Science Curriculum Map

We have approached the teaching of KS3 and KS4 in a spiral curriculum method. Students experience the 3 Sciences as building upon current knowledge throughout the 5 years. Key concept content for GCSE is repeated at points through year 10 and 11 to allow pupils to grasp the key ideas of science fully.

KS2	Chemistry
prior	
learning	Identifying solids, liquids and gases and describing the properties of each
	Understanding that the same material can exist as a solid, liquid and gas
	Observing melting, freezing, condensation and evaporation.
	Dissolving solids in water and understanding that not all are soluble
	Separating mixtures of solids and liquids
	Understanding that not all liquids contain water
	Understanding that all materials are made up of very small particles
	Biology
	Using the names and functions of some major organs in plants and animals
	Understanding some of the life processes common to living things, eg movement, growth, reproduction, nutrition
	Knowing that food is needed for activity and growth, that an adequate and varied diet is needed to maintain health and that food provides energy for the body
	Physics
	Experiencing the physical properties of materials
	Understanding that pushing and pulling change the speed, direction or shape of an object
	Knowing how to measure distance and how to use a forcemeter to measure force in Newtons
	Knowing that forces act in a particular direction and this can be indicated by arrows
	• Experiencing the effects of a variety of forces, eg magnetic, gravity, friction, air resistance
	Understanding that matter, including food, consists of particles, eg molecules, which can differ in size
	 Knowing that magnets attract magnetic materials, that magnets can attract and repel other magnets and that magnets have a range of uses in everyday life, e.g. fridge door catches.
	 Understanding that light travels from a source; the key terms opaque, transparent and translucent materials and relate shadow formation to opaque materials; light is reflected from shiny
	surfaces; that we see things only when light from them enters our eyes.
	 Understanding that sounds are produced by vibrating sources and that sounds produced by musical instruments can be changed

Understanding that sounds are produced by vibrating sources and that sounds produced by musical instruments can be changed

Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
7	Block 1	Block 1	Model, particle, diffusion, gas pressure,	Know that matter is	Reading	Baseline
			vibration, solution, solute, solvent,	made of particles.		test during
	Chemistry- Particle model	These topics underpin all of the sciences; matter is	soluble, insoluble, saturated solution		Information about different	first weeks
	Chemistry- Pure and	made from particles and organisms are made from	filtration, distillation, chromatography,	Differences in the	diseases.	at HWA to
	impure substances	cells.	chromatogram membrane, cytoplasm,	structure of animal		assess
			nucleus, chloroplast, vacuole, cell wall,	and plant cells.	Writing	

•	Biology - Cells and	The pure and impure topic starts to build on	membrane, tissue, variable, sample			current
	organisation	practical based skills which are essential for all	size, evaluate, magnification		Using key terms, descriptions	knowledge.
		practicals e.g. filteration as well as the practical	-		of states of matter	
Blo	ock 2	equipment names and health and safety				'Badger'
		precautions.			Making a model of a cell and	assessed
•	Chemistry - Atoms and	Block 2			evaluation report on friction	tasks
	elements and the periodic table	DIOCK 2	alament compound stom malacula	Difference between atoms, elements,	investigation, spring	Term 3
•	Physics – Forces	Atoms topic builds on particle topic with further	element, compound, atom, molecule, symbol,	compounds &	investigation etc.	DOYA
•	Biology - Nutrition and	detail. Students are introduced to the periodic	Symbol,	mixtures.	long answer assessment	
	digestion	table early in year 7 so that they have practise in		mixtures.	explaining heat transfers	
	-	identifying elements and deepening their				
		understanding.			Write a story/ create a	Term 6
Blo	ock 3	Forestanis is constituting Division on it halos provide			storyboard about the journey	DOYA
		Forces topic is essential in Physics as it helps pupils to explain how the same forces that hold the		Identify when forces	of the sperm cell to the egg	
•	Physics - Energy changes and transfers	universe together also hold atoms together and	drag, upthrust, weight, mass, density	are balanced and	cell	
	Biology – Microbes and	help us to move around		unbalanced.		
-	disease				Make a model of sperm cell	
•	Biology – Reproduction	Digestion and nutrition build on learning from KS2	intestine, villus, liver, pancreas,		or an egg cell and evaluate	
		and is very applicable to their everyday life. Their	carbohydrates, protein, enzyme,	Order of digestive	the model	
Blo	ock 4	understanding ranges from links to PSHE (what	absorption	organs.		
		makes a healthy diet), P.E. (why is energy needed where it comes from) so students can explain what			Write a full investigation into	
•	Chemistry/Physics -	happens to food after eat after we eat it.			the resistance of a wire.	
	Physical changes	happens to food after cat after we cat it.			Oracy	
•	Chemistry -Chemical reactions – acids and alkalis	Block 3			Gracy	
•	Physics - Magnetism		Conduction, convection, radiation,	Difference between	Using key terms -writing	
•	Physics – Electrical circuits	We are learning this so students can explain	insulator, conductor,	conduction,	methods for separating	
		simple energy transfers which builds from		convection and	substances e.g. rock salt &	
		knowledge from KS2 and into equations for KS4.		radiation	sea water using discussion	
		Both Biology topics have significant relevance to	bacteria, viruses, fungi, measles,		Class discussion on forces	
		students in terms of wellbeing when growing	chickenpox, infection, pathogen	Difference between	misconceptions	
		older. Students will be having inoculations in year	vaccination, inoculation and	pathogens and		
		8&9 and important that they understand the	immunisation, antibiotic, anti-	bacteria, viruses and		
		significance of these. The reproduction topic	microbial, ovary, testis, oviduct, uterus,	fungi.		
		explains the science behind reproduction and how	menstruation, ovulation, fertilisation,			
		human babies are made; which will link to PSHE	placenta, sperm, gestation, hereditary and inherited, baby and foetus,			
		Block 4	puberty and adolescence, fuse			
			paserty and addrescence, ruse			
		Students can explain the difference between		Identify the difference		
		physical changes and chemical reactions so they	Physical, chemical, state, mass,	between physical and		
		can identify these in their everyday lives and in the	diffusion, Brownian motion	chemical reactions.		
		various practicals during their science curriculum.				
