Science at Fleetwood High School

The science curriculum at Fleetwood High School is built around a clear sequence of essential knowledge, where core concepts are explicitly taught at the start of each topic and revisited throughout the module and in future year groups to ensure knowledge is secured, mastered and successfully built upon over time. The curriculum is carefully sequenced in line with the National Curriculum, with teaching orders and curriculum booklets forming the foundation of schemes of work that support progression across units and year groups.

Key questions underpin all areas of learning, providing a clear focus for teaching and assessment, with the expectation that students demonstrate mastery through their ability to confidently and accurately answer these questions. Teaching is responsive and adaptive, using in-lesson assessment strategies and formative assessment to identify understanding, address misconceptions and inform next steps in learning. Through high-quality modelling, purposeful verbal and written questioning, and targeted teacher adaptation, all students are supported to master foundational concepts before progressing to more complex scientific ideas.

This approach ensures that every student is challenged appropriately and given the opportunity to make sustained progress, with the belief that all learners can achieve mastery across the science curriculum when prior knowledge is secure.

Year 7

The teaching order, supported by structured resources, organises the Year 7 scheme of learning around key scientific questions. Building on Key Stage 2, pupils develop foundational knowledge of particles, cells, forces, energy and chemical processes, including separating techniques and acids and alkalis. Prior knowledge is revisited and strengthened to ensure cumulative understanding in line with the National Curriculum, preparing pupils for further study in Key Stage 3 and beyond.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
BIG IDEAS	**All matter is made up of particles**	**Organisms are organised on a cellular basis and have a finite life span**	**The total amount of energy in the Universe is always the same but can be transferred from one energy store to another**	**The composition of the Earth and its atmosphere and the processes occurring within them shape**	**All matter is made up of particles**	**Changing the movement of an object requires a net force to be acting on it**
7	**Particles** Atoms, elements and compounds Making and naming compounds The discovery of atoms – atomic structure What is a mixture? Link to compounds. Representing and comparing particle models Changes of state – hinge concept – link to particle models Marking point – hinge concept What happens to solids, liquids and gases when they are heated or cooled – link to particle models Calculating the density of a regular object working scientifically lesson Marking point – hinge concept - assess working scientifically skill Diffusion – how do particles move - link to particle models How do particles create pressure? link to particle models **Challenge lesson** Calculate the density of an irregular object **Challenge lesson** How do we represent heating and cooling?	**Cells and reproduction** Animal cells Plant cells Prokaryotic and eukaryotic cells Light microscopes working scientifically lesson The discovery of cells What are specialised cells? Marking point – hinge concept Levels of organisation in the body The reproductive systems Pregnancy **Challenge lesson** Stem cells **Term 1 assessment** = Link to KS2 science = working scientifically lesson = marking point = link to prior year 7 knowledge	**Energy** Stores of energy Energy transfers Energy stores in food Investigating energy stores in food working scientifically lesson Thermal energy transfer How does heat travel in solids? link to particle models How does heat travel in fluids? link to particle models How do we get energy from the Sun? Insulators – link to conduction Marking point – hinge concepts What are simple machines? Power Cost of energy Energy resources – link to energy stores **Challenge lesson** gravitational potential energy **Challenge lesson** Efficiency **Challenge lesson** Energy transfers **Challenge lesson** Nuclear energy	**Fast and furious reactions** The development of the periodic table working scientifically lesson – link to HT1 Properties of metals and non metals The structure of the atom – link to HT1 Subatomic particles Alkali metals Marking point – hinge concept - link to atomic structure Halogens link to atomic structure Noble gases link to atomic structure The reactivity series working scientifically lesson **Displacement reactions** The collision theory – link to particle models Earth and structure Rocks and Rock cycle working scientifically lesson Ceramics and polymers **Challenge lesson** Electron configuration **Challenge lesson** Alkali metals – explaining the trend **Challenge lesson** Halogens - explaining the trend **Challenge lesson**	**Separating chemicals and acids and alkalis** Elements, compounds and mixtures Dissolving Pure substances Working scientifically lesson – identify variables – link to HT1 Filtration – link to mixtures and dissolving Evaporation - link to mixtures and dissolving and changes of states Marking point – hinge concept Distillation Chromatography Acids and alkalis Identification of acid and alkalis Neutralisation – link to acids and alkalis Naming salts – link to acids and alkalis Reactions of metals and acids and identification of gases Chemical properties of metals and non metals **Challenge lesson** melting pure substances and impure substances and representing this in graphical form	**Forces** What are forces? Scalar and Vectors working scientifically lesson Resultant Forces Elasticity and Forces Friction Forces causing motion Marking Point – Hinge concept Calculating Speed working scientifically lesson Speed-Time Graphs Mass and Weight Solar System Earth in space **End of year assessment** **Challenge Lesson** Levers **Challenge Lesson** Streamlining **Challenge Lesson** The night sky

