

KS4 Science Curriculum Skills and Progression Map

Year	NC link/BSquared	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key Stage 4							
<u>Pearson Edexcel GCSE (9-1) Exam Specification</u>							
<u>Pearson Edexcel Entry level Certificate in Science Specification</u>							
Core Practicals:							
Biology							
Core practical 1: Looking at cells Autumn 2 Year 10							
Core practical 2: pH and enzyme activity Autumn 1 Year 10							
Core practical 3: Food tests Summer 1 Year 11							
Core practical 4: Osmosis in potato strips Autumn 1 Year 10							
Core practical 5: Microbial cultures Autumn 1 Year 11							
Core practical 6: Photosynthesis Autumn 1 Year 11							
Core practical 7: Respiration Spring 1 Year 11							
Core practical 8: Fieldwork Spring 1 Year 11							
Chemistry							

Core practical 1: Investigating the composition of inks **Spring 2 Year 10**

Core practical 2: Investigating pH **Autumn 1 Year 10**

Core practical 3: Preparation of copper sulfate **Autumn 1 Year 10**

Core practical 4: Electrolysis **Spring 2 Year 10**

Core practical 5: Acid-alkali titration **Autumn 1 Year 10**

Core practical 6: Rates of reaction **Autumn 1 Year 10**

Core practical 7: Identifying ions **Autumn 1 Year 10**

Core practical 8: Combustion of alcohols **Autumn 2 Year 11**

Physics

Core practical 1: Investigating force, mass and acceleration **Spring 1 Year 10**

Core practical 2: Investigating speed, frequency and wavelength of waves **Summer 2 Year 10**

Core practical 3: Investigating refraction in glass blocks **Summer 2 Year 10**

Core practical 4: Investigating thermal energy **Spring 1 Year 10**

Core practical 5: Investigating electrical circuits **Spring 1 Year 11**

Core practical 6: Investigating the density of solids and liquids **Spring 2 Year 11**

