

## Honiton Community College Science 5YR Curriculum Plan 2019 -20

### **Purpose**

The purpose of this template is to provide an overview of the curriculum for your subject. It makes clear *when* things are studied and perhaps most importantly the key concepts of studying it. It also tells us what's inside each Scheme of Learning in terms of the broad concepts, assessment points and how these might link to other units within and outside of your subject.

The next step is to look at the links

### **Guide to terminology**

**Topic** – this should briefly describe the area of the curriculum being focused on.

**Key Concepts** – ideas and concepts are often transferable within subjects and across subjects. By identifying the key ideas and concepts it should make it easier to see patterns and trends over time. What are the concepts in your subject? Does the curriculum provide opportunities to explore them?

**Knowledge & understanding milestones** – These are the specific educational gains for studying this topic. List the main skills they will develop, consolidate or learn by studying this topic. When you put all of these together you will have a clearly defined knowledge base that needs to be achieved by the end of each year. Your assessments therefore will test to what extent students have securely grasped this essential knowledge.

**Scaffolding for SEND to ensure quality first teaching** – as discussed in the Ofsted overview of research document differentiated activities/task have little to no impact on pupils' attainment.

**Careers** – what careers input will be included in SOL, as described in the Gatsby Benchmarks careers must be included in everyday teaching not just a bolt on.

**Vocabulary** – What are the most common words, phrases or vocabulary that will be explored in this unit / topic? You cannot list them all of course but provide a selection of the most relevant ones here. How do classroom displays support students with this vocabulary?

**Assessment Dates** - this covers a range of types of assessment and will depend on the range of methods that your subject uses to assess understanding (eg ongoing assessment, formative feedback). How and when do you check student understanding? When do you use retrieval practice to support better retention of knowledge and understanding? How will you use this information in planning and reviewing SOL?

Year 7						
	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
<b>Topic</b>	Science skills HSW Energy transfers Electric circuits	Cells	Substances and particles	Contact forces	Gravity	Reproduction Changing substances
<b>Key concepts</b>	Energy model Wasted energy Heat and temperature  Electric current Resistance	Cell structure Specialised cells	Particle model Substances and mixtures Solutions	Balanced or unbalanced Friction Density	Weight Gravitational force Solar system	Sexual and asexual Menstrual cycles Embryo development  Chemical change Neutralisation pH scale
<b>Knowledge &amp; Understanding Milestones</b>	Compare energy from different foods and relate this to diet. Use the relationship between energy and power to calculate quantities in a variety of units (J, kJ, kWh)  Measure current in circuits using an ammeter Construct series and parallel circuits Describe electricity as the flow of charge Recall the symbol circuits used for electrical components	Draw, label and give the functions of cell organelles. Discuss a range of specialised cells Use microscopes effectively Prepare microscope slides.	Describe the different states of matter and changes of state in terms of the particle model Apply the particle model to explain diffusion and density. Explain the difference between pure substances, mixtures and formulations Explain different mechanisms that can be used to separate mixtures.	Describe and calculate density. Draw forces using force arrow. Calculate resultant forces. Describe Upthrust. Describe the effect of forces on objects. Calculate work done using the formula $W=Fs$ .	Explain why we get day and night and the seasons, based on the model of Earth rotating and having an axis tilted to its plane of orbit around the Sun Describe why the gravitational field is different for different planets Calculate the weight of an object, given its mass and the gravitational field strength Explain what a star is and recall that our Sun is only one star in our Galaxy, which is only one of billions of galaxies Recall that a light year is a measure of distance	Have an understanding of reproduction, especially in humans  Have an understanding of different types of chemical reactions Understand how chemical reactions change the properties of substances Place acids and alkalis on the pH scale Understand what indicators do Plan a neutralisation reaction
<b>Scaffolding for SEND to ensure quality first teaching.</b>	Foundation worksheets on Exp sci Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge	Foundation worksheets on Exp sci Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge	Foundation worksheets on Exp Sci. Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge	Foundation worksheets on Exp Sci. Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge	Foundation worksheets on Exp Sci. Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge	Foundation worksheets on Exp Sci. Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge

