. Be able to define specific heat capacity</p>
<p>Half Term 3</p>	<p>Week 1 Tissues and organs</p> <p>Week 2 Tissues and organs</p> <p>Week 3 Bonding</p> <p>Week 4 Bonding</p> <p>Week 5 Energy resources</p> <p>Week 6 Energy resources</p> <p>Week 7 – Revision and assessment</p>	<p><u>Organisation and the digestive system</u> The Human Digestive System, The Chemistry of Food Catalysts and Enzymes, Factors affecting enzyme action, How the Digestive System Works Making digestion efficient</p> <p><u>Chemical bonds</u> Bonding, structure, and the properties of matter: ionic, covalent and metallic. How bonding and structure are related to the properties of substances. Structure of carbon.</p> <p><u>Energy sources</u> Students will examine the different sources of energy that are used to generate electricity or provide heating for homes. The different sources of energy including renewable and non-renewable. They will consider the effect of the production and use of biofuels on the environment along with the concept of carbon-neutrality</p>

<p>Half Term 4</p>	<p>Week 1 – Assessment review and Human body</p> <p>Week 2 – Human body</p> <p>Week 3 – Quantitative chemistry</p> <p>Week 4 – Quantitative chemistry</p> <p>Week 5 – Reteach and assessment</p> <p>Week 6 – Electricity (part to complete after Easter)</p>	<p><u>The Human Body</u> Students should know the structure and functioning of the human heart and lungs, including how lungs are adapted for gaseous exchange. Explain how the structures of plant tissue(s and components are related to their functions-Transpiration).</p> <p><u>Quantitative chemistry</u> Students should have a firm understanding of how to carry out calculations for Science, using the appropriate mathematical method. conservation of mass and the quantitative interpretation of chemical equations. Use of amount of substance in relation to masses of pure substances. They should also be able to explain in detail why a reaction does not yield 100%, and how this can be improved.</p> <p><u>Electricity</u> Focusing on the relationship between current, charge and resistance. Students define differences between series and parallel circuits.</p>
<p>Half Term 5</p>	<p>Week 1 – Electricity continued</p> <p>Week 2 – Communicable diseases</p> <p>Week 3 – Communicable diseases</p> <p>Week 4 – Chemical reactions</p> <p>Week 5 – Chemical reactions Reteach and assessment</p>	<p><u>Electricity,</u> Focusing on the relationship between current, charge and resistance. Students define differences between series and parallel circuits.</p> <p><u>Communicable Diseases</u> Describe what pathogens are, and explain differences between bacteria and virus, Describe and explain specific examples of diseases such as measles, HIV and tobacco mosaic virus</p> <p><u>Chemical reactions (Reactivity)</u> Understand a wide range of reactions with metals including: reactions with oxygen, acid, and their extraction. Other reactions include: neutralisation and salt production linked to the pH scale</p>

<p>Half Term 6</p>	<p>Week 1 – Electricity</p> <p>Week 2 – Electricity</p> <p>Week 3 – Protecting the body</p> <p>Week 4 – Protecting the body</p> <p>Week 5 - Revision</p> <p>Week 6 – Assessment</p> <p>Week 7 – Reteach</p>	<p><u>Electricity 2 (In the home)</u></p> <p>Describe how the mains electricity is set up, safety within electricity.</p> <p>Describe the function of the national grid</p> <p><u>Protecting the body</u></p> <p>Describe how vaccinations work, and the step by step method of the development of drugs</p>
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