

# 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.

<p>Half Term 1 7 Weeks</p> <p>Week 1-7</p> <p>7<sup>th</sup> Sept – 23<sup>rd</sup> Oct</p>	<p>Week 2 – Recap on communicable diseases including 1/2 lessons on Covid 19</p> <p>Week 3 – Non-communicable diseases</p> <p>Week 4 – Preventing and treating diseases</p> <p>Week 5 – Recap electricity 1 - at most 1-2 lessons, start Electricity 2</p> <p>Week 6 – Electricity 2</p> <p>Week 7 – Assessment – Non communicable, electricity 1 and 2.</p>	<p><u>Non – communicable</u></p> <p>The relationship between health and disease</p> <p>Communicable diseases including sexually transmitted infections in humans (including HIV/AIDs).</p> <p>Non-communicable diseases, diseases in animals and plants.</p> <p>The impact of lifestyle factors on the incidence of non-communicable diseases</p> <p><u>Electricity:1</u></p> <p>Measuring resistance using p.d. and current measurements.</p> <p>Exploring current, resistance and voltage relationships for different circuit elements; including their graphical representations.</p> <p>Quantity of charge flowing as the product of current and time.</p> <p>Drawing circuit diagrams; exploring equivalent resistance for resistors in series.</p> <p><u>Electricity 2:</u></p> <p>The domestic a.c. supply; live, neutral and earth mains wires, safety measures.</p> <p>Power transfer related to p.d. and current, or current and resistance.</p>
<p>Half Term 2 7 Weeks</p> <p>Week 8 – 14</p>	<p><u>Weeks 1 – 7</u></p> <p>Week 1 – Electrolysis</p> <p>Week 2 – Electrolysis</p> <p>Week 3 – Photosynthesis</p>	<p><u>Electrolysis:</u></p> <p>Balanced chemical equations, ionic equations and state symbols.</p> <p>Electrolysis of molten ionic liquids and aqueous ionic solutions.</p> <p>Reduction and oxidation in terms of loss or gain of oxygen.</p> <p><i>(Write half-equations; and be able to explain how electrolysis is used for extraction ).</i></p>

<p>2<sup>nd</sup> Nov – 18<sup>th</sup> Dec</p>	<p>Week 4 - Photosynthesis Week 5 – Molecules and matter Week 6 – Molecules and matter Week 7 – Assessment – Electrolysis , photosynthesis and molecules and matter</p>	<p><b>Photosynthesis:</b> Photosynthesis as the key process for food production and therefore biomass for life. The process of photosynthesis and factors affecting the rate of photosynthesis.</p> <p><b>Molecules and matter:</b> 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.</p>
<p>Half Term 3 6 Weeks  Weeks 15 – 20  4<sup>th</sup> Jan – 12<sup>th</sup> Feb</p>	<p>Week 1 – Energy changes Week 2 – Energy changes / Respiration Week 3 – Respiration Week 4 – Radioactivity Week 5 – Radioactivity Week 6 – Assessment Energy changes, Respiration, Radioactivity</p>	<p><b>Energy changes:</b> 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.</p> <p><b>Respiration:</b> The importance of cellular respiration; the processes of aerobic and anaerobic respiration.</p> <p><b>Radioactivity:</b> 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 4 5 Weeks  Weeks 21 – 25  22<sup>nd</sup> Feb – 26<sup>th</sup> March</p>	<p>Week 1 – Nervous system and start chemical calculations Week 2 – Chemical calculations continued Week 3 – Forces in Balance Week 4 – Forces in Balance Week 4 – Assessment – Nervous system, chemical calculations, Forces in balance. Week 5 – Reteach week</p>	<p><b>Nervous system:</b> 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.</p> <p><b>Chemical calculations:</b> Determination of empirical formulae from the ratio of atoms of different kinds. Balanced chemical equations, ionic equations and state symbols.</p> <p><b>Forces in balance:</b> Forces as vectors, Newton’s First Law. Forces and fields: electrostatic, magnetic, gravity. <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>Half Term 5 7 Weeks</p> <p>Weeks 26 – 32</p> <p>12<sup>th</sup> March – 28<sup>th</sup> May</p>	<p>Week 1 – Hormonal control</p> <p>Week 2 – Hormonal control</p> <p>Week 3 - Motion</p> <p>Week 4 – Reproduction</p> <p>Week 5 – Reproduction</p> <p>Week 6 - Oils and fuels</p> <p>Week 7 – Assessment – Hormonal control, motion, reproduction, oils and fuels</p>	<p><u>Hormonal control:</u> Principles of hormonal coordination and control - humans. Hormones in human reproduction, hormonal and non-hormonal methods of contraception. Hormones in the human body, menstrual cycle and fertility treatment.</p> <p><u>Motion:</u> Interpreting quantitatively graphs of distance, time, and speed.</p> <p><u>Reproduction:</u> 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><u>Oils and fuels:</u> Carbon compounds, both as fuels and feedstock, and the competing demands for limited resources. Fractional distillation of crude oil and cracking to make more useful materials.</p>
<p>Half Term 6 7 Weeks</p> <p>Weeks 33 – 39</p> <p>7<sup>th</sup> June – 23<sup>rd</sup> July</p>	<p>Week 1 – Variation and evolution</p> <p>Week 2 – Variation and evolution/ Genetics and evolution</p> <p>Week 3 – Genetics and evolution</p> <p>Week 4 – Chemical changes</p> <p>Week 5 – Chemical changes</p> <p>Week 6 – Assessment of variation and evolution, chemical changes, genetics and evolution.</p> <p>Week 6 – Reteach</p>	<p><u>Variation and evolution:</u> The process of natural selection leading to evolution the evidence for evolution. The importance of selective breeding of plants and animals in agriculture. The uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology. Process of evolution and variation to aid survival.</p> <p><u>Genetics and Evolution:</u> The process of natural selection leading to evolution. The evidence for evolution.</p> <p><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</p>