	organisers. SEN tests	organisers. SEN tests	organisers. SEN tests	organisers. SEN tests	organisers. SEN tests	organisers. SEN tests
<b>Careers input</b>	Dietician, electrician  Electrical Engineering, Electricians	Microbiology	Food chemist Chemical engineering Pharmaceutical analyst	Engineering	Space technology	Gynaecologist, Plant Breeder  Analytical Chemist, Pharmacist
<b>Links (prior knowledge, future knowledge)</b>	<b>In subject:</b> <b>Prior:</b> Animals including humans (Y5/6)  Electricity (Y5/6) <b>Future:</b> Heating and cooling (Y8)  Electrical Energy (Y 8) Home Electricity (Y10) <b>Outside of subject:</b> Food tech – nutritional content  Maths - Ratios, Rank order	<b>In subject:</b> <b>Prior:</b> Animals including humans (Y5/6) <b>Future:</b> Growth and differentiation (Y10) <b>Outside of subject:</b> Maths - Re-arranging equations	<b>In subject:</b> <b>Prior:</b> Properties and changes of materials (Y5/6) <b>Future:</b> Growth and differentiation (Y9) Elements and Compounds (Y8)  <b>Outside of subject:</b> Food tech - Formulations (Emulsifiers) Maths - Calculating density (Division)(units)	<b>In subject:</b> <b>Prior:</b> Properties and changes of materials (Y5/6) <b>Future:</b> Speed (Y8) Velocity and acceleration (Y9) Newton’s laws (Y10)  <b>Outside of subject:</b> Maths – Using and re- arranging equations	<b>In subject:</b> <b>Prior:</b> Earth and space (Y5/6) <b>Future:</b> Magnetism (Y8) <b>Outside of subject:</b> Maths - Graphs, algebra	<b>In subject:</b> <b>Prior:</b> Animals including humans (Y5/6) Properties and changes of materials (Y5/6) <b>Future:</b> Genetics (Y9) Menstrual cycle (Y10) Reactants and Products (Y8) Matter and Energy (Y9) Controlling Reactions (Y10) Making a Substance (Y11)  <b>Outside of subject:</b> Maths – Graphs, Measuring Maths – bar graphs
<b>Key Vocabulary</b>	Energy, transfer, power, electricity  Current, ammeter, series, parallel, charge, symbols, components, electricity, resistance.	Cell, nucleus, mitochondria, chloroplast, cytoplasm, cell membrane, cell wall, chloroplasts, resolution, magnification.	Particle, diffusion, density, mixtures, formulations, theory, pressure, impure, evaporation, filtering, distillation, chromatography, saturated.	Density, force, resultant, friction, upthrust, scalar, vector, streamlining, pressure	Fields, gravity, mass, weight, axis, galaxy, star, seasons.	Reproduction, life cycle, pollination, puberty, menstrual cycle, pregnancy.  Acid, alkali, pH, neutralisation, chemical, physical, atoms, indicators.

<b>Review &amp; Assessment Dates</b> (including opportunities for retrieval practice)	Test (HT2) POAE – Evaluation task marked Measuring and evaluation Millar: Concept	Test (HT2) POAE – planning task marked Knowledge of apparatus (microscope) and planning. Millar- Identify objects, learn a fact	Test (HT4) POAE task - assessed for planning strand Knowledge of apparatus, planning. Millar – Identify phenomena	Test (HT4) POAE – Analysis task marked Measuring and analysis of data Milar – Learn a relationship	Test (HT6) POAE – Analysis task marked Measuring and analysis Millar – Learn a relationship	Test (HT6) POAE –observation task marked Measuring and observation Millar – Identify a phenomena POAE – Planning task marked Planning, methods. Millar – learning a concept.
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Year 8						
	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
<b>Topic</b>	Body systems Elements and compounds	Rocks Speed	Magnetism Heating and cooling	Interdependence Electrical energy	Respiration Reactants and products	Evolution Light
<b>Key concepts</b>	Gas exchange system Tissues and organs Digestive system Elements and compounds Simple and giant structures	Structure of earth Rock cycle Speed Motion graphs	Magnetic field Field around wire Heat transfer	Feeding relationships Competition Biotic and abiotic factors Electric charge Potential difference	Aerobic respiration Fermentation Oxidation Thermal decomposition Acid reactions	Variation Natural selection Selective breeding Reflection Colour
<b>Knowledge &amp; Understanding Milestones</b>	State the hierarchical organisation of multicellular organisms, Describe the structure and functions of the human musculo-skeletal system. Outline the content of a healthy balanced diet and	Have an understanding of the structure of the earth, how it was formed and what use the different rocks have for humans. Be able to explain some of the effects that human made pollution has upon	Magnetic poles, attraction and repulsion, including KS4 effect of distance on field strength, induced magnetism Magnetic fields by plotting with compass, representation by field lines	Define the term ecosystem and give examples of organisms within an ecosystem. Describe how organisms can affect and be affected by their environment. Describe the importance	Recall the equations for aerobic and anaerobic respiration. Compare and contrast aerobic and anaerobic respiration. Explain the uses of anaerobic respiration in	Have an understanding of how and why organisms have changed over time Students should be able to draw ray diagrams for reflection and refraction.

	<p>explain the consequences of an unbalanced diet, Calculate the energy requirements in a healthy diet, Describe the functions of the organs within the human digestive system and the role of enzymes, Test foods appropriately to ascertain which food group they belong to, Determine the effect pH has on the function of amylase, Explain the structure and function of the gas exchange system in humans and the mechanism of breathing, Describe the impact of exercise, smoking and asthma on the gas exchange system, Give the names and functions of some plant tissues, Compare plant organ systems to the gas exchange system and digestive system in humans.</p> <p>To be able to define atoms, elements, compounds and mixtures To use chemical symbol for elements and compounds To name compounds Describe the tests for 4 gases</p>	<p>the earth.</p> <p>Calculate speed using the formula <math>s=vt</math>. Represent a journey on a distance-time graph. Calculate speed using a distance-time graph. Recall that distance and speed are scalar quantities.</p>	<p>Earth's Magnetism, compass and navigation The magnetic effect of a current, electromagnets, D.C. motors (principles only)</p> <p>Energy is transferred because of a temperature difference between two objects. If there is no net energy transfer the objects are in thermal equilibrium. Conduction, convection and radiation as mechanisms for heat transfer from the hotter to the cooler object to reduce the temperature difference. Insulators as materials that reduce heat flow. Processes that involve energy transfer include: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.</p>	<p>of interdependence and competition within a community. Explain how a change in an abiotic factor or a biotic factor would affect a given community. Identify how organisms are adapted Determine the relationships between organisms.</p> <p>Describe the shape of electric force fields Explain how to use a voltmeter to measure potential difference Measure the resistance of a component Recall and use the formula to calculate resistance</p>	<p>yeast in the brewing and baking industries. Explain the importance of respiration. Investigate respiration. Explain the effect of exercise on respiration. Explain the term 'metabolism'.</p> <p>Explain the different types of chemical reactions Write word equations for different types of chemical reactions Explain the role of catalysts. Understand and write word equations for the different reactions of acids. Explain how to prepare soluble salts Understand what happens during a neutralisation reaction and the difference between strong and weak acids and alkalis.</p>	<p>Students should be able to describe what lenses can do to rays of light. Students should recall the order of colours in the visible spectrum. Students should be able to describe how certain colours can be transmitted by different coloured filters Students should be able to give a description about the magnitude of the speed of light.</p>
<p><b>Scaffolding for SEND to ensure quality first teaching.</b></p>	<p>Foundation worksheets on Exp sci Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual</p>	<p>Foundation worksheets on Exp sci Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual</p>	<p>Foundation worksheets on Exp sci Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding,</p>	<p>Foundation worksheets on Exp sci Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual</p>	<p>Foundation worksheets on Exp sci Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual</p>	<p>Foundation worksheets on Exp sci Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual</p>