				Noble gases – explaining why they are unreactive **Term 2 assessment**		

Year 7 working scientifically skills

		WS Skills - KS3 National Curriculum																	
SOW	Suggested Practical	Accuracy, Precision, Repeatability and Reproducibility	Development of Scientific Theory, Peer Review	Evaluate Risks	Produce Observations	Make Predictions	Plan, Carry Out Investigations, Variables	Use Appropriate Apparatus	Record Measurements, Evaluate Methods	Apply Sampling Techniques	Mathematical Concepts and Calculations	Present Data in Tables and Graphs	Interpret Data, Identify Patterns, Draw Conclusions	Link Data to Predictions and Hypotheses	Random and Systematic Errors	Evaluate Data	Units, Chemical Names	Calculations	Producing an Average
Particles	Density	y				y		y	y		y						y	y	y
Cells and Reproduction	Microscopes				y			y											
Energy	Insulation	y	y	y		y	y	y	y		y	y	y	y	y	y	y		y
	Conduction	y	y	y	y	y	y	y	y			y	y	y	y	y	y		y
Separating Chemicals	Making Salts			y				y								y			
Fast and Furious	Reactivity			y	y	y		y					y	y					
Forces	Hooke's Law	y	y	y		y	y	y	y		y	y	y	y	y	y	y		y
	Streamlining	y	y	y	y	y	y	y	y			y	y	y	y	y	y		y
	Friction	y	y			y	y	y	y			y	y	y	y	y	y		y
	Air Resistance	y	y		y	y	y	y	y			y	y	y	y	y	y		y

Year 8

The teaching order, supported by structured resources, organises the Year 8 scheme of learning around key scientific questions. Building on Year 7, pupils develop a deeper understanding of how cells form tissues, organs and systems, including the roles of the heart, lungs, respiration, photosynthesis and enzymes in living organisms. Learning also extends to chemical reactions, electricity, ecology and waves, with prior knowledge revisited to strengthen and connect concepts in line with the National Curriculum.

