


Year 9: Combined Science	<p>Curriculum Intent: Year 9 science looks to build on the foundations from years 7 and 8 and work towards developing knowledge of similar areas as students begin to work towards their GCSE examinations:</p> <ul style="list-style-type: none"> • Physics: Energy, Motion, Waves and Radiation. • Chemistry: Particles, Periodic Table, Chemical Reactions and Earth and Environmental Science, with the addition of more complex ideas in Monitoring Reactions. • Biology: Cell Level Systems, Scaling up, Organism Level Systems, Community Level Systems, Genes, Inheritance and Selection and Global Challenges <p>The subject and procedural knowledge demands increase in this year, and students will be exposed to more complex ideas, models and explanations. Practical Activities (PAG) will be coupled with mathematical skills to build more procedural knowledge, focusing on areas such as data analysis and interpretation of graphs. The scientific knowledge developed through this year will provide the basis for further study in these areas as students enter year 10, with the whole of the Combined Science content being taught before the year 10 PPE's.</p>						
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	
Key ideas and sequence of learning	<p>Chemistry module C1 - particles</p> <ul style="list-style-type: none"> • Particles • Chemical & physical changes • Atomic structure • History of the development of the atom • Periodic table <p>Physics module P5 -- Energy</p> <ul style="list-style-type: none"> • Energy transfers • Energy, heat & temperature <p>Biology module B1 - cell level systems</p> <ul style="list-style-type: none"> • Maths skills for science • Plant and animal cells 	<p>Physics module P1 -Energy</p> <ul style="list-style-type: none"> • Specific heat capacity • State changes and specific latent heat • Density • Gas pressure & temperature <p>Chemistry module C2 – elements & compounds</p> <ul style="list-style-type: none"> • Metals/non-metals • Electronic structure • Forming ions • Ionic compounds • Simple molecules • Giant covalent 	<p>Physics module P2 - forces</p> <ul style="list-style-type: none"> • Speed • Vectors and scalars • Acceleration • Distance- time graph • Velocity – time graphs • Kinetic energy and motion calculations <p>Biology module 5 – Genese, inheritance and selection</p> <ul style="list-style-type: none"> • Variation • Dominant and recessive alleles • Genetic crosses • Mutations • Natural selection <p>Biology module B6 – global challenges</p> <ul style="list-style-type: none"> • Selective breeding 	<p>Physics module 4-waves</p> <ul style="list-style-type: none"> • Wavelength and frequency • Wave properties • Wave speed • EM waves and EM spectrum • Isotopes • Alpha, beta and gamma radiation • Nuclear equations • Half life • Radiation in and out of atoms <p>Biology module B6 – global challenges</p> <ul style="list-style-type: none"> • Human infections • Blood and Body defence mechanisms • Vaccinations 	<p>Chemistry module 2</p> <ul style="list-style-type: none"> • Relative formula mass • Empirical formula • Filtration and crystallisation • Distillation • Chromatography <p>Chemistry module 4</p> <ul style="list-style-type: none"> • Group 1 • Group 7 • Group 0 • Reactivity of metals <p>Revision for end of year exams</p>	<p>End of Year exams and review</p> <p>Physics module- P3 electricity</p> <ul style="list-style-type: none"> • Static electricity • Electric currents and charge 	

	<ul style="list-style-type: none"> • Bacterial Cells • Light Microscopes • Electron Microscopy • DNA Structure • Enzyme lock and key model • Biological Molecules • Food tests • Aerobic + Anaerobic Respiration 	<ul style="list-style-type: none"> • Polymer • Structure of metals • Allotropes of carbon • Bulk properties • Changing state <p>Biology module B1</p> <ul style="list-style-type: none"> • Photosynthesis • Testing for starch • Diffusion • Osmosis • Active transport <p>Biology module B2- scaling up</p> <ul style="list-style-type: none"> • Exchange and Transport • Circulatory System • Heart and blood <p>Biology module B3- organism level systems</p> <ul style="list-style-type: none"> • <i>Nervous system</i> • <i>Reflexes</i> <p>Biology module B4- community level systems</p> <ul style="list-style-type: none"> • Ecosystems • Introduction to Sampling • Abiotic and Biotic Factors 	<ul style="list-style-type: none"> • Genetic engineering • Health and Disease • Spread of communicable diseases • Preventing the spread of communicable diseases 	<ul style="list-style-type: none"> • Non-Communicable disease • Smoking and CVD • Treating CVD 		
--	--	---	--	---	--	--

		<ul style="list-style-type: none"> • Competition and Interdependence • Analysis of predator/prey graphs • Nutrient cycling (Water cycle only) 				
<p style="text-align: center;">Key Questions</p>	<ol style="list-style-type: none"> 1. How are particles arranged in solids, liquids and gases? 2. What is inside the atoms? 3. How did we discover the atom? 4. What are the energy stores and how is energy transferred? 5. What is inside a cell? 6. How do we digest food? 7. How do cells release energy? 	<ol style="list-style-type: none"> 1. What happens when we heat solids, liquid and gases? 2. How are chemical bonds formed? 3. What are the allotropes of carbon? 4. What is the structure of metals and plastics? 5. How do plants produce and store food 6. How does the body transport oxygen? 7. How does our nervous system work? 8. How do ecosystems interact? 	<ol style="list-style-type: none"> 1. How do we calculate and measure speed? 2. How do we represent motion graphically? 3. How are our characteristics inherited? 4. How does disease spread and how can it be prevented? 	<ol style="list-style-type: none"> 1. What are the properties of waves? 2. What is the EM spectrum and how does it affect our lives? 3. What is ionising radiation and how do we measure it? 4. How does disease spread and how can it be prevented? 	<ol style="list-style-type: none"> 1. How do we separate chemical compounds? 2. How can we determine masses of reactants? 3. How can we purify and analyse chemicals? 4. How can we predict trends in the periodic table? 	<ol style="list-style-type: none"> 1. What causes static electricity? 2. What are charge and current how can they be determined?