	coding, Knowledge organisers. SEN tests	coding, Knowledge organisers. SEN tests	Knowledge organisers. SEN tests	coding, Knowledge organisers. SEN tests	coding, Knowledge organisers. SEN tests	coding, Knowledge organisers. SEN tests
<b>Careers input</b>	<p>Medical professions, medical scientists, dietician, nutritionist, sports coach, horticulture.</p> <p>Chemical analyst</p>	<p>Geologist – Structure of the Earth and Rock Cycle , Environmental Scientist – Acid Rain Investigation</p> <p>Engineering, sports.</p>	<p>Engineering</p> <p>Building, Architecture</p>	<p>Ecology, toxicology, farming, zoology.</p> <p>Electrical Energy, Electrician</p>	<p>Personal trainer. Sports scientist. Brewing industry. Baking industry.</p> <p>Analytical Chemist – Neutralisation , Health and Safety Officer - Types of Chemical Reactions, Chemical Engineer – Catalysts, Development Chemist - Catalysts</p>	<p>Palaeontologist; geneticist; animal/plant breeder; farmer</p> <p>Optometrist, Advert designers</p>
<b>Links (prior knowledge, future knowledge)</b>	<p><b>In subject:</b> <b>Prior:</b> Plants (Y3) Animals (Y3) Animals (Y4) Animals (Y6) Properties and changes of materials (Y5/6) <b>Future:</b> Organ systems (Y10) Feedback and Control (Y11) Periodic table (Y9) <b>Outside of subject:</b> Sports science - Applied anatomy and physiology (KS4). Sports science - Health, fitness and well-being (KS4). Food and nutrition - Healthy eating (Y7), Nutrients (Y9/Y10), Enzymes (Y10)</p> <p>Maths - Ratio</p>	<p><b>In subject:</b> <b>Prior:</b> Rocks (Y3) Contact forces (Y7) <b>Future:</b> Earth's resources (Y9) Atmosphere (Y10) Materials (Y11) Acceleration (Y9) Newtons Laws (Y10) <b>Outside of subject:</b> Geography – structure of the earth, pollution. PE - Sports performance. Maths - Using and rearranging formulae.</p>	<p><b>In subject:</b> <b>Prior:</b> Forces and magnets (Y3)  Forces (Y5) Energy transfers (Y7) <b>Future:</b> Fields (Y10)  Energy stores (Y10) Energy conservation (Y11) <b>Outside of subject:</b> Maths – graphs, calculating means</p> <p>Food tech</p>	<p><b>In subject:</b> <b>Prior:</b> Living things and their habitats (Y4) Animals, including humans (Y4) Evolution and inheritance (Y6) Electricity (Y5/6) <b>Future:</b> Human interaction (Y10) Home Electricity (Y10) <b>Outside of subject:</b> Geography – Ecosystems and conservation</p> <p>Maths - Rearranging equations Use of standard form</p>	<p><b>In subject:</b> <b>Prior:</b> Body systems (Y8) Changing substances (Y7) <b>Future:</b> Photosynthesis (Y10) Cycling materials (Y11) Matter and energy (Y9) Controlling reactions (Y10) Making substances (Y11) <b>Outside of subject:</b> PE - Respiration and anaerobic respiration. Effects of exercise on cardiovascular system. Geography – climate change</p>	<p><b>In subject:</b> <b>Prior:</b> Evolution and inheritance (Y5/6) Light (Y5/6) <b>Future:</b> Genetics (Y9); Controlling reproduction (Y10); Diversity of life (Y11) Sound &amp; Waves (Y9) <b>Outside of subject:</b> Maths - Measuring and recording data Graph plotting Maths - Measuring angles with protractors</p>