	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
BIG IDEAS	Organisms are organised on a cellular basis Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms	**Objects can affect other objects at a distance**	**All matter in the Universe is made of very small particles**	**Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms**	**Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms**	**Objects can affect other objects at a distance**
8	**Keeping healthy** What organelles are found in cells? Aerobic respiration (link to cells & energy stores) Anaerobic respiration in animals and humans Anaerobic respiration in plants and yeast Marking point – hinge concept The lungs Diffusion Gas exchange-link to diffusion Blood vessels The heart Exercise and respiration working scientifically lesson – at least 2 lessons Marking point – hinge concept – graph skills	**Chemical reactions** Particles recap Elements and compounds and state symbols Physical and chemical reactions Naming compounds – link to neutralisation working scientifically lesson Word equations – link to compounds Chemical formula Balancing equations – link to chemical formula working scientifically lesson Marking point – hinge concept Atoms recap Electron configuration recap Bonding Conservation of mass	**Electricity and magnetism** Conductors and insulators Electricity symbols Models of electricity working scientifically lesson Current in series circuit working scientifically lesson Current in a parallel circuit Potential difference in a series circuit Potential difference in a parallel circuit Marking point – hinge concept Resistance Power supplied to devices Static electricity **Challenge lesson** Electric fields Magnets **Challenge lesson**	**Ecology** How do we group living things How is energy transferred through living things Genetic and environmental variation Continuous and discontinuous variation working scientifically lesson How is genetic information passed on marking point – hinge concept Adaptations Natural selection Evolution Extinction Biodiversity **Challenge lesson** Food webs and interdependence **Challenge lesson** Food pyramids **Challenge lesson** pyramids of biomass	**Energy from food** Food groups Balanced and unbalanced diet – link to respiration Food tests Tissues and organs in the digestive system How are enzymes and bacteria involved in digestion? Photosynthesis Marking point – hinge concept Testing for starch working scientifically lesson Leaf adaptation for photosynthesis How are leaves adapted for water Plant reproduction and pollination **Challenge lesson** adaptions of the digestive system – link to diffusion	**Waves** Labelling a wave and Superposition. Introduction to reflection and refraction Calculating speed of a wave working scientifically lesson Transverse and Longitudinal Sounds and hearing Frequency, Ultrasound, and Radios, Microphones and Speakers Ears Echoes and Speed of sound in matter Marking Point Light, Transparency, Luminous Reflection working scientifically lesson, **End of year assessment** **Challenge** – Using a protractor,

	The skeleton and joints The Muscular system The effects of asthma and smoking on the lungs The effects of recreational drugs	working scientifically lesson Combustion Exothermic and endothermic reactions Acid and alkalis recap **Challenge lesson –** Heat of neutralisation **Challenge lesson** Thermal decomposition **Challenge lesson** Oxidation **Term 1 assessment**	Creating a compass Electromagnets working scientifically lesson **Challenge lesson** Motors	**Challenge lesson** how do we show how closely organisms are related **Challenge lesson** Extremophiles **Challenge lesson** how do we get males and females **Challenge lesson** genetic diseases **Term 2 assessment**	**Challenge lesson** denaturation of enzymes = Link to KS2 and year 7 science = working scientifically lesson = marking point = link to prior year 8 knowledge	Refraction working scientifically lesson, Colour and Filters Eye, Lenses, Seeing colour Camera **Challenge Lesson –** Comparing waves

Year 8 working scientifically skills

		WS Skills - KS3 National Curriculum																	
SOW	Suggested Practical	Accuracy, Precision, Repeatability and Reproducibility	Development of Scientfic Theory, Peer Review	Evaluate Risks	Produce Observations	Make Predictions	Plan, Carry Out Investigations, Variables	Use Appropriate Apparatus	Record Measurements, Evaluate Methods	Apply Sampling Techniques	Mathematical Concepts and Calculations	Present Data in Tables and Graphs	Interpret Data, Identify Patterns, Draw Conclusions	Link Data to Predictions and Hypotheses	Random and Systematic Errors	Evaluate Data	Units, Chemical Names	Calculations	Producing an Average
Keeping Healthy	Exercise and Heart Rate					y						y		y		y	y		y
Electricity and Magnetism																			
Chemical Reactions	Conservation of Mass	y	y	y		y	y	y	y		y		y	y			y	y	
Ecology, Inheritance and Variation	Quadrats	y							y	y			y		y				y
Energy from Food	Burning Food			y			y	y	y								y	y	
Waves	Ripple Tank	y	y		y	y	y	y	y	y	y	y	y	y	y	y	y		y
	Reflection	y	y	y	y	y	y	y	y	y		y	y	y	y	y	y		
	Refraction	y	y	y	y	y	y	y	y	y		y	y	y	y	y	y		

Year 9

The teaching order, used alongside the workbooks, structures the scheme of learning, with each section centred around a key question. This year secures the foundational knowledge required for students to begin their GCSE content in Year 10. Prior knowledge is clearly identified to support the cumulative development of pupils' understanding over time, and pupils must demonstrate secure understanding before progressing to the next topic.