				Know the difference		
				between acids, alkalis		

		Acids and alkalis topic is quite large at GCSE and therefore content learnt in KS3 will help to support this. This will also allow them to deal with situations like this in real life e.g. bee stings. Building on the forces topic in Y7 the magnetism topic will continue to develop their knowledge of invisible force-fields that act throughout the universe and these affect different materials in different ways. Electricity is another large topic in GCSE and brings further application of science to everyday life and possible career ideas. Students need to be able to explain how electrical devices work to enable new devices to be designed for the future	Acid, alkali, indicator, solution, neutral, react, equation, harmful, corrosive, caustic, hazard north-seeking pole, south-seeking pole, magnetic field, magnetic field line, compass Current, resistance, energy transfer Potential Difference	and neutral substances in terms of pH number. Know when magnets are attracted and repelled, even when magnets are turned. Know the difference between series and parallel circuits and the symbols to draw these.		
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
8	 Block 1 Chemistry: chemical reactions Physics: forces and motion Block 2 Biology: cellular respiration and gas exchange Physics: waves Block 3 Biology: evolution Chemistry: energy in chemical reactions Chemistry: metals and reactivity Block 4 Biology: photosynthesis 	 Block 1 Using knowledge from year 7; students will further develop their understanding of reactions to include word and symbol equations which is a fundamental skill. Using knowledge from year 7; students will further understand forces to explain how to predict the future motion of an object using a scientific law. The laws are also a key part of Physics GCSE. Block 2 Linking knowledge on cells and organisms students will learn fundamental biology equations for photosynthesis and respiration; so they can explain how plants and animals get the energy they need for life. Waves is a large topic at GCSE which is broken down into learning so that students can describe how sound and light transfer information for sight and sound. Block 3 	Elements, compounds reactant, product, word equation Speed, distance, time, metres, miles, kilometres, seconds, m/s, km/h, mph, resultant, acceleration lung, trachea, bronchus, ribcage, red blood cell, haemoglobin, artery, vein, breathing, ventilation, inspire, respire, inhale, exhale image, reflection, pitch, frequency, amplitude, wave inheritance, species, variation, environmental characteristics, genetic characteristics, survival, adaptation.	Difference between reactants and products. Mass and weight are not the same. Recall the equations for respiration. Respiration is not breathing. Know how sound waves are formed.	Reading About how some animals and plants have become endangered or extinct. Different energy suppliers information to make a judgement. Writing Extended response analysis and evaluation of rusting experiment. Core practical - Investigate how length of wing of a helicopter affects the time of flight A conclusion explaining results from an investigation into the angles of refraction. onclusion of investigation into exo and endothermic reactions Written method for making copper sulfate crystals.	Term 3 DOYA Term 6 DOYA

	 Biology: relationships in an ecosystem Chemistry: earth and atmosphere 	To understand how variation can lead to new species or extinction. To describe that some reactions take in energy and some reactions release energy We are learning this so we can describe where the metals we use in everyday life come from and how we process them. Block 4 We are learning this so that we can explain why plants are so important for the survival of all life on Earth. To explain how organisms depend on each other in an ecosystem. So they can describe the atmosphere, and what we can do to keep it healthy for humans in the future.	Heat, thermal, exothermic, endothermic, bonds, activation energy. salt, reaction, product palisade cell, chlorophyll, biomass, glucose and sugar, photosynthesis, biomass, community, habitat, pyramid of numbers, predator, carnivore, environment, ecosystem, environmental conditions, quadrat sampling, transect, population sizes, reliable data, vegetation cover, acid rain, catalytic converter, air and water quality, global warming, magma, core, crust, lava, turbine, generator, national grid, fuel, hydroelectricity, geothermal, ozone, global warming, carbon cycle, decomposer, respiration, photosynthesis	Understand how evolution occurs. Energy is not used up in reactions. The equation for photosynthesis. How to interpret food webs. How global warming is caused.	Written piece about the advantages and disadvantages of pesticides. Oracy Explanation of metal extraction linked to reactivity series. How light affects the rate of photosynthesis investigation Letter to your MP campaigning for/against a local power station. Comparing different types of ways to generate electricity.	