<p><b>Key Vocabulary</b></p>	<p>Digestion, enzymes, alveoli, bronchi, bronchioles, gas exchange, transpiration, translocation, xylem, phloem.</p> <p>Atom, elements, compound, mixture, properties.</p>	<p>Earth, crust, mantle, core, sedimentary, metamorphic, igneous, pressure, cycle, acid rain</p> <p>Speed, distance, scalar, displacement.</p>	<p>Attraction, repulsion, field, magnetism, poles, electromagnet, motor.</p> <p>Energy, transfer, thermal, conductor, insulator, conduction, convection, radiation, combustion.</p>	<p>Ecosystem, communities, pollination, environment, accumulation, interdependence, competition, organism, food security, biotic, abiotic.</p> <p>Field, voltmeter, potential difference, resistance, component, charge, current.</p>	<p>Aerobic, anaerobic, respiration, yeast, metabolism, gas exchange, energy, breathing</p> <p>Combustion, fuels, thermal decomposition, oxidation, displacement, reactivity, catalyst, acid, alkali, neutralisation, soluble.</p>	<p>Variation, continuous, discontinuous, species, selective breeding, natural selection, extinction, preservation.</p> <p>Reflection, refraction, spectrum, lenses, transmitted, absorbed, filters.</p>
<p><b>Review &amp; Assessment Dates</b> (including opportunities for retrieval practice)</p>	<p>Test (HT2) POAE – Analysis task marked Data Analysis</p> <p>Millar – learn a relationship</p> <p>POAE – Obtaining task marked</p> <p>Measurement, evidence to develop explanations</p> <p>Millar – Learning a fact</p>	<p>Test (HT2) POAE – Obtaining task marked</p> <p>Observations and measurements</p> <p>Millar – Learning a fact and relationship.</p> <p>POAE – Analysis task marked</p> <p>Data analysis</p> <p>Millar – learn a relationship</p>	<p>Test (HT4) POAE – Obtaining task marked</p> <p>Measuring and techniques</p> <p>Millar – learn a relationship</p> <p>POAE – Planning task marked (and risk assessment)</p> <p>Knowledge of methods and equipment. Planning. Safety.</p> <p>Millar - Learn a relationship</p>	<p>Test (HT4) POAE task – Evaluation task marked</p> <p>Evaluation. Using evidence to develop explanations.</p> <p>Millar – Identify a phenomena.</p>	<p>Test (HT6) POAE task – Planning task marked</p> <p>Planning. Knowledge of methods. Measuring.</p> <p>Millar – Learn a relationship</p>	<p>Test (HT6) POAE task – Planning task marked</p> <p>Planning. Use of evidence to develop explanations.</p> <p>Millar – Identify a phenomena. Learn a fact.</p> <p>POAE – Planning task marked</p> <p>Planning. Knowledge of methods.</p> <p>Millar – Identify a phenomena.</p>

Year 9						
	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
<b>Topic</b>	Growth and differentiation Matter and energy	Genetics	Periodic table	Earths resources	Sound and waves	Acceleration
<b>Key concepts</b>	Stem cells Cell transport Conservation of atoms Combustion	Genes Monohybrid inheritance Genetic engineering	Periodic patterns Subatomic particles	Reactivity series Potable water Life cycle assessment	Wave properties Transverse and longitudinal Refraction	Velocity Acceleration
<b>Knowledge &amp; Understanding Milestones</b>	Describe what stem cells are Give some applications of stem cells Explain the process and results of mitosis Explain and apply knowledge of cell transport processes.  Explain what happens to mass during both physical changes and chemical reactions. Understand why it may appear that mass may be lost or gained during chemical reactions. Balance chemical equations and calculate relative formula masses Explain uncertainty in chemical measurements	How genetic information is transferred through the generations	Draw the atomic structure of the first 20 elements Describe the development of the periodic table Describe the patterns of the periodic table	Explain the types of materials that can be obtained from the earth and the issues that are involved in obtaining them. Understand the reactivity series role in obtaining metals from ores and its general use in chemistry. Explain the processes involved in obtaining potable water. Compare a range of synthetic materials, their uses, preparation and impacts on the environment.	Recall and use the wave equation formula Describe the differences between longitudinal and transverse sound waves Explain how sound wave echoes can be used to measure distances underwater Give a description into how to measure the speed of sound Explain some of the dangers to hearing Describe how to measure the speed of waves in (a) water and (b) along a piece of string.	Compare speed as a scalar quantity to velocity as a vector quantity. Use a formula to calculate acceleration. Use and interpret velocity-time graphs to represent motion. More able will be able to calculate acceleration from these graphs. Use and rearrange a formula for uniform acceleration.
<b>Scaffolding for SEND to ensure quality first teaching.</b>	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers.	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge



	organisers. SEN tests	organisers. SEN tests	organisers. SEN tests	SEN tests	organisers. SEN tests	organisers. SEN tests
<b>Careers input</b>	<p>Research Biomedical science</p> <p>Research Chemist - Conservation of Mass, Chemical Engineer – Conservation of Mass; Development Chemist - Conservation of Mass; Balancing Chemical Equations, Statistician - Chemical Measurements</p>	<p>Geneticist; plant or animal breeder; molecular biologist</p>	<p>Chemical analyst</p>	<p>Mining Engineer; Metal Production; Environmental Scientist; Development Scientist; Manufacturing Scientist; Life Cycle Analyst.</p>	<p>Audiologist, Hearing Loss Prevention Officer</p>	<p>Engineering.</p>
<b>Links (prior knowledge, future knowledge)</b>	<p><b>In subject:</b> <b>Prior:</b> Animals, including humans (Y5/6) Reproduction (Y7) Changing substances (Y7) Reactants and Products (Y8) <b>Future:</b> Genetics (Y9) Controlling reproduction (Y10) Controlling reactions (Y10) Making substances (Y11) <b>Outside of subject:</b> Maths - Percentage change Drawing line graphs (not straight lines of best fit)</p>	<p><b>In subject:</b> <b>Prior:</b> Evolution and inheritance (Y5/6) Reproduction (Y7) <b>Future:</b> Y10 controlling reproduction; Y11 diversity of life <b>Outside of subject:</b> Maths - Ratios/ percentages History - History of medicine</p>	<p><b>In subject:</b> <b>Prior:</b> Properties and changes of materials (Y5/6) Substances and particles (Y7) Elements and compounds (Y8) <b>Future:</b> Structure and Bonding (Y10) <b>Outside of subject:</b> Art - Transition metals and colour Maths - Subtraction History - Scientific developments</p>	<p><b>In subject:</b> <b>Prior:</b> Rocks (Y8) <b>Future:</b> Atmosphere (Y10) Materials (Y11) <b>Outside of subject:</b> Geography - Rock Cycle , Potable Water, Recycling and uses of materials and obtaining materials Resistant materials - Polymers, Ceramics, composites</p>	<p><b>In subject:</b> <b>Prior:</b> Sound (Y4) <b>Future:</b> Electromagnetic Radiation (Y10) <b>Outside of subject:</b> Music - Pitch and Frequency Geography - Changing Landscapes of the UK (year 9)</p>	<p><b>In subject:</b> <b>Prior:</b> Contact forces (Y7) Speed (Y8) <b>Future:</b> Newton's Laws (Y10) <b>Outside of subject:</b> Maths - Rearranging formula.</p>