Energy stores and transfers	**Atomic structure**	**Cell biology and cell division**	**The periodic table**	**Energy transfer from heating and energy resources**	**Energy changes**	**Bioenergetics**	**Treating and preventing disease**	**Chemistry of the atmosphere**
Energy stores	Atoms	Cell structure	The periodic table	Thermal conductivity	Exothermic and endothermic reactions	Photosynthesis	Health and disease	The Earth's early atmosphere
Energy transfers	Atomic structure	Microscopes	The development of the periodic table	Insulation	Reaction profiles	Limiting factors of photosynthesis	Pathogens	Earth's Modern Atmosphere
Work done	Electron configuration	Specialised cells	Alkali metals	**Marking point**	**Challenge lesson**	Uses of glucose	Risk factors and causal mechanisms	Greenhouse gases
Marking point	Ions	Eukaryotic and prokaryotic	The halogens	Keeping homes warm	Bond energy calculations	Making the most of photosynthesis	Non Communicable diseases	**Marking point**
GPE	Writing chemical formula	**Marking point**	**Marking point**	**Marking point**	**Marking point**	Aerobic respiration	Cancer	Global climate change
Kinetic energy	Balancing equations	Diffusion and osmosis	Noble gases	Energy demands	Investigating temperature changes	**Marking point**	**Marking point**	Carbon footprint and it's reduction
Elastic potential energy	Isotopes	Active transport	**Assessment**	Renewable and non renewable energy	**Assessment**	Anaerobic respiration	Smoking related diseases	Atmospheric pollutants
Hooke's Law	History of the atom	Cell division by mitosis		Power stations – base load, energy surge and start up times		Effect of exercise	Risk factors of diseases	**Assessment**
Efficiency	**Marking point**	Growth and differentiation		**Assessment**		Metabolism	Discovering drugs	
Power	Elements, atoms and mixtures	Stem cells				**Assessment**	Drug development *literacy task*	
Assessment	Separating mixtures	**Assessment**					Antibiotics and painkillers	
							Assessment	

- link to year 7
- link to year 8
- link to year 7 and 8
- link to year 9

Year 10 Scheme of work 26-27

The teaching order, used alongside the workbooks, structures the scheme of learning, with each section centred around a key question. As this year is the start of the delivery of GCSE content, prior knowledge is clearly identified to support the cumulative development of pupils' understanding over time, and pupils must demonstrate secure understanding before progressing to the next topic. In response to assessment of learning at both KS3 and KS4, the Year 10 curriculum has also been updated for 2027–28 to align with the changes made to the Year 9 curriculum for 2026–27.

Biology

Communicable disease	**Preventing and treating disease**	**Organisation of the digestive system**	**Organisation of the circulatory system**
Health and disease Pathogens Bacterial infections Viral infections Fugal and protist infections **Biology only** Growing bacteria in a lab RPA **Marking point** Human body defences **Biology only** Plant diseases **Assessment**	Discovering and development of drugs. Vaccinations **Marking point** Cancer review **Biology only** Monoclonal antibodies **Assessment**	Cells, tissues and organs The digestive system Food tests RPA Enzymes Factors that affect enzymes **Marking point** Enzymes RPA Adaptations to the digestive system **Assessment**	The blood - respiration The blood vessels - respiration The heart - respiration Helping the heart The lungs Adaptations of the lungs **Marking point** Tissues and organs in plants Transpiration **Assessment**

- link to year 7
- link to year 8
- link to year 9
- link to year 10

Chemistry

Bonding and structure	**Chemical changes**	**Quantitative chemistry**
States of matter Metallic bonding Covalent bonding Ionic bonding **Marking point** Properties of ionic bonding Giant covalent bonding	The reactivity series Metal oxides Extraction of metals and reduction Oxidation and reduction in terms of electrons **HT** **Marking point** Electrolysis **RPA** The pH scale Reactions of metals and acids Neutralisation Strong and weak acids – higher tier Preparation of a soluble salt **RPA**	Relative formula mass Mass conservation Mass of a gas Moles – higher tier **Marking point** Limiting reactants – higher tier Concentration