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
9	 Terms 1 and 2: Biology Biology key concepts: microscopes, cells, enzymes and transport Biology processes: mitosis, meiosis, inheritance, variation, nervous system Terms 3 and 4: Chemistry Chemistry: states of matter, filtration, crystalisation, chromatography, distillation, drinking water Chemistry key concepts: atoms, elements, bonding, metals Chemistry: acids and alkalis, neutralisation, acid reactions 	 Terms 1 and 2: Biology Key concepts in Biology which are on both papers: Cells are building blocks of life (links to KS3 cells) further parts of the cell are learnt and links to processes such as respiration Enzymes allow important processes to happen inside organisms (e.g. digestion) links to KS2 & 3 but further understanding of how enzymes function and their importance included Transport allows pupils to understand how substances can move between cells. Processes allow students to understand why we are all different: Processes of growth in animals and plants which links to cells taught earlier Ideas about how we inherit variation and how mutation leads to more dramatic types of variation. Links to KS3 (reproduction & evolution) but pupils now learn about how 	Lens, magnification, resolution, aerobic respiration, chlorophyll, eukaryotic, mitochondrion, ribosome, acrosome, ciliated epithelial cell, cilium, diploid, enzyme, epithelial cell, gamete, haploid, flagellum, plasmid, prokaryotic, catalyst, substrate, synthesis, active site, denatured, specific, optimum, active transport, diffusion, osmosis Anaphase, cytokinesis, interphase, metaphase, prophase, telophase, spindle fibres, differentiation, elongation, meristem, stem cell, axon, dendrite, dendron, myelin sheath, neurotransmission, receptor cell, stimulus, neurotransmitter, reflex arc, synapse, chromosome, genome, meiosis, mitosis, zygote, base (DNA), complementary base pair, double helix, dominant, recessive, heterozygous, homozygous, Punnett square, mutation,	Recall the differences between eukaryotic and prokaryotic cells. Enzymes speed up reactions but are not used up. Differences between diffusion, osmosis and active transport. Most cells contain 23 pairs of chromosomes, gametes contain 23 chromosomes.	Reading Text about the discovery of the structure of the atom over time. Writing Methods/ conclusion/ evaluation for the core practicals: osmosis in potato, chromatography, distillation, making a soluble salt, car acceleration on a ramp, Oracy Describing the roles of the structure of a call. Describing how a stimulus is detected in the body through a reflex arc.	End of topic assessments from Edexcel which give an estimated grade. Y9 PPE Term 6

 Physics: vector and scalar measurement, speed, acceleration, velocity, forces, Newton's laws, momentum, stopping distances Physics: energy stores and transfers, efficiency, non- 	 sexual reproduction leads to variation, further detail about DNA structure & its importance Understanding how the body responds to environmental stimulus Terms 3 and 4: Chemistry There are several core/ required practicals included to increase pupil engagement (biology topics are light on practical elements). Real life application for how drinking water is purified. 	Particle, crystallisation, filtrate, insoluble, residue, solute, solvent, chromatography, stationary phase, mobile phase, chromatogram, Distillation, still, aquifer, chlorination, desalination, precipitate, sedimentation Atom, compound, element, proton, neutron, electron, shell, nucleus, subatomic particles, atomic number, mass number, isotopes, relative atomic	Difference between DNA, chromosomes, genes and alleles. Recall the order of a reflex arc.	
renewable and renewable resources	 Links to KS3 content: particle model, pure & impure, chemical and physical reactions; now applying this to different investigations and applications Key concepts in Chemistry which are on both papers: Atoms make up all substances (links to KS3; atoms & periodic table; now looking in detail 	mass, inert, period, group, electronic configuration, anion, cation, electrostatic forces, ionic bond, covalent bond, lattice structure, molecule, intermolecular forces, polymer, delocalised electron, fullerene, graphite, graphene, nanotubes, lubricant, lattice, malleable Aqueous solution, concentrated, dilute, dissociate, pH meter, burette,	separating substances. Structure of the atom	
	 at the inside of atom) How model of the atom has changed over time with scientists involved (also links to Physics later in the course) Use of periodic table to work out atom structure is fundamental (KS3; periodic table in more depth including how to use the data on the table) Bonding completes understanding from KS3 about differences between atoms, elements, mixtures and compounds Commomly used chemicals in science 	end-point, crystallisation, titration, pipette, effervescence, half equation, ionic equation, oxidation, reduction, spectator ions, Acceleration, displacement, magnitude, momentum, scalar quantity, vector quantity, velocity, gradient, deceleration, centripetal force (higher only), mass, weight, gravitational field strength, thinking distance, braking distance, stopping distance, crumple zone,	(Bohr model).	
	 experiments Formation of word and symbol equations from information provided Core practical applies knowledge of whole topic Links to KS3; acids & alkalis, metals & reactivity; now looking at how neutralisation can be investigated accurately, what are the features of acids and alkalis Terms 5 and 6: Physics 	Chemical energy, elastic potential energy, gravitational potential energy, joules, kinetic energy nuclear energy, Sankey diagram, thermal energy, dissipated, efficiency, emit, infrared radiation, thermal conductor, thermal insulator, climate change,	Recall that acid + base -> salt + water.	

T						
		 Fundamental concepts in Physics: Introduction of several equations to learn for exams earlier (KS3; forces types helps understanding as now applying force diagrams to different scenarios, developing understanding of how forces can be calculated) Key scientist, Newton, his discoveries Stopping distances related to everyday life in a serie and future tests for diving ligance 		Difference between acceleration and velocity.		
		 a car and future tests for driving licence Links to everyday life with choosing appliances based on efficiency Links to everyday life with electricity production & links to global warming & atmosphere (also in Chemistry course) Further calculations and required practical Links to KS3; energy changes and electricity; now 		Energy is not lost from a situation; it transfers in its form		
		applying knowledge of energy to its production				
		and evaluating these ways				
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
10	Term 1 Both Chemistry and Biology topics start with re-teach from Y9 of the key concepts Biology: Natural Selection and health	Term 1 This content can appear on both papers (4 out of the 6). Gives time for re-teaching gaps in knowledge from the assessment in yr9. Topics finish off the content for paper 1 and relate well to everyday life. These topics are very engaging as a start to year 10.	Binomial system, ancestor, classification, domain, genus, kingdom, species, artificial selection, breed, genetic engineering, genetically modified organism, yield, diabetes, ligase, plasmid, recombinant DNA, restriction enzyme, sticky end	Reasons why artificial selection is important.	Reading Different view-points on the use of GM foods. Articles on various communicable and non- communicable diseases. Articles on nuclear/ radioactive disasters.	End of topic assessments from Edexcel which give an estimated grade.