	Maths - Percentage; Graph skills; Calculating Means					
<b>Key Vocabulary</b>	Stem cells, diffusion, osmosis, active transport, turgid, flaccid, isotonic, hypotonic, hypertonic, surface area  Physical, dissolving, evaporation, sublimation, distillation, conservation, composition	Asexual, sexual, meiosis, DNA, genome, synthesis, inheritance, crosses, chromosomes, disorders, enzymes, genetic modification.	Atoms, protons, neutrons, electrons, shells, energy levels, isotope, reactivity.	Reactivity, displacement, oxidation, extraction, reduction, redox, ionic, resources, sustainable, recycling, polymer, ceramic, composite, potable, life cycle.	Longitudinal, transverse, echo, refractions, frequency, vibration, pitch.	Speed, velocity, scalar, vector, acceleration
<b>Review &amp; Assessment Dates (including opportunities for retrieval practice)</b>	Tests after modules POAE – Evaluation task marked  Evaluating. Knowledge of data analysis.  Millar – Learning a relationship.	Test after module	Test after module POAE – Evaluation task marked  Evaluating. Knowledge of using evidence to develop explanations.  Millar – Identify a phenomena. Learn a fact.	Test after module POAE – Obtaining task marked  Obtaining evidence. Knowledge of data analysis.  Millar – Learn a fact. Using evidence to prove a theory.	Test after module	Test after module

Year 10						
	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
<b>Topic</b>	Organ systems  Structure and bonding	Human interaction  Newtons laws	Controlling reactions	Home electricity  Fields	Photosynthesis  Energy stores  Atmosphere	Controlling reproduction  EM radiation

<p><b>Key concepts</b></p>	<p>Circulatory system Non communicable disease</p> <p>Types of bonding Structure and properties Electrolysis</p>	<p>Biodiversity Pollution Communicable disease</p> <p>Newtons 2<sup>nd</sup> law Momentum</p>	<p>Collision theory Bond energies Equilibrium</p>	<p>Energy resources Circuit components Power</p> <p>Gravitation and magnetism Force on conductors</p>	<p>Photosynthesis Transpiration and translocation</p> <p>Heat transfer Energy conservation Internal energy</p> <p>Changing atmosphere Climate change Air pollutants</p>	<p>Hormones in reproduction</p> <p>Electromagnetic spectrum Wave energy</p>
<p><b>Knowledge &amp; Understanding Milestones</b></p>	<p>Describe the structure of the cardiovascular system and how it functions Identify non-communicable diseases and their risk factors Interpret information from graphs</p> <p>Explain different types of bonding between atoms Give the structure and Properties of different compounds Explain the process and uses of electrolysis</p>	<p>Evaluate the impact environmental changes have on the distribution of a species in an ecosystem (triple only). Explain how waste, deforestation and global warming have an impact on biodiversity and how we can reduce this. Assess the environmental implications of deforestation. Describe some of the biological consequences of global warming. Describe some of the biological factors affecting levels of food security and how to improve production.</p> <p>Explain the idea of Hooke's law. Explain the concept of pressure in the atmosphere and in fluids. Explain the idea of momentum and changes in momentum during collisions. Explain the idea of moments and apply them to real life situations. Describe and apply</p>	<p>Understand how energy changes during a chemical reaction Explain the Importance of controlling Rate of Reaction Be able to measure rate of reaction Understand how different factors affect rate of reaction Chem (triple) – Explain how cells and fuel cells work Understand the effect of changing certain factors on a reaction in equilibrium</p>	<p>Students should be able to calculate electrical energy Students should be able to list advantages and disadvantages of different renewable and non-renewable Students can explain the differences between AC and DC electricity Students can describe how electricity is transmitted round the country by The National Grid</p> <p>Know what a solenoid is, able to draw the field and state factors that affect it. H: Able to use Flemings LH rule and calculate using <math>F=BIL</math> and apply this to motors. Triple H: Explain the function and operation of Loudspeakers and Microphones. Triple H: use the generator effect to explain how generators induce a pd and interpret graphs of DC and AC and microphone outputs. Triple H: Explain the role,</p>	<p>Recall the equation for photosynthesis. Recall the method for testing plants for starch and how this method could be used in identifying limiting factors. Explain the inverse square law in relation to light as a limiting factor of photosynthesis. Explain all the limiting factors of photosynthesis and relate these to greenhouses and the horticultural industry.</p> <p>State examples of energy stores and give examples of how machines convert one type of energy to another. Apply the idea of conservation of energy Calculate internal energy changes,( specifically thermal, using SHC) Describe National energy resources and calculate efficiency.</p> <p>Explain how the Earths atmosphere has changed from the</p>	<p>How the reproduction cycle can be controlled</p> <p>Describe what happens when light is reflected and refracted Describe some of the uses of ultrasound State the electromagnetic waves in the spectrum in the correct order Describe a property and use of some of the waves in the electromagnetic spectrum (Triple Only) Explain what happens when some electromagnetic radiation is absorbed or emitted.</p>