Core practical 7: Investigating the properties of water **Spring 2 Year 11**

Core practical 8: Investigating the extension of a spring **Spring 2 Year 11**

ASDAN Science short Course

Pupils in vocational pathways may be continuing their ASDAN portfolios

10	Topic	CC1 States of Matter CC3 Atomic Structure CC4 The Periodic Table CC5 Ionic Bonding CC6 Covalent Bonding CC7 Types of Substance CC8 Acids and Alkalis CC14 Rates of Reaction	CB1 Key Concepts in Biology CB2 Cells and Control	CP1 Motion CP2 Forces and Motion CP3 Conservation of Energy CC9 Calculations Involving Masses	CC2 Methods of Separating and Purifying Substances CC10 Electrolytic Processes CC11 Obtaining and Using Metals CC12 Reversible Reactions and Equilibria	CB3 Genetics CB4 Natural Selection and Genetic Modification	CP4 Waves CP5 Light and the Electromagnetic Spectrum CP6 Radioactivity CP7 Energy - Forces Doing Work CP8 Forces and their Effects
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<p>Pupils will learn about...</p> <p>(Core knowledge and concepts to be learned)</p> <p>Specification Link</p>	<p>CC1a States of matter</p> <p>CC3a Structure of an atom</p> <p>CC3b Atomic number and mass number</p> <p>CC3c Isotopes</p> <p>CC4a Periodic table and elements</p> <p>CC4b Atomic number and the periodic table</p> <p>CC4c Electronic configurations and the periodic table</p> <p>CC5a Ionic bonds</p> <p>CC5b Ionic lattices</p> <p>CC5c Properties of ionic compounds</p> <p>CC6a Covalent bonds</p> <p>CC7a Molecular compounds</p> <p>CC7b Allotropes of carbon</p>	<p>CB1a Microscopes</p> <p>CB1b Plant and animal cells</p> <p>CB1b Core practical - Using microscopes</p> <p>CB1c Specialised cells</p> <p>CB1d Inside bacteria</p> <p>CB1e Enzymes and nutrition</p> <p>CB1f Enzyme action</p> <p>CB1g Enzyme activity</p> <p>CB1g Core practical - pH and enzymes</p> <p>CB1h Transporting substances</p> <p>CB1h</p> <p>Core practical - Osmosis in potato slices</p> <p>CB2a Mitosis</p> <p>CB2b Growth in animals</p> <p>CB2C Growth in plants</p> <p>CB2d Stem cells</p>	<p>CC9a Masses and empirical formulae</p> <p>CC9b Conservation of mass</p> <p>CC9C Moles</p> <p>CP1a Vectors and scalars</p> <p>CP1b Distance/time graphs</p> <p>CP1c Acceleration</p> <p>CP1d Velocity/time graphs</p> <p>CP2a Resultant forces</p> <p>CP2b Newton's First Law</p> <p>CP2c Mass and weight</p> <p>CP2d Newton's Second Law</p> <p>CP2d Core practical - Investigating acceleration</p> <p>CP2e Newton's Third Law</p>	<p>CC2a Mixtures</p> <p>cc2b Filtration and crystallisation</p> <p>CC2c Paper chromatography</p> <p>CC2d Distillation</p> <p>CC2d Core practical - Investigating inks</p> <p>CC2e Drinking water</p> <p>CC10a Electrolysis</p> <p>CC10a Core practical - Electrolysis of copper sulfate solution</p> <p>CC10b Products from electrolysis</p> <p>CC11a Reactivity</p> <p>CC11b Ores</p> <p>CC11c Oxidation and reduction</p> <p>CC11d Life cycle assessment and recycling</p> <p>CC12a Dynamic</p>	<p>CB3a Meiosis</p> <p>CB3bi DNA</p> <p>CB3bii DNA extraction</p> <p>CB3C Alleles</p> <p>CB3d Inheritance</p> <p>CB3e Gene mutation</p> <p>CB3f Variation</p> <p>CB4a Evidence for human evolution</p> <p>CB4b Darwin's theory</p> <p>CB4C Classification</p> <p>CB4d Breeds and varieties</p> <p>CB4e Genes in agriculture and medicine</p>	<p>CP4a Describing waves</p> <p>CP4b Wave speeds</p> <p>CP4b Core practical - Investigating waves</p> <p>CP4c Refraction</p> <p>CP5a Electromagnetic waves</p> <p>CP5a Core practical - Investigating refraction</p> <p>CP5b The electromagnetic spectrum</p> <p>CP5c Using the long wavelengths</p> <p>CP5d Using the short wavelengths</p> <p>CP5e EM radiation dangers</p> <p>CP6a Atomic models</p> <p>CP6b Inside atoms</p> <p>CP6c Electrons and orbits</p> <p>CP6d Background radiation</p> <p>CP6e Types of radiation</p>
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		<p>CC14b Factors affecting reaction rates</p> <p>CC14b Core practical - Investigating reaction rates</p> <p>CC14c Catalysts and activation energy</p>					
	<p>Why are we doing this now?</p> <p>How does it build on prior learning and prepare for knowledge and learning still to come?</p>	<p>To build upon KS3 learning.</p> <p>CC4 - To build upon content learnt in topic CC3.</p> <p>CC5 - To build upon content learnt in topic CC3 and 4.</p> <p>CC6 - To build upon content learnt in topic CC3.</p> <p>CC7 - To build upon content learnt in</p>	<p>To build upon KS3 learning.</p> <p>CB2 - To build upon content learnt in topic CB1.</p>	<p>To build upon KS3 learning.</p> <p>CP2 and CP3 - To build upon content learnt in topic CP1.</p>	<p>To build upon KS3 learning.</p> <p>CC2 - To build upon content learnt in topic CC1.</p> <p>CC10 - To build upon content learnt in topic CC3 and CC5.</p> <p>CC11 - To build upon content learnt in topic CC3 and CC10.</p>	<p>To build upon KS3 learning.</p> <p>CB3 - To build upon content learnt in topic CB2.</p>	<p>To build upon KS3 learning.</p> <p>CP5 - To build upon content learnt in topic CP4.</p> <p>CP6 - To build upon content learnt in topic CC3, CP5 and CC5.</p> <p>CP7 - To build upon content learnt in topic CP2 and CP3.</p> <p>CP8 - To build upon content learnt in topic CP1, CP2 and CP7.</p>

