

SEPARATE SCIENCE			Year: 11		
AUTUMN		SPRING		SUMMER	
Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Theme/ topic: Physics (P1,3,) Chemistry (C1-C2 Biology (B1) and B4)	Theme/ topic: Physics (P4) Chemistry (C3,4,5) Biology (B2 and B3)	Theme/ topic: Biology (B3 cont. B4 Physics(P5) Chemistry(C6)	Theme/ topic: Biology (B5 and B6) Chemistry(C7) Physics (P6)	Theme/ topic: Biology (B 7) Chemistry(C8,9,10) Physics(P7and P8)	Theme/ topic: Exam preparation
By the end of this half term pupils will know:					
<p>Physics:</p> <p>Principals of Thermal Conduction Thermal store of energy and relating to the concepts behind the required practical</p> <p>Chemistry:</p> <p>The importance of the electronic structure relating to the position in the periodic table and the properties of atoms and bonding.</p> <p>Biology:</p> <p>The structures within the cells and how they interact in all of wider functions of a living organism.</p> <p><u>Tier 3 vocab:</u></p> <p>Cellulose, resolution, plasmid, diffusion osmosis, passive.</p>	<p>Physics:</p> <p>The three types of nuclear radiation and link them to the decay of the of atoms</p> <p>Chemistry:</p> <p>Students will be able to predict elements and compounds behaviour in chemical reactions including how the ionisation affect pH, calculating reacting masses.</p> <p>Biology:</p> <p>Students will be able to describe the factors which contribute towards communicable and non-communicable diseases, summarising the similarities and differences.</p> <p><u>Tier 3 vocab:</u></p> <p>Ionising, penetration, half-life, nuclear decay</p>	<p>Physics:</p> <p>Newton’s three laws and relating them to Hooke’s law and Momentum and other investigations. Advance resultant force calculations.</p> <p>Chemistry:</p> <p>Revisit the factors which affect the rate of reaction exo and endothermic reactions but relate them to the dynamic equilibrium and Le Chatelier’s principal.</p> <p>Biology:</p> <p>Organisms need a supply of energy and molecules to carry out life processes</p> <p>Linking transpiration and water movement to photosynthesis and chemosynthesis. Relating aerobic respiration in plants and animals to their ability</p>	<p>Physics:</p> <p>Electromagnetic waves, velocity in vacuum; waves transferring energy; wavelengths and frequencies from radio to gamma-rays. Velocities differing between media: absorption, reflection, refraction effect.</p> <p>Chemistry:</p> <p>Relating the functional groups of ester, alcohols and carboxylic acids to properties and chemical reactions.</p> <p>Biology:</p> <p>How the genome, and its interaction with the environment, influence the development of the phenotype of an organism. Comparison or mitosis and meiosis. The uses of modern biotechnology including</p>	<p>Physics:</p> <p>How the motor effect and electricity are generated, how transformers work.</p> <p>The lifecycle of a star, red shift, theories for the origin and prognosis of the universe</p> <p>Chemistry:</p> <p>Life cycle assessment and recycling to assess environmental impacts associated with all the stages of a product's life. evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change. the Earth’s water resources and obtaining potable water.</p> <p>Biology:</p> <p>How materials cycle through abiotic and biotic components of ecosystems</p>	

<p>Covalent, ionic, electrostatic, energy level electron configuration</p> <p>Specific heat capacity, specific latent heat internal energy, efficiency</p>	<p>Neutralisation, relative formula mass, percentage yield</p> <p>Antibodies, antigen and antitoxins, phagocyte, lymphocyte</p>	<p>to survive and how humans have developed fermentations for own needs</p> <p><u>Tier 3 vocab:</u></p> <p>Resultant forces, scalar, vector, terminal velocity</p> <p>Endothermic, exothermic, dynamic equilibrium</p> <p>Aerobic, anaerobic, transpiration, photosynthesis</p>	<p>gene technology; some of the practical and ethical considerations of modern biotechnology.</p> <p>Students will explain the regions of the brain and how the structure and function of the eye help to protect us.</p> <p><u>Tier 3 vocab:</u></p> <p>Absorption, refraction, wavelength frequency, amplitude Analogue.</p> <p>Ester, organic, carboxylic, alkene alcohol homologous series</p> <p>Anaphase, interphase, telophase, metaphase, splicing, ligase genome chromosome</p>	<p>• the role of microorganisms (decomposers) in the cycling of materials through an ecosystem</p> <p><u>Tier 3 vocab:</u></p> <p>Proto star, nebula, supernova, Doppler effect. Transformer</p> <p>Potable, effluent, sterile, filtration, sedimentation, climate, spectroscopy</p> <p>Decomposer nodule</p>	
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They will understand (key concepts):