	Term 2 Chemistry: groups of the periodic table and extracting metals	Term 2 Topics finish off the content for paper 1 and link to previous Chemistry topics well (atoms, periodic table). Also extend knowledge about the patterns in reactivity of groups and why this occurs. More	Communicable disease, correlation, immune system, non-communicable disease, pathogen, cirrhosis, deficiency disease, cardiovascular disease, stent, stroke, AIDS, cholera, diarrhoea, haemorrhagic fever, host, HIV, malaria, protist, tuberculosis, ulcer, epidemic,	Difference between communicable diseases and non- communicable diseases.	Writing Explaining how vaccines lead to immunity. Method/ results/ conclusion for different electrolysis	Term 6 Y10 PPE
	Terms 3 and 4	difficult content in the extracting metals topic (e.g. electrolysis) which needs to be embedded over	vector, chlamydia, lysozyme, physical barrier, chemical barrier, antibody,		practicals.	
	Terms 3 and 4 Physics: Waves, radioactivity and the EM spectrum Physics: Energy and forces and					

and marger plant and hormones, and the surcess of these. Image plant and hormones, marger plant and hormones, marger plant and hormones, marger plant and hormones, and the surcess of these. Image plant and hormones, marger plant hormones, marger plant and hormones, marger plant and	T		topic extends knowledge about the EM spectrum.	Electrolysis, anode, cathode, cation,		Suggesting appropriate
and menstrule cycle and diabetes Tem 5 and the success of these. Tem 6 First paper 2 topics for biology, chosen for their adaptations to real adaptations and structure) to understand set functions in depth. Aroms can form ions ystem, dymanic equilibrium, adaptations and structure) to understand set functions in depth. Aroms can form ions ystem, dymanic equilibrium, adaptations and structure) to understand set functions in depth. Aroms can form ions ystem, dymanic equilibrium, adaptations and structure) to understand set functions in depth. Aroms can form ions ystem, dymanic equilibrium, adaptations and structure) to understand set functions in depth. Aroms can form ions ystem, dymanic equilibrium, adaptations and structure) to understand set functions in depth. Aroms can form ions ystem, dymanic equilibrium, adaptations and structure) to understand infered, curves, my solicitations set functions, understand set functions, integer, commany set adaptations, struggle with these calculations set of aroms, project table and equitons from physics, so students are more able and confident of aroms, project table and equitons from physics, so students are more able and confident when approaching Chemistry calculations. Aroms can form ions ystem, dymanic equilibrium, and wave, medium, franked, adarom curves, cose, Geger, Audiento, Maleret, Beta article, contex, infact, adaptation, celectric field, force radios, state, electricit, free body fore radios, state, electricit, field, dore, againma regulation, form, celectric field, force radios, state, electricit, field, dore, againma regulation for work, adaptation for work, diagnin, potnets; field, offer regulation in gent, field, contex, infact, adaptation for work, diagnin, potnets; field, force regulation fore regulation for work, dore all phys. beta and all ph		Riology: Plants and hormonos		-		
diabetesTerm 5leadate, ore, phytoextration, corroston, ruting, taminh, doed papilation to reaHerm 6Term 6Stap paper 2 topis for biology, chosen for their appilation to reaStap paper 2 topis for biology, chosen for their appilation to reaAmousting, taminh, doed paper 1Amousting or gaining electrons, spect to waves, frequency, here the building up of knowledge from KS3 appilation to reaAmousting or gaining electrons, spect to waves, frequency, here the building up of knowledge from KS3 appilation to reaAmousting or gaining electrons, spect to waves, frequency, here the building up of knowledge of incidence, system, reversible reactionAmousting or gaining electrons, spect to waves, frequency, here the building up of knowledge of incidence, system, reversible reactionReall the EM spectrum in order electrons, spect to waves, frequency, here the light to low frequency or vice wersal.Reall the EM spectrum in order electrons, spect to waves, frequency, here hight to low frequency or vice wersal.V bio spectrum, emission spectrum,			These are the first parts of paper 2 content.			
Furm 6First paper 2 topics for biology: chosen for the application to rea application to rea adaptations on a supplication to rea adaptations and structure) to understand plants i adaptations and structure) to understand plants i tunctions in depth.Conscient for supplication to rea system, dynamic equilibrium, example extension, exempting the plant adaptations and structure) to understand plants incident requestion, herers, long runseling turning the plant incident requestion, herers, long runseling turning turning the plant incident requestion, herers, long runseling turning turni			Torm F			and the success of these.
