Curriculum Information: Year 7 Science

- Year 7 students study topics spanning biology, chemistry, and physics across the year, building a strong scientific foundation 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 weekly homework tasks.
- The year concludes with an end-of-year examination and a scientific investigation project in partnership with the Francis Crick Institute.

Autumn 1

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Introduction to Science	• Variables: independent, dependent, and controlled • Science equipment and their correct names • Hazards, risks, and control measures • Continuous and categoric variables • Tables, bar charts, and line graphs • Lines and curves of best fit • Patterns in data and drawing conclusions	• Using a Bunsen burner safely • Measuring temperature, length, volume, and mass • Planning and carrying out fair tests • Recording results in tables with headings and units • Drawing bar charts and plotting line graphs • Calculating means and identifying anomalies • Drawing evidence-based conclusions	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Energy Stores	• Energy stores: kinetic, gravitational potential, thermal, elastic, chemical, magnetic, electrostatic, nuclear • Energy is measured in Joules • Conservation of energy; energy dissipation to surroundings • Energy transfer pathways	• Identifying energy stores before and after a change • Describing energy transfers in everyday situations	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Autumn 2

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Particles	• Properties of solids, liquids, and gases • Changes of state: melting, freezing, boiling, evaporation, condensation, sublimation • The difference between boiling and evaporation • The particle model: arrangement and forces between particles • Melting and boiling points; heating and cooling curves • Gas pressure: caused by particle collisions • Diffusion: movement from high to low concentration	• Observing and recording properties of substances • Measuring temperature changes during changes of state • Using the particle model to explain observations • Interpreting heating and cooling curves	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Cells	• Cell structure: nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, vacuole • Similarities and differences between plant and animal cells • Specialised cells (animal and plant) and their functions • Diffusion: movement of substances into and out of cells	• Using a light microscope to observe cells • Preparing slides of animal and plant cells • Identifying cells from diagrams and microscope images • Drawing scientific diagrams of cells	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Forces 1	• Forces as pushes and pulls; contact and non-contact forces • Measuring forces in Newtons • Balanced and unbalanced forces; equilibrium • Mass (kg) vs weight (N); gravitational field strength • Weight = mass × gravitational field strength • Resultant force and its effect on motion • Structure of the universe: solar system, galaxies	• Drawing and labelling force diagrams with arrows • Calculating weight on Earth and other planets • Determining resultant forces in simple situations • Rearranging equations to solve problems	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Spring 1

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Reproduction	• Changes during puberty for boys and girls • Structure and function of male and female reproductive systems • Gametes (sperm and egg): structure and function • The menstrual cycle and its stages • Fertilisation, gestation, and birth • Structure of a flower: male and female parts • Pollination: wind-pollinated vs insect-pollinated plants	• Labelling diagrams of reproductive systems • Comparing structures and identifying adaptations • Sequencing biological processes	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Atoms, Elements and Compounds	• Atoms: the smallest particle of an element; subatomic particles • Elements, compounds, and mixtures: definitions and distinctions • The periodic table: groups, periods, and chemical symbols • Physical properties of metals and non-metals • Chemical formulae: interpreting subscripts and coefficients • Molecules vs giant structures • Composition of air	• Drawing and labelling atomic structure diagrams • Using the periodic table to find information about elements • Using molecular models (Molymods) to represent structures • Interpreting chemical formulae to identify molecules and giant structures	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Spring 2

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Body Systems	• Organisation: cells, tissues, organs, organ systems • Structure and function of the skeletal system • Joints and how they work with muscles • Antagonistic muscle pairs • The digestive system: structure, function, and the role of enzymes • Structure and function of the circulatory system	• Labelling organs and body systems on diagrams • Describing structure–function relationships • Explaining hierarchies of biological organisation	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Waves 1 (Light)	• Waves are vibrations that transfer energy (not matter) • Wave properties: amplitude, wavelength, frequency and their units • Wave speed = wavelength × frequency • Light travels in straight lines; luminous vs non-luminous objects • Law of reflection; ray diagrams for mirrors • Refraction: light bending as it changes speed in different materials • Dispersion of white light through a prism • The electromagnetic spectrum: seven wave types in order	• Drawing and labelling ray diagrams (reflection and refraction) • Labelling amplitude and wavelength on wave diagrams • Using the wave speed equation and rearranging it • Identifying uses of different electromagnetic waves	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Summer 1

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Chemical Reactions	• Chemical reactions vs physical changes: evidence for reactions • Exothermic and endothermic reactions • Naming compounds and writing word equations • Reactants and products • Physical properties of compounds vs their constituent elements • Conservation of mass • Symbol equations and balancing equations • Thermal decomposition	• Carrying out test-tube reactions and recording observations • Measuring temperature changes to classify reactions • Writing and balancing symbol equations • Using a balance to investigate conservation of mass	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly
Energy Transfers	• Kinetic energy = 0.5 × mass × speed^2 • Gravitational potential energy = mass × g × height • Power = energy ÷ time; measured in Watts • Renewable and non-renewable energy resources • How electricity is generated in a power station • Advantages and disadvantages of different energy resources	• Calculating kinetic and gravitational potential energy • Calculating power in different contexts • Rearranging energy equations • Comparing advantages and disadvantages of energy resources	• End-of-topic test • Retrieval practice in lessons • Homework tasks set regularly

Summer 2

Unit	Key Knowledge	Key Scientific Skills	Assessing Understanding
Ecosystems	• Food chains and food webs • Interdependence of organisms • Bioaccumulation of toxic materials • Niches within an ecosystem	• Constructing and interpreting food chains and food webs • Explaining the effects of population changes • Applying ecological concepts to real-world contexts	• Ecosystems booklet • Links to Zoo trip
Crick Project	• Scientific investigation designed in partnership with the Francis Crick Institute • Application of skills and knowledge from across the year	• Formulating research questions • Planning and carrying out an investigation • Analysing results and drawing conclusions • Communicating scientific findings	

End-of-year assessment: Students sit an end-of-year examination in early June covering the majority of topics studied.