		<p>Newton's three laws of motion.</p> <p>Explain the difference between thinking distance, braking distance and overall stopping distance.</p> <p>Describe reaction time and some factors that might affect it.</p>		<p>operation of transformers. Calculate pd, current, power and efficiency of transformers and investigate one factor which affects the output.</p>	<p>early earth to the present day.</p> <p>Explain how the greenhouse effect keeps the planet warm enough for life.</p> <p>Explain the causes and effects of global warming.</p> <p>Explain the causes and effects of atmospheric pollution.</p>	
<b>Scaffolding for SEND to ensure quality first teaching.</b>	<p>Foundation worksheets</p> <p>Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers.</p> <p>SEN tests</p>	<p>Foundation worksheets</p> <p>Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers.</p> <p>SEN tests</p>	<p>Foundation worksheets</p> <p>Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers.</p> <p>SEN tests</p>	<p>Foundation worksheets</p> <p>Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers.</p> <p>SEN tests</p>	<p>Foundation worksheets</p> <p>Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers.</p> <p>SEN tests</p>	<p>Foundation worksheets</p> <p>Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers.</p> <p>SEN tests</p>
<b>Careers input</b>	<p>Dietician, nutritionist, doctor, nurse, researcher</p> <p>Chemical analyst, Forensic science, Metal extraction, material chemist, Pharmacologist, Toxicologist</p>	<p>Ecology, farming, environmental protection, waste management &amp; recycling, research scientist.</p> <p>Engineering</p>	<p>Research Chemist</p> <p>Chemical Engineer</p> <p>Development Chemist</p>	<p>Electrical Engineers, Energy Consumption Advisors, Power Generation Engineers, Civil Engineers</p> <p>Electrician, power generation industry, music technician</p>	<p>Horticulture, Farming.</p> <p>Building &amp; architecture, Renewable fuel industry</p> <p>Environmental Scientist, Analytical Chemist Meteorologist</p>	<p>Gynaecologist; Medical Researcher; GP</p> <p>Radiographer, Ultrasound Engineer</p>
<b>Links (prior knowledge, future knowledge)</b>	<p><b>In subject:</b></p> <p><b>Prior:</b></p> <p>Body systems (Y8)</p> <p>Properties and changes of materials (Y5/6)</p> <p>Substances and particles (Y7)</p> <p>Elements and compounds (Y8)</p> <p>Periodic Table (Y9)</p> <p><b>Future:</b></p> <p>Feedback and control (Y11)</p>	<p><b>In subject:</b></p> <p><b>Prior:</b></p> <p><b>Interdependence (Y8)</b></p> <p>Contact forces (Y7)</p> <p>Speed (Y8)</p> <p>Acceleration (y9)</p> <p><b>Future:</b></p> <p>Genetic diversity and adaptation (Y12).</p> <p>Energy and ecosystems (Y13).</p> <p><b>Outside of subject:</b></p> <p>Geography -Climate change (Y7, Y8, Y10)</p>	<p><b>In subject:</b></p> <p><b>Prior:</b></p> <p>Changing substances (Y7)</p> <p>Reactants and products (Y8)</p> <p>Matter and energy (Y9)</p> <p><b>Future:</b></p> <p>Making substances (Y11)</p> <p><b>Outside of subject:</b></p> <p>Maths – rearranging equations, gradients and tangents</p>	<p><b>In subject:</b></p> <p><b>Prior:</b></p> <p>Electric circuits (Y7)</p> <p>Electrical energy (Y8)</p> <p>Magnetism (Y8)</p> <p><b>Future:</b></p> <p>N/A</p> <p>Space physics (Y11)</p> <p><b>Outside of subject:</b></p> <p>Maths - Rearranging Equations</p>	<p><b>In subject:</b></p> <p><b>Prior:</b></p> <p>Plants (Y3)</p> <p>Respiration (Y8)</p> <p>Energy Transfers (Y7)</p> <p>Heating and Cooling (Y8)</p> <p>Rocks (Y8)</p> <p>Earths resources (Y9)</p> <p><b>Future:</b></p> <p>Cycling materials (Y11)</p> <p>Energy Conservation (Y11)</p> <p>Materials (Y11)</p>	<p><b>In subject:</b></p> <p><b>Prior:</b></p> <p>Reproduction (Y7)</p> <p>Genetics (Y9)</p> <p>Light (Y5/6)</p> <p><b>Future:</b></p> <p>Diversity of life (Y11)</p> <p>Waves (Y11)</p> <p><b>Outside of subject:</b></p> <p>History - History and medicine</p> <p>Maths - Angles, using a protractor (Y8)</p>