<p style="text-align: center;">Vocabulary</p>	<p>Chemistry</p> <ul style="list-style-type: none"> • Solid • Liquid • Gas • Melting Point • Boiling Point • Ion • Isotope <p>Physics Module</p> <ul style="list-style-type: none"> • Thermal • Gravitational • Chemical • Magnetic • Kinetic • Nuclear • Electrostatic • Forces • Waves • Heating • Current <p>Biology</p> <ul style="list-style-type: none"> • Cell membrane • Cell wall • Chloroplast • Cytoplasm • Eukaryotic cell • Flagellum • Mitochondria • Nucleus • Plasmid • Prokaryotic cell • Resolution • Vacuole • Active site • Bases • Chromosome 	<p>Physics</p> <ul style="list-style-type: none"> • Specific Heat Capacity • Specific Latent Heat • Density • Pressure <p>Chemistry</p> <ul style="list-style-type: none"> • Relative Formula Mass • Group • Period • Ionic Compound • Covalent Compound • Dot And Cross Diagram • Giant Lattice • Allotrope • Polymer • Metals • Lattice • Giant Covalent <p>Biology</p> <ul style="list-style-type: none"> • Chlorophyll • Limiting Factors • Photosynthesis • Active Transport • Concentration gradient • Differentiation • Diffusion 	<p>Physics</p> <ul style="list-style-type: none"> • Velocity • Acceleration • Deceleration • Distance • Displacement • Time • m/s • km/s • Equation • m/s² • Distance-time graph <p>Biology</p> <ul style="list-style-type: none"> • Insulin • Diabetes • Abiotic Factors • Biomass • Biotic Factors • Carbon Cycle • Community • Competition • Consumers • Decomposers • Detritivores • Ecosystem • Egestion • Excretion • Habitat • Interdependence • Mutualism • Parasitism • Population • Predation • Producers • Pyramid of biomass • Trophic Level 	<p>Physics</p> <ul style="list-style-type: none"> • Transverse • longitudinal • Wavelength • Frequency • Electromagnetic • Radio • Microwave • Infrared • Visible • Ultraviolet • X-Ray • Gamme • Alpha • Beta • Half life • Ionisation • Penetration • Attraction • Repulsion • Unstable isotope <p>Biology</p> <ul style="list-style-type: none"> • Antigens • Antiseptic • Antivirals • Aseptic technique • Clinical Trial • Communicable Disease • Contagious • Diagnosis • Disease • Droplet infection • Immunity • Incubation period • Lymphocytes 	<p>Chemistry</p> <ul style="list-style-type: none"> • Rf value • filtration • Fractional Distillation • Reactivity • Trends • Outer electron • Displacement reaction 	<p>Physics</p> <ul style="list-style-type: none"> • Electrostatic Attraction
--	--	--	---	---	--	--

	<ul style="list-style-type: none"> • Complementary Base pairing • Denature • DNA • DNA base • Enzyme • Gene • Aerobic Respiration • Anaerobic Respiration • ATP • Exothermic • Fermentation • Anaerobic Respiration • Metabolic rate • Oxygen debt 	<ul style="list-style-type: none"> • Meristems • Mitosis • Osmosis • Water potential • Alveoli • Artery • Atria • Capillary • Diffusion Distance • Double Circulatory System • Exchange Surface • Heart • Lumen • Phloem • Potometer • Vein • Ventricle 	<ul style="list-style-type: none"> • Urine • Alleles • Asexual reproduction • Cancer • Clone • Continuous variation • Diploid cells • Discontinuous Variation • Dominant allele • Environmental Variation • Fertilisation • Gametes • Sex Cells • Genetic cross • Genetic variation • Genome • Genotype • Haploid Cells • Heterozygous • Homozygous • Meiosis • Mutation • Phenotype • Punnett square • Recessive allele • Sexual reproduction • Variation • Zygote 	<ul style="list-style-type: none"> • Monoclonal Antibodies • Pathogen • Phagocytes • Placebo • Sterile • Vaccine • Zone of inhibition 		
--	--	--	---	--	--	--

<p>Practical Skills</p>	<p>Chemistry</p> <ul style="list-style-type: none"> • Comparing chemical and physical changes <p>Biology</p> <ul style="list-style-type: none"> • Light Microscopy • Food Tests 	<p>Physics</p> <ul style="list-style-type: none"> • Specific heat capacity • Density <p>Biology</p> <ul style="list-style-type: none"> • Heart dissection • Testing for Starch 	<p>Physics</p> <ul style="list-style-type: none"> • Speed • acceleration 	<p>Physics</p> <ul style="list-style-type: none"> • radiation demonstration • skittles experiment 	<p>Chemistry</p> <ul style="list-style-type: none"> • Filtration and crystallisation • Chromatography 	<p>Physics</p> <ul style="list-style-type: none"> • Static electricity • Building simple circuits
--------------------------------	--	--	---	--	--	--