<p>Physics:</p> <p>Linking the ideas of particle model and matter to energy stores and transfers.</p> <p>Chemistry:</p> <p>The behaviour and structural arrangement of atoms explains the properties of different compounds and linking this to the type of bonding, electronic structure and position in the periodic table</p> <p>Biology:</p>	<p>Physics:</p> <p>Linking the Atomic nuclei to how radioactive decay, occurs and why some radiation is stronger Ionising than other types radiation,</p> <p>Chemistry:</p> <p>During chemical reactions, atoms are rearranged and new substances are formed.</p> <p>Biology:</p> <p>Organisms must stay in good health to survive and thrive; the health of an</p>	<p>Physics:</p> <p>Understanding forces helps us to predict and control physical change.</p> <p>Chemistry:</p> <p>During chemical reactions atomic nuclei and electrons are rearranged and new substances are formed.</p> <p>Biology:</p> <p>Organisms need a supply of energy and molecules to carry out life processes</p>	<p>Physics:</p> <p>Waves radiate information. Understanding waves helps us to communicate.</p> <p>Chemistry:</p> <p>Homologous series each have distinctive properties based on the number and types of atoms and their functional groups.</p> <p>Biology:</p> <p>Genetic information is passed from each generation to the next; this</p>	<p>Physics:</p> <p>Understanding electricity and magnetism helps us develop technology to improve lives.</p> <p>Chemistry:</p> <p>Substances can move within and between the atmosphere, hydrosphere, geosphere and biosphere as part of large-scale Earth systems.</p> <p>Biology:</p>	
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Cells working together, tissues and organ systems, Supplying cells – the human circulatory, digestive and gas exchange systems	individual results from interactions between its body, behaviour, environment and other organisms.		information and the environment affect the features, growth and development of organisms. The great diversity of organisms is the result of evolution.	All organisms, including humans, depend on, interact with and affect the environments in which they live and other organisms that live there.	
They will know how to:					
<p>Physics:</p> <p>Explain how the specific heat practical can demonstrate, energy stores and transfers</p> <p>Chemistry:</p> <p>Predict properties from given trends down the group.</p> <p>Explain the importance of the Rutherford experiment</p> <p>Biology:</p> <p>Explain the adaptations of structures to functions within the specialised cells and the organelles within them</p>	<p>Physics:</p> <p>Calculate radioactive half-lives from a graph and explain the difference between atomic mass and atomic number.</p> <p>Chemistry:</p> <p>Identify the number of atoms of each element from their formula, balance equations and calculate mass of products.</p> <p>Biology:</p> <p>Logically sequence in chronological order the immune/vascular responses and apply it to new situations</p>	<p>Physics:</p> <p>Communicate the scientific rationale for investigations, including the methods used, the findings and reasoned conclusions.</p> <p>Chemistry:</p> <p>Interpret observations inferences and drawing conclusions and predicting the direction of reactions.</p> <p>Biology:</p> <p>Explain every day and technological applications of science; evaluating associated personal, social, economic impacts.</p>	<p>Physics:</p> <p>Evaluate risks both in practical science and the wider societal context, including perception of risk</p> <p>Chemistry:</p> <p>Use a variety of formula, diagrams and models to develop scientific explanations</p> <p>Biology:</p> <p>Interpret observations and other data, including identifying patterns and trends, making inferences and drawing conclusions</p>	<p>Physics:</p> <p>Conduct experiments to make observations, test hypotheses or explore phenomena</p> <p>Chemistry:</p> <p>Present reasoned explanations, including relating data to hypotheses</p> <p>Biology:</p> <p>Apply knowledge of a range of techniques, apparatus, and materials to select those appropriate both for fieldwork and for experiments</p>	
Link to prior learning					
<p>Students know the different types of energy stores and transfers.</p> <p>Students should be able to read the periodic table, know properties of the</p>	<p>Students know the structures within an atom and their relative charges, how atoms behaviour in their various states.</p> <p>Students can work the number and type of atoms within a molecule.</p>	<p>Students can link back to resultant forces, speed and acceleration.</p> <p>Students can link to chemical reactions unit from the previous topic.</p>	<p>Students can link back to their work in 9/10 on light and also the EM spectrum</p> <p>Students can link back the knowledge of covalent bonding and the properties of solids liquids and gases.</p>	<p>Students can link to the knowledge of the solar system and planets and orbits at KS3</p> <p>Students can link back to link back to</p>	

<p>groups and understand the history behind the design.</p> <p>Students should be able to identify the structures within a cell and understanding of the process of</p>	<p>Students can link to previous work on body system and healthy life styles</p>	<p>Students can link to photosynthesis</p>	<p>Students can link back to their work on systems of the human body</p>	<p>Students can look back on their knowledge of food chains and the transfer or biomass and nutrient cycling</p>	
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