Tem 6Fist paper 2 topis for biology; chosin for the application to real application and structure; to understand plants functions in depth.Atoms can form ions by lossing ore gaining electrons.Tem 6Tem 6Tem 6Tem 6Tem 6Tem 6Students struggle with these calculations so placed of forom periodic table and equations from equations, periodic table and equations from equation, periodic table and equations from equivalence equations, from equation, periodic table and equations from equation, periodic table and eq		ulabeles	Terms			
Chemistry: Quantitative analysis application to real in equilibrium of nonvelage from WS3 8, system, reversible reaction agnetic waves, frequency, hert, individual waves, reversible reaction agnetic waves, frequency, hert, individual waves, reversible reaction, interface, wavelength, refraction, interface, wavelength, refraction, interface, social tors, periodic table and equations from depth of domination, irradiverse, social tors, bernot cable and confident, when approaching Chemistry calculations. Pression of the EM spectrum in order (letter high angle of incidence, angle of refraction, interface, social tors, bernot cable and confident, when approaching Chemistry calculations. Recall the EM spectrum in order (letter high angle of incidence, angle of refraction, interface, social tors, bernot cable and confident, when approaching Chemistry calculations. Recall the EM spectrum in order (letter high angle of incidence, angle of refraction, interface, social tors, bernot cable and confident, when approaching Chemistry calculations. Recall the EM spectrum in order (letter high angle of incidence, angle of refraction, interface, social tors, bestrate), associations, bascration, bascration, bascration, bascration, bascration, bascration, bascration, association, bascration, bascration, associations, applicate, elitit electricity, free body force diagram, costing cables cell, protist, starch, surros, stars, dissa, edicate clinit, free body force diagram, cellulation for down adjend, endering (game, endergo erg, hyroid glind, endersiting flind, endersitie electricity, free body force dingram, cell methy, esting addication, cell meth					Atoms can form ions	
Chemistry: Quantitative analysis If if and the building up of knowledge from KS3 & system, reversible reaction system, reversible reaction electrons. VID (cells, photosynthesis, now applying to the system, reversible reaction Amplitude, electronagentic wave, modeling have, reducting wave, medling, range of refraction, inerdiace, angle of refraction, inerdiace, angle of refraction, incident ray, gamma rays, microwver, radio waves, rays, socialitons, fraction, incident ray, gamma rays, microwver, radio waves, rays, socialitons, fraction, incident ray, gamma rays, microwver, radio waves, rays, socialitons, fraction, incident ray, gamma rays, microwver, radio waves, rays, socialitons, fraction, incident ray, gamma rays, microwver, radio waves, rays, socialitons, fraction, incident rays, gamma rays, microwver, radio waves, rays, socialitons, fraction, incident rays, gamma rays, microwver, radio mays, rays, socialitons, fraction, incident rays, gamma rays, microwver, radio waves, rays, socialitons, fraction, incident rays, gamma rays, microwver, radio waves, rays, socialitons, fraction, incident rays, gamma rays, microwver, radio waves, rays, socialitons, fraction, rays, down, design rudio radiation, coamic rays, down, design rudio radiation, rays, down, design rudio radiation, rays, rays, rays, fore, feight, forter field, forter field, forter field, response, glycogen, ragive feedback, comparide (regram, response, glycogen, ragive feedback) Equation for work done. Image: I		Term 6				
Schember y doubleder biologies in depth. Term 6 Students struggle with these calculations so placed adaptations and structure) to understand plants functions, inderph. Term 6 Students struggle with these calculations so placed and of yr10 to build on chemistry knowledge of atoms, periodic table and equations from Physics, so students are more able and confident Amplitude, electromagnetic waves, reading and equations in particle, nucleon, absorption spectrum, inside light, angle functione, angle of refraction, incident ray, gamma rays, microwaves, funcescener, radiotarop, approaching Chemistry calculations spectrum, ensisting approaching Chemistry knowledge of atoms, periodic tables and equations function, beta particle, nucleon, absorption spectrum, ensisting approaching Chemistry calculations, field, static electricity, free body force diagram. Cellulose, gas exchange, guard cell, lipid, palicade cull, lipid, palicade cull, lipid, palicade cull, field, static electricity, free body force diagram. After angle and, adrenain, fight or flyrd gamma radjention, microwared, field, static electricity, free body force diagram. After angle and, adrenain, fight or flyrd gamma radjention, adrenain, fight or flyrd gamma radjention, protect, siven tube, translocation, trayet ogan, thyrde, gamma radjention, glind, endocrine glind, prutary glind, adrenain, fight or flyrd gamma, fight or flyrd gamma radjention in plants. Homeostasis.						
Amplitude, lettering, microarganetic wave, medium, transverse wave, wavelength, refraction, infrared, unctions in depth.Amplitude, lettering, hirtzon medium, transverse wave, wavelength, refraction, infrared, unctionet, angentic mays, microwave, radio waves, transv, sciitolie, yacuum, visible light, angle of indicence, angentic mays, sciitorawave, radio waves, transv, sciitolie, yacuum, visible light, angle of indicence, angentic mays, sciitorawave, radio waves, krays, sciitatora, transverse, cradiotherapy, Alpha particel, nucleon, absorption scientum, emission spectrum, minsion gradiation, backquerd, when approaching Chemistry calculationsRecall the EM spectrum, model reguestion, transverse, radio waves, krays, sciitatora, radio waves, krays, sciitatora, versa).Recall the EM spectrum, model reguestion, and spectrum, model reguestion, science, radio waves, krays, sciitatora, radiaton, backqueen, absorption gradiation, backqueen, absorption and waves, transverse, radio waves, krays, sciitatora, data particel, nucleon, absorption gradiation, backqueen, absorption reas, dose, Geiger-Muller tube, beta particel, radiotative decay, gramm aray, penetrate, positive, field, force field, static electricity, free body force diagram,Differences between alpha, beta and gamma radiation.Cellulose, gas exchange, guard cell, lipid, palisade cul, haf-life, contamination, Irradiaded, haf-life, contamination, irradiaded, hytouing,		Chemistry: Quantitative analysis		system, reversible reaction	elections.	
