

# POS – 2020-2021

## Year 10

### 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 Chemical changes Week 2 Chemical changes Week 3 Chemical changes Week 4 Preventing and treating diseases Mini assessment Week 5 Molecules and matter Week 6 Non-communicable diseases Week 7 Non-communicable diseases Week 8 Reteach and assessment	<u>Non – communicable</u> The relationship between health and disease Communicable diseases including sexually transmitted infections in humans (including HIV/AIDs). Non-communicable diseases, diseases in animals and plants. The impact of lifestyle factors on the incidence of non-communicable diseases <u>Molecules and matter:</u> Relating models of arrangements and motions of the molecules in solid, liquid and gas phases to their densities. Melting, evaporation, and sublimation as reversible changes. Calculating energy changes involved on heating, using specific heat capacity; and those involved in changes of state, using specific latent heat. <u>Chemical changes:</u> Reduction and oxidation in terms of loss or gain of oxygen. the chemistry of acids; reactions with some metals and carbonates. Extraction and purification of metals related to the position of carbon in a reactivity series <u>Preventing and treating diseases</u>
Half Term 2	Week 1 Biology GCSE Linked knowledge Week 2 Chemistry GCSE Linked knowledge Week 3 Physics GCSE Linked knowledge	<u>Electrolysis:</u> Balanced chemical equations, ionic equations and state symbols. Electrolysis of molten ionic liquids and aqueous ionic solutions.

	<p>Week 4 Chemistry – The atom and bonding - Reteach  Week 3 Electrolysis  Week 4 Electrolysis  Week 5 Radioactivity  Week 6 Radioactivity and Assessment</p>	<p>Reduction and oxidation in terms of loss or gain of oxygen.  <i>(Write half-equations; and be able to explain how electrolysis is used for extraction ).</i>  <u>Radioactivity:</u>  The nuclear model and its development in the light of changing evidence.  Masses and sizes of nuclei, atoms and small molecules  differences in numbers of protons, and neutrons related to masses and identities of nuclei, isotope characteristics and equations to represent changes.  Ionisation; absorption or emission of radiation related to changes in electron orbits.  Radioactive nuclei: emission of alpha or beta particles, neutrons, or gamma-rays, changes in the nuclear mass and/or charge.  Radioactive materials, half-life, irradiation, contamination and their associated hazardous effects, waste disposal  Nuclear fission, nuclear fusion and our sun’s energy.</p>
<p>Half Term 3</p>	<p>Week 1 Photosynthesis  Week 2 Photosynthesis  Week 3 Respiration Mini assessment  Week 4 Energy changes  Week 5 Energy changes and Forces in balance  Week 6 Forces in balance  Week 7 Reteach and mini assessment</p>	<p><u>Photosynthesis:</u>  Photosynthesis as the key process for food production and therefore biomass for life.  The process of photosynthesis and factors affecting the rate of photosynthesis.  <u>Energy changes:</u>  Determination of empirical formulae from the ratio of atoms of different kinds.  Balanced chemical equations, ionic equations and state symbols.  The chemistry of acids; reactions with some metals and carbonates.  pH as a measure of hydrogen ion concentration and its numerical scale.  <u>Respiration:</u>  The importance of cellular respiration; the processes of aerobic and anaerobic respiration.</p>
<p>Half Term 4</p>	<p>Week 1 – The nervous System and homeostasis  Week 2 – The nervous System and homeostasis  Week 3 – The nervous System and homeostasis and MA  Week 4 – Rates of reaction  Week 5 – Rates of reaction  Week 6 – Reteach and assessment</p>	<p><u>Nervous system:</u>  Principles of nervous coordination and control in humans.  The relationship between the structure and function of the human nervous system.  The relationship between structure and function in a reflex arc.  Homeostasis.  <u>Energy changes:</u>  Determination of empirical formulae from the ratio of atoms of different kinds.  Balanced chemical equations, ionic equations and state symbols.  The chemistry of acids; reactions with some metals and carbonates.  pH as a measure of hydrogen ion concentration and its numerical scale.  <u>Radioactivity:</u>  The nuclear model and its development in the light of changing evidence.  Masses and sizes of nuclei, atoms and small molecules  differences in numbers of protons, and neutrons related to masses and identities of nuclei, isotope characteristics and equations to represent changes.  Ionisation; absorption or emission of radiation related to changes in electron orbits.</p>