Physics

Particle model of matter	Electricity	Atomic structure	Forces part 1
Density of materials Density **RPA** **Marking Point** Changes of state Internal energy Specific heat capacity **RPA** Specific latent heat **Marking Point** Particle motion in gases	Current and charge Potential difference Resistance **RPA** Series and parallel circuits **Marking Point** Resistors **RPA** DC and AC current Resistance of a wire **Marking Point** Mains electricity Power Electricity in appliances The national grid	The structure of an atom Isotopes The development of the atomic model (common content with chemistry) Radioactive decay and nuclear radiation **Marking Point** Irradiation and contamination Nuclear equations Half-lives of radioactive decay Radioactive contamination	**Paper 2 content – only to be complete in Year 10 if time** Elastic potential energy Hooke's Law and elasticity **RPA Marking Point** Scalar and vector quantities Distance and displacement Forces between objects Resultant forces Centre of Mass

<u>End of unit tests</u>

Biology

Communicable disease
Preventing and treating disease **and** non communicable disease
Organisation of the circulatory system
Organisation of the digestive system

Chemistry

Structure and bonding
Electrolysis
Chemical changes
Quantative chemistry (chemical calculations)
Our atmosphere (if completed in Year 10)

Physics

Electric circuits
Electricity in the home
Particle model of matter (molecules and matter)

Year 11 teaching order

The teaching order, used alongside the workbooks, structures the scheme of learning, with each section centred around a key question. As the final stage of GCSE study, prior knowledge is clearly highlighted to support the cumulative development of pupils' understanding over time, and pupils must demonstrate secure understanding before progressing to the next topic.

Biology

Homeostasis and response	Inheritance, variation and evolution	Ecology
Homeostasis	Reproduction	Ecosystems and interdependence
The nervous system	Mitosis and meiosis	Competition
Reaction times RPA	DNA and the genome	Abiotic and biotic factors
Marking point	Genetic inheritance	Adaptations
Biology only The brain	**Marking point**	Organisation of an ecosystem
Biology only The eye	Inherited disorders	Quadrat RPA
The endocrine system	Variation	**Assessment**
Blood glucose and diabetes	Natural selection	Carbon and water cycle
The menstrual cycle	Evolution	Biodiversity
Assessment	**Assessment**	Pollution
Contraception	Selective breeding	Global warming
Biology only IVF	Genetic engineering	Maintaining biodiversity
Biology only Negative feedback	Theories of evolution	
	Evidence of evolution	
	Classification	

Chemistry

Organic chemistry	Using resources	Rates of reaction and equilibrium
Crude oil, hydrocarbons and alkanes	Earth's Resources	Calculating rate of reaction
Fractional distillation	Sustainable Development	Factors that affect rate of reaction
Properties of hydrocarbons	Potable water	Collision theory
Cracking and alkenes	Potable water **RPA**	Measuring Rate of Reaction
Assessment	**Assessment**	Catalysts
Pure substances	Waste water treatment	**Assessment**
Formulations	Alternative methods of extracting metals **HT**	Reversible reactions
Chromatography	Life cycle assessment	Equilibrium
Chromatography **RPA**	Reducing resources	The effect of changing conditions on equilibrium – higher tier
Marking point		
Identification of gases		

Physics

Forces part 2	Waves	Magnetism and electromagnetism	Space (physics only)
Newtons 3 laws **RPA** Acceleration **Marking Point** Distance Time Graphs Velocity Time Graphs Stopping Distance and factors Momentum (HT only) Changes in Momentum (PHY only)	Transverse and Longitudinal Properties of waves Ripple tank **RPA** Wave on a string **RPA** **Marking Point** Electromagnetic waves Uses of EM waves Radiation **RPA** Lenses (PHY only) Black Body Radiation (PHY only)	Permanent Magnets Plotting magnetic fields Electromagnets **Marking Point** Fleming's Left Hand Rule (HT only) (All PHY only) Loudspeakers Microphones Induction Motor Effect Transformers	Solar System Life Cycle of a Star Orbital Motion Red Shift

- link to year 7
- link to year 8
- link to year 9
- link to year 10
- link to year 11