Iunctions in depth. frequency, transverse wave, wavelength, transverse wavelength, transverse wavelength, transverse wave, wavelength, transverse wave, wavelength, transverse wave, wavelength, transverse wave, wavelength, transverse wavelength, transverse wave						
Term 6 medium.transvers.wave, wavelength. tracticulin.interface, normal, infrardac, proman, infrardac, normal, infrardac, proman, infrardac, normal, infrardac, proman, indicent ray, ganma ray, microwars, radio waves, x-ray, socillations, incident ray, ganma ray, microwars, radio waves, x-ray, socillations, radio waves, x-ray, socillations, response, gluca equation, becquerel, light, patistate eductivity, free body force field, state edectricity, free body force field, state edectivity, free body force field, state edectivity, free body force field, state edectivity, free body force field, gluin, politate, companion cell, light, patistate, companion cell, light, patistate, companion cell, light, and, endocrine gluan, Adrenaig gluan, denocrine gluan, fart, corpus lutum, fSH, VF, LH, homeostatis Equation for photosynthesis and respiration in plants.						
Term 6Interace, normal, infrared, ultraviole, vacuum, volishe light, angle of incidence, angle of refraction, incident ray, gamma rays, microwers, radio waves, x-rays, colliations, fluorescence, radiotherapy, Alpha particle, nucleon, absorption incident rays, discing calculations or when spectrum, mission spectrum, inoising radiation, background radiation, nacident rays, discing calculations spectrum, mission spectrum, inoising radiation, background radiation, indigent rays, discing calculationsRecall the EM spectrum in order irequency or vice versal.Recall the EM spectrum, inoising radiation, background radiation, indigent rays, discing calculationsRecall the EM spectrum, inoising radiation, background radiation, indigent rays, discing calculation between alpha, beta and gamma ray, pentrate, companion (algram, radiated), proteints, starch, radiation, indigent ray, pentrate, companion call, lighi, palisade cell, protist, starch, ranslocation, transpiration Adrenal gland, andercine gland, pituitary gland, targer gram, thrys, htt, htt, indigent rays, persite feedback, pentrespiration, inplants.Recall the EM spectrum in order light, palisade cell, protist, starch, comparisation, Adrenal gland, andercine gland, pituitary gland, targer gram, thrys, htt, hthomeostasisRecall the EM spectrum in order light, palisation, fight, palisation, equation for provork equation for prospiration in plants.Image data data			functions in depth.			
Sudents struggle with these calculations so placed near end of yr10 to build on chemistry knowledg of atoms, periodic table and equations from Physics, so students are more able and confident when approaching Chemistry calculations.ultravioler, yacum, visible indications, radio waves, yacry, so calliditons, spectrum, emission spectrum, indication, cosmic rays, dose, Geiger-Muller tube, beta particle, radioactive decay, gamma rays, metrovaee, radio waves, peetrum, indicated, Watts, work done, elterit field, for diagram, work spectrum, beta particle, radioactive decay, gamma rays, metrovaee, radio waves, geiger-Muller tube, beta particle, radioactive decay, gamma rays, metrovae, gamma rays, metrovae, posterum, indicated, Watts, work done, elterit field, for diagram, sucress, elterit field, for sucress, elterit field, for sucress, elterit field, for sucress, elterit field, for sucress, fault elter, field for sucress, fault elter, field for sucress, elterit field, for sucress, fault elter, field for sucress, fault elter, field, for 				medium, transverse wave, wavelength,		
Students struggle with these calculations so placed nearend of yr10 to build on chemistry knowledge of atoms, periodic table and equations from Physics, so students are more able and confident when approaching Chemistry calculations. of incident ray, gamma rays, microwaves, radio waves, x-rays, oscillations, fluorescence, radiotherapy. Alpha particle, nucleon, absorbion spectrum, ionising radiation, background radiation, cosmic ray, dose, Geiger-Muller tube, beta particle, radioactive decay, gamma ray, penetrate, positron, unstable, nuclear equation, brequerel, half-life, contamination, irradiated, Watts, work done, electric field, force field, static electricity, free body force diagram, Differences between alpha, beta and particle, rudicative decay, gamma radiation. Cellulose, gas exchange, guard cell, liggland, androzine, progesterone, ACT-corpus luteum, FSH, IVF, LH, homeostasis. Equation for photosynthesis and respiration in plants.			Term 6	refraction, interface, normal, infrared,		
Students struggle with these calculations so placed of incident ray, gamma rays, microwaves, radio waves, radio wav				ultraviolet, vacuum, visible light, angle	Decall the EM	
 In a reak end of vruit to build on chemistry knowledge of atoms, periodic table and equations from Physics, so students are more able and confident when approaching Chemistry calculations. Alpha particle, nucleon, absorption spectrum, emission spectrum, ionising radio waves, x-radio therapy. Alpha particle, radioactine, background radiation, cosmic ray, dose, Geiger-Muller tube, beta particle, radioactine decay, gamma ray, penetrate, positron, unstable, nuclear equation, becquerel, half-life, contamination, irradiated, Watts, work done, electric field, force field, static electricity, free body force figid, palisade cell, protist, starch, surves, stoma, nitrate, companion cell, lignin, potenter, iseque tube, transpiration Adrenal gland, endocrine gland, pitulary gland, target organ, hyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyrowrthe sia and response, glycogen, negative feedback, thyrowrthe, esstrogen, progesterone, Aff. corpus luterum, FSH, IVF, LH, homeostasis. 			Students struggle with these calculations so placed	of incidence, angle of refraction,		
Or atoms, periodic table and equations from Pathysics, so students are more able and confident when approaching Chemistry calculations. Fraguency or vice Frequency or vice Alpha particle, nucleon, absorption Spectrum, emission spectrum, ionising radiation, cosmic rays, dose, Geiger-Muller tube, beta particle, radioactive decay, gamma ray, penetrate, positron, unstable, nuclear equation, becquerel, half-life, contamination, irradiated, Watts, work done, electric field, force field, static electricity, free body force diagram, Differences between alpha, beta and igna, bate and gamma ray, anitrate, companion cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, andorcine gland, endorcine gland, endorcine gland, endorcine gland, aptivitary gland, target organ, thyroid gland, and endorcine gland, pituitary gland, and endorcine gland, protesties and respiration in plants. Equation for photosynthesis and respiration in plants. ATT, corpus Liteum, FSH, IVF, LH, homeostasis. Empirical formula, molecular formula, Homeostasis.			near end of yr10 to build on chemistry knowledge	incident ray, gamma rays, microwaves,	•	