	<p>Cardiovascular system (Y12 Biology)</p> <p>Carbon Chemistry (Y11)</p> <p><b>Outside of subject:</b></p> <p>PE – Heart and cardiovascular system</p> <p>D&amp;T: Materials</p> <p>Geography: Extraction of metals</p>	<p>Pollution (Y8)</p> <p>Human impact on the environment (Y8)</p> <p>Ecosystems inc biomes, food webs (Y10)</p> <p>Food tech – Food , nutrition and health inc mycoprotein (Y10)</p> <p>Food tech – food provenance (sustainability, waste)(Y10)</p> <p>Math - Circles (Y8)</p> <p>Circles (clear areas around antibiotic discs) (Y9)</p> <p>Maths - Rearranging formula.</p> <p>Life skills - Effects of alcohol</p>		<p>Maths - Ratio</p>	<p><b>Outside of subject:</b></p> <p>Geography- Farming methods.</p> <p>Geography</p> <p>Geography – Global warming, pollution</p>	
<b>Key Vocabulary</b>	<p>Cardiovascular system, non-communicable, blood vessels.</p> <p>Properties, polymers, monomers, covalent, ionic, metallic, bonding, electrons, electrolysis, compounds</p>	<p>Biodiversity, sustainability, environment, pollution, global warming, organisms, biomass, food security, efficiency</p> <p>Pressure, momentum, moment, reaction time, extension, conservation</p>	<p>Conservation, energy, exothermic, endothermic, reaction profiles, alcohol, combustion, cells, rates, catalysts, collision theory, reversible, dynamic equilibrium.</p>	<p>Energy, renewable, non-renewable, National grid, power, resistance, current, voltage, fuse, charge.</p> <p>Solenoid, field, generator, transformers.</p>	<p>Photosynthesis, starch, limiting factors, horticulture, carbohydrates, light intensity, glucose</p> <p>Acceleration, power, energy, particles, kinetic, potential, state, sublimate, temperature, thermal, efficiency.</p> <p>Reactivity, atmosphere, composition, evolving, global, climate, carbon footprint, pollutants</p>	<p>Menstrual cycle, contraception, fertility, hormones.</p> <p>Reflected, refracted, ultrasound, electromagnetic, absorbed, emitted.</p>
<b>Review &amp; Assessment Dates (including opportunities for retrieval practice)</b>	<p>Test at the end of the module</p> <p>POAE – Planning task marked.</p> <p>Planning. Knowledge of methods.</p>	<p>Test at end of the module</p>	<p>Test at the end of the module</p> <p>POAE – Evaluation task marked (Foundation)</p> <p>Or Analysis task marked (Higher)</p> <p>Analysis and evaluation. Knowledge</p>	<p>Test at the end of the module</p> <p>POAE – Analysis task marked</p> <p>Knowledge of data analysis.</p>	<p>Test at the end of the module</p>	<p>Test at the end of the module</p>

	Millar – Learn a fact. Learn a theory.		of data analysis. Millar – Learn a relationship.	Millar – Learn a relationship.		
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Year 11						
	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
<b>Topic</b>	Feedback and control Carbon chemistry	Making a substance Radioactivity Cycling materials Materials	Diversity of life Energy conservation	Space (Triple only)	REVISION EXAMS	N/A
<b>Key concepts</b>	Nervous system Hormonal control Immune system Hydrocarbons Carbon structures	Concentration Moles Radioactive decay Radioactive sources Carbon and water cycles Corrosion, alloys, polymers, fertiliser production	Natural selection Adaptation Calculating energy Force and work Elastic materials	Solar system Stars Red shift	N/A	N/A
<b>Knowledge &amp; Understanding Milestones</b>	Describe the structure of the nervous system, endocrine system and immune system. Explain how the above systems function Draw, name and describe the tests for hydrocarbons	Explain how amount of substance can be measured using the mole Calculate mass of product from mass of reactant using a balanced chemical equation. Calculate the concentration of a solution in both $\text{g}/\text{dm}^3$ and $\text{mol}/\text{dm}^3$ .	Have an understanding of how and why organisms have changed over time Calculate work done and recognise that machines can give bigger force but at the expense of movement Calculating energy changes before and after a change	Our solar system consists of one star, eight planets plus dwarf planets. Moons orbit planets (natural satellites) Our solar system is one part of the Milky way galaxy The Sun was formed from a nebula, students should	N/A	N/A