		topic CC3, CC5 and CC6. CC14 - To build upon content learnt in topic CC8.					
	Key Terminology	acid aqueous solution alkali atom atomic number balanced compound electron element group ion reactants mass number neutron noble gases	active transport algae alveoli bacteria cell membrane cell wall cellulose chlorophyll chloroplasts cytoplasm diffusion eukaryotic cells mitochondria nucleus	acceleration deceleration displacement gradient (of a straight line graph) tangent velocity conservation of energy dissipated efficiency elastic potential energy Hooke's Law input energy	anode cathode chromatogram chromatography dissolve distillation electrolysis equilibria filtering filtrate filtration impure insoluble irreversible mixture	alleles asexual reproduction bases (DNA) carriers cystic fibrosis Darwin dominant allele endangered extinction evolution genetic engineering genotype heterozygote homozygote meiosis mutation	alpha radiation amplitude beta radiation compression echo electromagnetic waves force frequency half life gamma light longitudinal waves mechanical wave oscillate radioactive rarefaction reflection

		periodic table	osmosis	power	pure	natural selection	refraction
		pH	partially permeable membrane	spring constant	residue	nucleotide	speed
		proton		useful energy	reversible	phenotype	transmission
		reactant	permanent vacuole	wasted energy	saturated solution	polydactyly	transverse wave
		shell	phloem	work	solubility	Punnett square diagram	ultraviolet
		state symbol	prokaryotic cells		solute	recessive	ultrasound wave
		Universal indicator	resolving power	Avogadro constant	solution	sex chromosomes	Vibrate
			ribosomes	burette	solvent	sexual reproduction	work
		alkali metal	sperm	concentration			
		halogen	stomata	concordant			
		noble gas	turgor	end point			
		transition metal	ventilated	limiting reactant			
		alloy	xylem	mole			
		covalent bond		percentage yield			
		covalent bonding		pipette			
		delocalised electron		relative atomic mass A_r			
		dot and cross diagram		relative formula mass M_r			
		gases		titration			
		giant lattice		yield			
		intermolecular forces					

		ionic bond					
		liquids					
		nanoscience					
		particle theory					
		polymer					
		solids					
		states of matter					
		activation energy					
		anhydrous					
		catalyst					
		climate change					
		closed system					
		collision theory					
		equilibrium					
		hydrated					
		precise / precision					
		reversible reaction					

11	Topic	<p>CB5 Health, Disease and Development of Medicines</p> <p>CB6 Plant Structures and their Functions</p> <p>CB7 Animal Coordination, Control and Homeostasis</p>	Mock exams	<p>CB8 Exchange and Transport in Animals</p> <p>CB9 Ecosystems and Material Cycles</p> <p>CP9 Electricity and Circuits</p>	Entry level exams	Exam preparation and Revision	Exam preparation and Revision
	<p>Pupils will learn about...</p> <p>(Core knowledge and concepts to be learned) Specification Link</p>	<p>CB5a Health and disease</p> <p>CB5b Non-communicable diseases</p> <p>CB5c Cardiovascular disease</p> <p>CB5d Pathogens</p> <p>CB5e Spreading pathogens</p> <p>CB5f Physical and chemical barriers</p> <p>CB5g The immune system</p>	<p>CC13a Group 1</p> <p>CC13b Group 7</p> <p>CC13c Halogen reactivity</p> <p>CC13d Group 0</p> <p>CC15a Exothermic and endothermic reactions</p> <p>CC15b Energy changes in reactions</p> <p>CC16a Fuels</p> <p>CC16b Hydrocarbons</p>	<p>CB8a Efficient transport and exchange</p> <p>CB8b The circulatory system</p> <p>CB8c The heart</p> <p>CB8d Cellular respiration</p> <p>CB8d Core practical - Respiration rates</p> <p>CB9a Ecosystems</p> <p>CB9b Abiotic factors and communities</p>	<p>CP10a Magnets and magnetic fields</p> <p>CP10b Electromagnetism</p> <p>CP10c Magnetic forces</p> <p>CP11a Transformers</p> <p>CP11b Transformers and energy</p> <p>CP12a Particles and density</p> <p>CP12a Core practical - Investigating</p>	<p>Pupils will develop their exam skills by practising previous examination questions.</p> <p>Pupils will complete revision lessons on topics necessary for their progress.</p> <p>Pupils will be revisiting the core practicals that sit within the specification.</p> <p>Pupils will develop their revision strategies.</p> <p>Pupils will refresh upon their examination techniques.</p>	