		<p>Radioactive nuclei: emission of alpha or beta particles, neutrons, or gamma-rays, changes in the nuclear mass and/or charge.</p> <p>Radioactive materials, half-life, irradiation, contamination and their associated hazardous effects, waste disposal</p> <p>Nuclear fission, nuclear fusion and our sun's energy.</p>
Half Term 5	<p>Week 1 – Motion and forces in motion</p> <p>Week 2 - Motion and forces in motion</p> <p>Week 3 - Motion and forces in motion</p> <p>Week 4 – Crude oil and fuels and mini assessment</p> <p>Week 5 – Reproduction</p> <p>Week 6 – Reproduction</p> <p>Week 7 – Reproduction Mini assessment</p>	<p><b>Forces in balance:</b></p> <p>Forces as vectors, Newton's First Law.</p> <p>Forces and fields: electrostatic, magnetic, gravity.</p> <p><i>(Vectors and scalars, forces, resultant forces, moments, levers, gears, centre of mass, moments and equilibrium, the parallelogram of forces, resolution of forces).</i></p> <p><b>Hormonal control:</b></p> <p>Principles of hormonal coordination and control - humans.</p> <p>Hormones in human reproduction, hormonal and non-hormonal methods of contraception.</p> <p>Hormones in the human body, menstrual cycle and fertility treatment.</p>
Half Term 6	<p>Week 1 – End of year 10 exams</p> <p>Week 2 – End of year 10 exams</p> <p>Week 3 – End of year 10 exams</p> <p>Week 4 – Required practical week</p> <p>Week 5 – Required practical week</p> <p>Week 6 – Reteach and mock analysis</p> <p>Week 7 – Reteach and mock analysis</p>	<p><b>Motion:</b></p> <p>Interpreting quantitatively graphs of distance, time, and speed.</p> <p><b>Rates and Equilibrium:</b></p> <p>Rate of reaction, Collision theory, catalysts, reversible reactions, equilibrium and altering conditions.</p>
Notes	<p><b>Variation and evolution:</b></p> <p>The process of natural selection leading to evolution the evidence for evolution.</p> <p>The importance of selective breeding of plants and animals in agriculture.</p> <p>The uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology.</p> <p><b>Genetics and Evolution:</b></p> <p>The process of natural selection leading to evolution.</p> <p>The evidence for evolution.</p>	

## Year 11

### 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	<p><b>Weeks 1 – 7</b></p> <p>Week 1 - Reproduction            Week 2 Reproduction            Week 3 Reproduction Mini assessment            Week 4 Rates and equilibrium            Week 5 Rates and equilibrium Mini assessment            Week 6 Variation and evolution            Week 7 Motion            Week 8 Half term assessment</p>	<p><b>Reproduction:</b>            The genome as the entire genetic material of an organism            How the genome, and its interaction with the environment, influence the development of the phenotype of an organism.            The potential impact of genomics on medicine.            Most phenotypic features being the result of multiple, rather than single, genes.            Single gene inheritance and single gene crosses with dominant and recessive phenotypes.            Sex determination in humans.            Genetic variation in populations of a species.</p> <p><b>Variation and evolution:</b>            The process of natural selection leading to evolution            the evidence for evolution.</p> <p><b>Rates and Equilibrium:</b>            Rate of reaction, Collision theory, catalysts, reversible reactions, equilibrium and altering conditions.</p>
Half Term 2	<p>Week 1 Crude oil and fuels            Week 2 Genetics and evolution            Week 3 Genetics and evolution - Mini assessment            Week 4 Waves            Week 5 Chemical analysis Mini assessment            Week 6 Adaptations            Week 7 Adaptations</p>	<p><b>Adaptions and independence:</b>            Organisms are interdependent and are adapted to their environment.            The importance of biodiversity.</p> <p><b>Forces and motion:</b>            Interpreting quantitatively graphs distance, time, speed.            Acceleration caused by forces; Newton’s First Law</p>

		<p>weight and gravitational field strength.          Decelerations and braking distances involved on roads, safety.          Calculating work done as force x distance; elastic and inelastic stretching.</p>
Half Term 3	<p>Week 1 Mocks          Week 2 Mocks          Week 3 Mocks          Week 4 Forces in motion          Week 5 Forces in motion</p>	<p><b>Chemical analysis:</b>          Identification of common gases</p>
Half Term 4	<p>Week 1 – Reteach          Week 2 – Earth’s Atmosphere          Week 3 – Organising ecosystems          Week 4 – EM waves          Week 5 – EM waves Mini assessment          Week 6 – Electromagnetism</p>	<p><b>Organising an ecosystem:</b>          Levels of organisation within an ecosystem          some abiotic and biotic factors which affect communities;          the importance of interactions between organisms in a community.          How materials cycle through abiotic and biotic components of ecosystems.          The role of microorganisms (decomposers) in the cycling of materials through an ecosystem.          Methods of identifying species and measuring distribution, frequency and abundance of species within a habitat.          Positive and negative human interactions with ecosystems.</p> <p><b>Electromagnets:</b>          Exploring the magnetic fields of permanent and induced magnets, and the Earth’s magnetic field, using a compass.          Magnetic effects of currents, how solenoids enhance the effect.          How transformers are used in the national grid and the reasons for their use.</p>
Half Term 5	<p>Week 1 – Biodiversity and Ecosystems          Week 2 – Biodiversity and Ecosystems          Week 3 – Earth’s Resources          Week 4 – Reteach          Week 5 – Assessment          Week 6 –</p>	<p>Biodiversity:</p>
Half Term 6		

--	--	--