	<p>Explain the process of fractional distillation</p> <p>Explain Carbons different structures</p>	<p>Carry out titration calculations to determine the concentration of acids or bases.</p> <p>Use the molar volume constant to calculate the volume of gases.</p> <p>Calculate percentage yield, atom economy and their importance to the chemical industry.</p> <p>Describe the structure of the atom</p> <p>Describe what happens when a nucleus decays</p> <p>To perform calculations involving half life</p> <p>TRIPLE ONLY To explain which isotopes are suitable for which jobs</p> <p>TRIPLE ONLY To describe the difference between Fission and Fusion.</p> <p>Explain the importance of certain materials being recycled in the environment.</p> <p>Recall the parts of the water cycle.</p> <p>Describe the parts of the carbon cycle.</p> <p>Explain the effects that human behaviours might have on these cycles e.g. deforestation, land use, burning fossil fuels, climate change.</p> <p>Describe the process of decomposition and the products produced.</p> <p>Investigate the effect of decomposition on the pH of the material being decomposed.</p> <p>Understand the different types of materials we use, where they are obtained</p>	<p>Describing qualitatively and quantitatively the changes in energy stores in a variety of situations</p> <p>Calculating energy changes associated with change of state</p> <p>Using the Kinetic model to describe changes in pressure of a gas.</p>	<p>be able to explain how, using ideas of gravity and fusion.</p> <p>Describe the life cycle of different stars, using HR diagram and explain what happens to the matter at the end of a Stars life cycle. Fusion causes the formation of new elements.</p> <p>Gravity causes natural and artificial satellites to orbit. Connect height of orbit to speed.</p> <p>Red shift as evidence for the expanding universe and big bang theory. Not everything is yet known (Dark energy / matter)</p>		
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		and how their properties affect their uses. Understand how ammonia is produced. Explain the compromise conditions for the Haber Process Explain how fertilisers are formed and their importance.				
<b>Scaffolding for SEND to ensure quality first teaching.</b>	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers. SEN tests	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers. SEN tests	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers. SEN tests	Foundation worksheets Differentiated questioning, TFW, Recall quizzes, Vocab introduction, Dual coding, Knowledge organisers. SEN tests	N/A	N/A
<b>Careers input</b>	Doctor, nurse, endocrinologist, drug development  Petrochemical scientist, plastics engineer, cosmetic scientist.	Research Chemist , Chemical Engineer, Development Chemist, Analytical Chemist  Radiographer, Nuclear Scientist  Environmental Science.  Materials Scientist, Mining, Oil Industry, Research Chemist, Chemical Engineer, Development Chemist.	Palaeontologist; geneticist  Mechanical engineering, electrician	Astronaut, space scientist, rocket scientist, Exobiologist	N/A	N/A
<b>Links (prior knowledge, future knowledge)</b>	<b>In subject:</b> <b>Prior:</b> Body systems (Y8) Organ systems (Y10) Properties and changes of materials (Y5/6) Substances and particles (Y7)	<b>In subject:</b> <b>Prior:</b> Changing substances (Y7) Reactants and Products (Y8) Matter and Energy (Y9) Controlling reactions	<b>In subject:</b> <b>Prior:</b> Evolution (Y8) Energy Transfers (Y7) Heating and Cooling (Y8) Energy stores (Y10) <b>Future:</b>	<b>In subject:</b> <b>Prior:</b> Gravity (Y7) Fields (Y10) <b>Future:</b> Fields and circular motion (Y12/13) <b>Outside of subject:</b>	N/A	N/A



	<p>Elements and compounds (Y8) Periodic Table (Y9) Structure and Bonding (Y10)</p> <p><b>Future:</b> Immune system (Y12) Response and control (Y13)</p> <p><b>Outside of subject:</b> Food tech – Food hygiene Geography: Oil production/formation D&amp;T: Materials Food tech: Making alcohol</p>	<p>(Y10)</p> <p>Light (Y8) Sounds and waves (Y9) EM radiation (Y10)</p> <p>Respiration (Y8) Photosynthesis (Y10)</p> <p>Rocks (Y8) Earth's resources (Y9) Atmosphere (Y10)</p> <p><b>Future:</b> Reacting mass and titration (Y12); Gas volumes (Y12); Redox Titration (Y13)</p> <p>Radioactivity (Y13)</p> <p>Nutrient cycles (Y13)</p> <p>Chemical equilibrium (Y12) <b>Outside of subject:</b> Maths - Rearrangement of equations, Standard form, Percentage calculations</p> <p>Maths – Fractions (Y7)</p> <p>Geography - Environment</p> <p>Geography – Land use</p>	<p>Genetic information, variation and relationships between organisms(Y12) The control of gene expression (Y13) Force &amp; motion Y12 Thermodynamics Y13</p> <p><b>Outside of subject:</b> Maths - Graphs Geography - Environmental geography Maths - Rearranging formulae - throughout KS3 and 4 Graphs – throughout KS3 and 4</p>	<p>Chemistry - Atomic structure Maths - Speed calculation</p>		
<p><b>Key Vocabulary</b></p>	<p>Neurone, reflex, sensory, relay, motor, endocrine, enzyme, denature, communicable, microorganism, vaccination, antibiotics,</p>	<p>Mole, balanced, concentration, titration, volume, yield, atom economy, reactants, products, neutralisation</p>	<p>Classification, selective breeding, evolution, resistant, speciation, fossils, extinction, cloning, quadrats.</p> <p>Kinetic, energy,</p>	<p>Solar system, planet, nebula, gravity, fusion, satellites, red shift.</p>	<p>N/A</p>	<p>N/A</p>

	<p>painkillers, negative feedback, hormones</p> <p>Hydrocarbon, polymers, fractional distillation, Alkanes, Alkenes, saturated, unsaturated, cracking.</p>	<p>Fission, fusion, nucleus, decay, Isotope, stability, half life, contamination, irradiation.</p> <p>Recycled, environment, deforestation, climate change, decomposition</p> <p>Corrosion, prevention, alloys, polymers, composites, Haber process, fertiliser</p>	<p>potential, extension, proportionality, gravitational, conservation, pressure, qualitative, transfer</p>			
<p><b>Review &amp; Assessment Dates</b> (including opportunities for retrieval practice)</p>	<p>Test at the end of the unit</p>	<p>Test at the end of the unit.</p>	<p>Test at the end of the unit</p>	<p>Test at the end of the unit. POAE – Obtaining task marked.</p> <p>Observations. Knowledge of measurement.</p> <p>Millar – Learn a relationship.</p>	<p>N/A</p>	<p>N/A</p>