		<p>CB5h Antibiotics</p> <p>CB6a Photosynthesis</p> <p>CB6b Factors that affect photosynthesis</p> <p>CB6b Core practical - Light intensity and photosynthesis</p> <p>CB6c Absorbing water and mineral ions</p> <p>CB6d Transpiration and translocation</p> <p>CB7aHormones</p> <p>CB7b Hormonal control of metabolic rate</p> <p>CB7C The menstrual cycle</p> <p>CB7d Hormones and the menstrual cycle</p> <p>CB7e Control of blood glucose</p> <p>CB7f Type 2 diabetes</p>	<p>in crude oil and natural gas</p> <p>CC16c The alkane homologous series</p> <p>CC16d Complete and incomplete combustion</p> <p>CC16e Combustible fuels and pollution</p> <p>CC16f Breaking down hydrocarbons</p> <p>CC17a The early atmosphere</p> <p>CC17b The changing atmosphere</p> <p>CC17c The atmosphere today</p> <p>CC17d Climate change</p>	<p>CB9b Core practical - Quadrats and transects</p> <p>CB9c Biotic factors and communities</p> <p>CB9d Parasitism and mutualism</p> <p>CB9e Biodiversity and humans</p> <p>CB9f Preserving biodiversity</p> <p>CB9g The water cycle</p> <p>CB9h The carbon cycle</p> <p>CB9i The nitrogen cycle</p> <p>CP9a Electric circuits</p> <p>CP9b Current and potential difference</p> <p>CP9c Current, charge and energy</p> <p>CP9d Resistance</p> <p>CP9e More about resistance</p> <p>CP9e Core practical - Investigating resistance</p> <p>CP9f Transferring</p>	<p>densities</p> <p>CP12b Energy and changes of state</p> <p>CP12c Energy calculations</p> <p>CP12c Core practical - Investigating water</p> <p>CP12d Gas temperature and pressure</p> <p>CP13a Bending and stretching springs</p> <p>CP13b Extension and energy transfers</p>	<p>Pupils will complete any outstanding coursework (ASDAN).</p>
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				<p>energy</p> <p>CP9g Power</p> <p>CP9h Transferring energy by electricity</p> <p>CP9i Electrical safety</p>		
	<p>Why are we doing this now?</p> <p>How does it build on prior learning and prepare for knowledge and learning still to come?</p>	<p>CB5 and CB6 - To build upon content learnt in topic CB1.</p>	<p>CC13 - To build upon content learnt in topic CC3, CC4 ad CC11.</p> <p>CC16 - To build upon content learnt in topic CC8 and CC2</p>	<p>CB8 - To build upon content learnt in topic CB1.</p> <p>CB9 - To build upon content learnt in topic CB6.</p> <p>CP9 - To build upon content learnt in topic CP6, CP3 and CP7.</p>	<p>CP10 - To build upon content learnt in topic CP8 and CP9.</p> <p>CP11 - To build upon content learnt in topic CP9 and CP10.</p> <p>CP12 - To build upon content learnt in topic CP1 and CC3.</p> <p>CP13 - To build upon content learnt in topic CP7.</p>	

	Key Terminology	communicable culture medium inoculate microorganisms mutation pathogens sexually transmitted disease (STD) vaccine endothermic reaction glucose limiting factors photosynthesis stomata hormone nervous system neurotransmission thermoregulatory vasoconstriction vasodilation	alkane alkene atmosphere endothermic exothermic group halogen metal metalloid noble gases non-metal period physical property reactive unreactive	active transport algae artery blood vessels alveoli bacteria cell membrane cell wall cellulose chlorophyll chloroplasts cytoplasm diffusion heart osmosis valve vein ventilated abundance adaptations biodiversity community consumers cycle	alternator dynamo electromagnet electromagnetic induction generator induced magnetism magnetic field magnetic field line motor effect solenoid transformer boiling point density freezing point internal energy latent heat melting point physical change pressure	<p style="text-align: center;"> <u>GCSE</u> <u>combined</u> <u>science</u> <u>examination</u> <u>command</u> <u>words (Pearson)</u> </p>
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				competition		
				distribution		
				extremophile		
				interdependence		
				mean		
				median		
				mode		
				producers		
				quadrat		
				quantitative sampling		
				range		
				sample size		
				transect		
				diode		
				electric field		
				electrons		
				ion		
				light-depending resistor (LDR)		
				light-emitting diode (LED)		

				line of force in an electric field		
				neutrons		
				Ohm's law		
				parallel		
				potential difference		
				protons		
				resistance		
				series		
				static electricity		
				thermistor		
				alternating current (a.c.)		
				direct current (d.c.)		
				earth wire		
				fuse		
				live wire		
				neutral wire		
				oscilloscope		
				plugs		
				step-down transformers		

				step-up transformers three-pin plug		
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