# POS – 2020-2021

## Year 11

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<p>Half Term 1 7 Weeks</p> <p>Week 1-7</p> <p>7<sup>th</sup> Sept – 23<sup>rd</sup> Oct</p>	<p><b>Weeks 1 – 7</b></p> <p>Week 1 – Cells and organisms - Link all previous Biology topics to the basics of cells.</p> <p>Week 2 – Atomic structure, periodic table recap – Link all Chemistry topics to the basics of Chemistry</p> <p>Week 3 – Energy re teach – Link all previous Physics topics to the basics of energy</p> <p>Week 4 – Re teach focus on required practical's.</p> <p>Week 5 – Assessment – cells, atomic structure, energy (compare to previous assessments and identify areas to revisit).</p> <p>Week 6 – Reproduction/ Variation and Evolution/ Evolution and genetics recap (1/2 lessons)</p> <p>Week 7 – Adaptions and interdependence</p>	<p><b>Adaptions and independence:</b></p> <p>Organisms are interdependent and are adapted to their environment.</p> <p>The importance of biodiversity.</p>
<p>Half Term 2 7 Weeks</p> <p>Week 8 – 14</p> <p>2<sup>nd</sup> Nov – 18<sup>th</sup> Dec</p>	<p>Week 1 – Adaptions and interdependence</p> <p>Week 2 – Forces and motion</p> <p>Week 3 – Forces and motion and start rates and equilibrium</p> <p>Week 4 – Rates and equilibrium</p> <p>Week 5 – Rates and equilibrium</p> <p>Week 6 – Assessment –(reproduction, variation and evolution), Adaptions, forces and motion and rates and equilibrium.</p> <p>Week 7 – Re teach</p>	<p><b>Adaptions and independence:</b></p> <p>Organisms are interdependent and are adapted to their environment.</p> <p>The importance of biodiversity.</p> <p><b>Forces and motion:</b></p> <p>Interpreting quantitatively graphs distance, time, speed.</p> <p>Acceleration caused by forces; Newton's First Law</p> <p>weight and gravitational field strength.</p> <p>Decelerations and braking distances involved on roads, safety.</p> <p>Calculating work done as force x distance; elastic and inelastic stretching.</p>

		<p><b><u>Rates and Equilibrium:</u></b> Rate of reaction, Collision theory, catalysts, reversible reactions, equilibrium and altering conditions.</p>
<p>Half Term 3 6 Weeks</p> <p>Weeks 15 – 20 4<sup>th</sup> Jan – 12<sup>th</sup> Feb</p>	<p>Week 1 – Chemical analysis and start revision Week 2 – Revision Week 3 – Mocks Week 4 – Mocks Week 5 – Reteach Week 6 – Reteach</p>	<p><b><u>Chemical analysis:</u></b> Identification of common gases</p>
<p>Half Term 4 5 Weeks</p> <p>Weeks 21 – 25</p> <p>22<sup>nd</sup> Feb – 26<sup>th</sup> March</p>	<p>Week 1 – Re teach Week 2 – Organising an ecosystem Week 3 – Waves and EMS re teach Week 4 – Electricity reteach Week 4 – Electromagnets Week 5 – Assessment – Organisation, electromagnets, chemical analysis</p>	<p><b><u>Organising an ecosystem:</u></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><u>Electromagnets:</u></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>
<p>Half Term 5 7 Weeks</p> <p>Weeks 26 – 32</p> <p>12<sup>th</sup> March – 28<sup>th</sup> May</p>	<p>Week 1 – Reteach week Week 2 – Biodiversity Week 3 – Biodiversity Week 4 – Rates of reaction re teach – link to all other topics Week 5 – Forces reteach – link to all other topics Week 6 – Assessment – H Week 7 – Reteach week</p>	<p>Biodiversity:</p>
<p>Half Term 6 7 Weeks</p> <p>Weeks 33 – 39</p> <p>7<sup>th</sup> June – 23<sup>rd</sup> July</p>		

