Curriculum Information: Year 8 Science

- Year 8 students build on their Year 7 foundations, studying topics that deepen their understanding of biology, chemistry, and physics in preparation for GCSE.
- Each unit is divided into key knowledge and key scientific skills. Each unit has a particular focus on one or more of the three science disciplines.
- Knowledge is assessed through end-of-topic tests, regular retrieval practice, and regularly assigned homework.
- The year concludes with a scientific investigation project in partnership with the Francis Crick Institute.

Autumn 1

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Life Processes	• Aerobic respiration: word equation and location in cells • The gas exchange system: structure and function of key parts • Breathing: how the ribs and diaphragm bring about inhalation and exhalation • The bell jar model of breathing • How and why heart rate and breathing rate change during exercise • The heart: structure and role in transporting gases to and from cells • Anaerobic respiration in muscle cells and in yeast (fermentation) • Fermentation in brewing and bread making • Photosynthesis: word equation, factors needed, and glucose as the product • How light intensity affects the rate of photosynthesis	• Labelling the gas exchange system and the heart on diagrams • Describing how breathing mechanics work • Explaining links between exercise, heart rate, and breathing rate • Comparing aerobic and anaerobic respiration	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Acids and Bases	• Natural acids and laboratory acids (hydrochloric, nitric, sulfuric) • Bases and alkalis: definitions and everyday examples • Indicators: litmus and universal indicator • The pH scale (0–14): acidic, neutral, and alkaline • Strength vs concentration of acids • Neutralisation: acid + base → salt + water • Reactions with carbonates: acid + carbonate → salt + water + carbon dioxide • Naming salts: chlorides, sulfates, and nitrates • Metal oxides produce basic solutions; non-metal oxides produce acidic solutions	• Using indicators to test for acids and alkalis • Measuring pH with universal indicator • Writing word equations for neutralisation reactions • Predicting the name of a salt from its reactants	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Autumn 2

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Healthy Lifestyle	• Nutrients needed by the human body and their roles • Components of a healthy, balanced diet • Food tests for starch, lipids, sugar, and protein • Energy requirements: different people need different amounts • Health issues caused by an unhealthy diet • Recreational vs medicinal drugs • Effects of drugs on health and behaviour • Effects of alcohol on health, behaviour, conception, and pregnancy • Chemicals in tobacco smoke and their effects on health and pregnancy	• Carrying out food tests and interpreting positive and negative results • Calculating energy requirements using data • Describing and explaining the effects of lifestyle choices on health	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Forces 2	• Speed = distance ÷ time; units of speed • Distance–time graphs: describing and interpreting journeys • Velocity as speed in a given direction • Work done = force × distance; units of work done • Pressure = force ÷ area; units of pressure • How liquids and gases cause pressure • Moments and turning forces	• Calculating speed, work done, and pressure • Drawing and interpreting distance–time graphs • Converting between units of speed • Rearranging equations to find unknown values	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Spring 1

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Mixtures	• Pure substances vs mixtures: definitions and particle diagrams • Melting points of pure vs impure substances • Solute, solvent, and solution • Separation techniques: filtration, evaporation, crystallisation, distillation, fractional distillation, chromatography • Choosing the appropriate separation technique based on physical properties • Mixtures vs compounds: key differences	• Carrying out filtration, evaporation, and chromatography • Labelling distillation apparatus • Interpreting chromatograms • Explaining separation methods using differences in physical properties	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Electricity	• Two types of charge; static electricity • Circuit symbols for common components • Current: what it is, how it is measured, and its units • Potential difference: what it is, how it is measured, and its units • Series and parallel circuits: rules for current and potential difference • Conductors and insulators • Resistance: definition, units, and how it controls current	• Drawing circuit diagrams using standard symbols • Building and testing series and parallel circuits • Measuring current and potential difference • Predicting current in different circuits	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Magnetism	• The four magnetic materials • Magnetic poles: like repel, opposite attract • Magnetic fields: definition, field lines, and field strength • The Earth's magnetic field • Electromagnets: a solenoid with an iron core • Permanent vs induced (temporary) magnets • Ways to increase the strength of an electromagnet (the three C's)	• Using iron filings and plotting compasses to show field lines • Drawing magnetic field diagrams for bar magnets and solenoids • Describing experiments to investigate electromagnet strength	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Spring 2

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Adaptation and Inheritance	• Competition for resources in plants and animals • Adaptations to environments, including seasonal changes • Variation: environmental and inherited causes • Genes and how characteristics are inherited · • Natural selection and how it leads to evolution • Extinction: causes and how scientists try to prevent it • How organisms have changed over time (evidence from fossils)	• Describing how organisms are adapted to their environments • Distinguishing between environmental and inherited variation • Explaining how competition and environmental change can lead to adaptation or extinction	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Reactions of Metals	• The reactivity series of metals • Reactions of metals with acids: metal + acid → salt + hydrogen • Reactions of metals with oxygen and water • Displacement reactions: a more reactive metal displaces a less reactive one	• Carrying out reactions of metals with acids and recording observations • Ordering metals by reactivity from experimental results	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
	• Metal ores and extraction of metals • Oxidation (gaining oxygen) and reduction (losing oxygen) • Redox reactions	• Writing word equations for reactions of metals • Predicting displacement reactions using the reactivity series	

Summer 1

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Waves 2 (Sound)	• Sound is produced by vibrations and transferred through particle vibrations • Sound cannot travel through a vacuum • Sound travels at different speeds through solids, liquids, and gases • Longitudinal waves: oscillations parallel to the direction of energy transfer • Amplitude and loudness; pitch and frequency • Echoes: reflected sound waves • Ultrasound and its uses • Comparing light and sound waves • Wave speed = wavelength × frequency	• Labelling amplitude and wavelength on wave diagrams • Comparing waves of different loudness and frequency • Using and rearranging the wave speed equation • Explaining why sound travels faster in solids than in gases	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Space	• The structure of the solar system: Sun, planets, moons, and dwarf planets • The Sun as a star; other stars and galaxies • Day and night: caused by the Earth's rotation on its axis • The seasons: caused by the tilt of the Earth's axis • The Moon: phases and its orbit around the Earth • Satellites: natural and artificial	• Using models to explain day and night, and the seasons • Describing the phases of the Moon • Explaining observations about the solar system using scientific ideas	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Summer 2

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Crick Project	• Scientific investigation designed in partnership with the Francis Crick Institute • Application of skills and knowledge from across Year 7 and Year 8	• Formulating research questions • Planning and carrying out an investigation • Analysing results and drawing conclusions • Communicating scientific findings	• Crick project assessment • End-of-year examination covering all topics

End-of-year assessment: Students sit an end-of-year examination in early June covering the majority of topics studied, including some from Year 7.