Privstay, so subdents are infore able and coninering when approaching Chemistry calculations. Alpha particle, nation, absorption spectrum, emission spectrum, emission, becquerel, half-life, contamination, irradiated, Watts, work done, electric field, force field, static electric/tity, free body force diagram, contamination, inpotometer, sieve tube, translocation, transpiration, adrenal gland, endorcine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, estrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasis Equation for photosynthesis and respiration in plants.			of atoms, periodic table and equations from	radio waves, x-rays, oscillations,		
when approximing chemistry calculations. Approximation approximation is spectrum, ionising radiation, background radiation, cosmic rays, dose, Geiger-Muller tube, beta particle, radioactive decay, gamma ray, penetrate, positron, unstable, nuclear equation, becquerel, half-life, contamination, irradiated, Watts, work done, electric field, force field, static electricity, free body force diagram, Differences between alpha, beta and gamma radiation. Cellulose, gas exchange, guard cell, lipid, palisade cell, protist, starch, sucrose, storma, nitrate, companion cell, ligand, endorcine gland, pituitary gland, target organ, thryroid gland, afarget organ, thryroid gland, afarget organ, thryroid response, glycogen, negative feedback, thryroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasis Equation for photosynthesis and respiration in plants.			Physics, so students are more able and confident	fluorescence, radiotherapy.		
spectrum, emission spectrum, ionising raviation, background radiation, comic ravs, dose, Geiger-Muller tube, beta particle, radioactive decay, gamma ray, penetrate, positron, unstable, nuclear equation, becquerel, half-life, contamination, irradiated, Watts, work done, electric field, force field, static electric field, force field, static electric field, force field, static electric field, force field, and gamma radiation. Differences between alpha, beta and gamma radiation. Lellulose, gas exchange, guard cell, ligin, potometer, sieve tube, translocation, transpiration Adrenal gand, endocrine gland, endocrine gland, endocrine gland, derealin, fight-orflight response, glycogen, negative feedback, thyrowine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasis Equation for mork erespiration in plants. Equation in plants. Empirical formula, molecular formula, Homeostasis.			when approaching Chemistry calculations.	Alpha particle, nucleon, absorption	versa).	
radiation, background radiation, cosmic rays, dose, Geiger-Muller tube, beta particle, radioactive decay, gamma ray, penetrate, positron, unstable, nuclear equation, becquerel, haff-life, contamination, irradiated, Watts, work done, electric field, force field, static electricity, free body force diagram, Cellulose, gas exchange, guard cell, lipid, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, endorrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasis				spectrum, emission spectrum, ionising		
cosmic rays, dose, Geiger-Muller tube, beta particle, radioactive decay, gamma ray, penetrate, positron, unstable, nuclear equation, becquerel, half-life, contamination, irradiated, Watts, work done, electric field, force field, static electricity, free body force diagram,Differences between alpha, beta and gamma radiation.Cellulose, gas exchange, guard cell, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, transpication Adrenal gland, adrenalin, fight-or-flight-or explose, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.Homeostasis.Empirical formula, molecular formula,Homeostasis.						
beta particle, radioactive decay, garma ray, penetrate, positron, unstable, nuclear equation, becquerel, half-life, contamination, irradiated, Watts, work done, electric field, force field, static electric field, force diagram,Differences between alpha, beta and garma radiation.Cellulose, gas exchange, guard cell, lipid, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, endocrine gland, pituitary gland, arget organ, thyroid gland, adrenalin, fight-or-filight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, homeostasisEquation for photosynthesis and respiration in plants.empirical formula, molecular formula,Homeostasis.Homeostasis.				_		
gamma ray, penetrate, positron, unstable, nuclear equation, becquerel, half-life, contamination, irradiated, Watts, work done, electric field, force field, static electricity, free body force diagram,Differences between alpha, beta and gamma radiation.Cellulose, gas exchange, guard cell, lipid, palisade cell, protist, starch, oucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, endorine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, 				-		
Image: Section of the section of th						
half-life, contamination, irradiated, Watts, work done, electric field, force field, static electricity, free body force diagram,Differences between alpha, beta and gamma radiation.Cellulose, gas exchange, guard cell, lipid, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.						
Watts, work done, electric field, force field, static electricity, free body force diagram,alpha, beta and gamma radiation.Cellulose, gas exchange, guard cell, lipid, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flightEquation for work done.Equation for work cell, lipic, potist, starch, sucrose, stoma, nitrate, companion Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight homeostasisEquation for photosynthesis and response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.					Differences between	
field, static electricity, free body force diagram, gamma radiation. Cellulose, gas exchange, guard cell, lipid, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpiration Equation for work done. Adrenal gland, endocrine gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasis Equation for photosynthesis and respiration in plants. Empirical formula, molecular formula, Homeostasis. Homeostasis.					alpha, beta and	
diagram,Cellulose, gas exchange, guard cell, lipid, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.Empirical formula, molecular formula, homeostasis.Homeostasis.						
Cellulose, gas exchange, guard cell, lipid, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for work done.Empirical formula, molecular formula,Homeostasis.					-	
Ipid, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpirationEquation for work done.Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.Empirical formula, molecular formula,Homeostasis.Homeostasis.						
Ipid, palisade cell, protist, starch, sucrose, stoma, nitrate, companion cell, lignin, potometer, sieve tube, translocation, transpirationEquation for work done.Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.Empirical formula, molecular formula,Homeostasis.Homeostasis.				Cellulose, gas exchange, guard cell,		
Sucrose, stoma, nitrate, companion Equation for work cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, rhyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasis Empirical formula, molecular formula,						
cell, lignin, potometer, sieve tube, translocation, transpiration Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisdone.Empirical formula, molecular formula, Homeostasis.Homeostasis.					Equation for work	
translocation, transpiration Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.Empirical formula, molecular formula,Homeostasis.				-	done.	
Adrenal gland, endocrine gland, pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.Empirical formula, molecular formula,Homeostasis.						
pituitary gland, target organ, thyroid gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.Empirical formula, molecular formula,Homeostasis.				-		
gland, adrenalin, fight-or-flight response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasisEquation for photosynthesis and respiration in plants.Empirical formula, molecular formula,Homeostasis.						
response, glycogen, negative feedback, thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasis Empirical formula, molecular formula,					c	
thyroxine, oestrogen, progesterone, ART, corpus luteum, FSH, IVF, LH, homeostasis Empirical formula, molecular formula, Homeostasis.					•	
ART, corpus luteum, FSH, IVF, LH, homeostasis Empirical formula, molecular formula, Homeostasis.						
homeostasis Empirical formula, molecular formula, Homeostasis.					respiration in plants.	
Empirical formula, molecular formula, Homeostasis.				-		
				nomeostasis		
				Empirical formula, molecular formula	Homeostasis.	

				How to calculate relative molecular mass from atomic masses on the periodic table,		
Year	What do students learn?	Why?	Tier 3 keywords	Threshold concepts	Literacy	Assessment
11	Term 1 Chemistry: key concepts revision, rates of reaction, endo and exothermic, fuels and earth science	Term 1 Build on gaps identified in yr10 assessment. Rates of reaction topic is highly engaging and includes a couple of required practicals which pupils need to be very familiar with. The fuels and earth science topic was a key weakness in 2018 exams possibly due to it being taught at the end of yr11. Therefore it has been moved to a more prominent place	Activation energy, endothermic, exothermic, active site, catalyst, denatured, reaction profile. Crude oil, feedstock, finite resource, hydrocarbon, fractionating column, ignite, viscosity, alkane, general formula, homologous series, carbon monoxide, complete combustion, incomplete combustion, haemoglobin, acid rain, weathering, alkene, cracking, saturated, unsaturated. Causal link, climate change, global warming, greenhouse effect, infrared, resolution.	Recall the definition of activation energy. What the boiling point of a substance means.	Reading Article on heart disease in the UK. Article on ecosystem problems; deforestation, eutrophication, overfishing. Writing Extended writing on the use of fractional distillation. Extended writing on the journey of blood through the body and heart.	End of topic assessments from Edexcel which give an estimated grade. Term 2 Y11 PPE Term 2
	Term 2 Biology: Ecosystems, key concepts revision, exchange in animals	Term 2 Ecosystems needs to be taught earlier in year 11 for weather conditions to be able to complete outdoor practicals. Build on weaknesses form yr10 exam. Exchange in animals is also covered in PE GCSE and knowledge of the plant topic in yr10 builds to understand exchange in animals. Also opportunity to recap transport in yr9	Ecosystem, community, interdependent, quadrat, abiotic factors, belt transect, biotic factors, predation, host, mutualism, parasite, eutrophication, overfishing, reforestation, potable, decomposer, crop rotation, nitrogen-fixing bacteria. Aerobic respiration, alveolus, erythrocyte, plasma, platelet, valve, aorta, atrium, deoxygenated blood, oxygenated blood, pulmonary artery, pulmonary vein, septum, stroke volume, tendon, vena cava, ventricle, lactic acid.	Differences between abiotic factors and biotic factors.	Oracy Explaining how to set up various circuits to test voltage, current, resistance. Explaining how to correctly wire a plug and describing the functions of the various components.	Term 3 Y11 PPE Term 4
	Term 3 Physics: electricity, forces, magnetism, EM induction, particle model	Term 3 These physics topics relate very well to each other as they build from electricity, forces, magnets and then how these will be used in electromagnets. The particle model covers content taught earlier in Chemistry and should build on understand rather than being 'left to last'.	Ampere, potential difference, voltage, charge, coulomb, ohm, resistance, direct proportion, diode, LDR, LED, thermistor, power, watt, a.c. , d.c. , hertz, national grid, circuit breaker, earth wire, fuse, live wire, neutral wire. Induced magnet, permanent magnet, electromagnet, solenoid, Fleming's left-hand rule, magnetic flux density, motor effect, tesla.	The structure of the heart.		

	Electromagnetic induction, transformer, step-down transformer, transmission lines,	Difference between voltage/ potential difference and current		
--	--	---	--	--