Subject – Science (KS3/GCSE Combined Science)

With a view to working towards excellence in science (both at Cranbrook and across the TWMAT), the current science curriculum is being prepared and delivered collaboratively with other trust schools and also those involved in the Common Curriculum project. From 2019, Science will be delivered on a 12 week cycle model, with each cycle (term) focusing on a single discipline (Biology, Chemistry or Physics). For all year groups, each cycle is summarized for pupils in the form of a knowledge organizer, with the KOs acting as a focus for a weekly test.

Each cycle includes a knowledge pre-test, which is repeated at the end of the cycle as a measure of pupil progress. Each cycle includes 2 mid-cycle assessment points, the first (weeks 3-4) focusing on literacy and the second (weeks 7-8) focusing on application of knowledge. At the end of each cycle, pupils complete an end-of-cycle assessment comprised of exam GCSE exam questions to assess knowledge recall, application and analysis.

The science **Key Stage 3** curriculum (Years 7 and 8) is designed to introduce pupils to the core scientific concepts, providing a solid foundation of knowledge which will be built upon during GCSE. A strong emphasis is placed on Working Scientifically, with pupils completing 2 core practicals per cycle, selected to cover the range of required skills. GCSE questions are used for assessment at KS3 to increase familiarity of exam requirements and expect, although "guided papers" are used with hints on exam techniques and response expectations.

At **Key Stage 4**, all pupils follow the GCSE Combined Science course, revisiting the areas covered at KS3 to consolidate, broaden and deepen their understanding of these topics. Core practicals from KS3 are repeated in light of developed skills and additional core practicals will be covered. Cycle 2 of year 11 is set aside to review and repeat the core practical elements given their importance as exam content and to act as focal point to revision of all content.

A strong emphasis on retrieval, interleaving and spaced learning continues over the 5 year course, with each lesson including retrieval practice of current/recent lessons as well as of content from elsewhere in the course. This will be supplemented with the use of an online AI platform (Century Tech) to identify personalized areas in which pupils need to make focused progress.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	Life processes Cell biology • Microscopy • Animal and plants cells • Bacteria • Cell cycle and mitosis • Cell differentiation • Specialised cells Tissues and organs The digestive system	Enzymes • Enzyme action Reproduction • Types of reproduction • Sex organs and sex cells • Development • Hormones • Contraception	Particle model • States of matter • Changes in state • Pure substances and mixtures Heating and cooling curves Solubility Separation techniques	Atomic structure • History of the atom • Periodic table • Metals and non-metals • Electronic configuration • Isotopes Compounds Word and symbol equations Balancing equations Conservation of mass Relative formula mass	Energy stores and transfers Conservation of energy Energy in food Sankey diagrams Efficiency Heat transfer • Conduction • Convection • Radiation Energy in fuels Energy resources	Energy calculations • GPE • Kinetic energy Motion • Scalars and vectors • Distance/time • Velocity/time • Acceleration Forces • Springs • Resultant force • Newton's Laws • Mass and weight • Stopping distance

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8	Transport in cells • Osmosis Variation DNA structure Inheritance • Inherited characteristics • Punnett squares • Genetic disease	Evolution • Evidence for evolution • Natural selection Health and disease • Communicable disease • Cardiovascular disease • Drugs Pathogens • Body's defences • Immune system • Immunisation	Periodic table • Group 1 • Group 7 • Group 0 Rates of reaction • Measuring ROR • Factors affecting ROR • Investigating ROR	Chemical bonding • Ions Electrolysis Covalent bonding Acids and alkalis • Indicators • pH Scale • Making slats • Neutralisation	Waves • Describing waves • Sound waves • Waves speed • Wave interactions • Reflection • Refraction • Colour EM Spectrum • Communication • Uses • Dangers	Density Current electricity Circuit symbols Static Current Potential difference Resistance • IV graphs Electrical safety

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9	Ecosystems • Biotic and abiotic factors • Sampling • Biodiversity Cycles • Water • Carbon • Nitrogen Cell biology • Organelles • Specialised cells Enzymes • Enzyme activity • Factors affecting enzymes • Nutrition Transporting substances • Osmosis • Active transport	Evolution • Evidence for evolution • Darwin's theory Classification Selective breeding Genetic engineering Photosynthesis • Limiting factors • Water and mineral absorption • Transpiration • Translocation	States of matter • Mixtures Separation techniques • Chromatography • Distillation Atomic structure • Mass number • Isotopes • Periodic table • Electronic configuration Conservation of mass Chemistry calculations • Moles • Empirical formula	Periodic table • Group 1 • Group 7 • Halogen reactivity • Group 0 Rates of reaction • Factors affecting ROR • Catalysts Endo/Exothermic • Bond energy • Graphs • Calculations	Waves • Properties of waves • Wave speed calculations • Refraction EM waves • Uses • Dangers Motion • Vectors and scalars • Distance time graphs • Acceleration • Velocity time graphs	Forces • Newton's Laws • Acceleration • Momentum • Calculations • Collisions • Stopping distances Energy • Stores and transfers • Efficiency • Sankey diagrams • Insulation • GPE • KE Energy resources • Renewable • Non-renewable

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10	Cell division • Mitosis • Differentiation • Stem cells • Meiosis Nervous system • Reflex arc • Synapses DNA • Structure • Extraction • Alleles Punnett Squares Inheritance Mutations	Non-communicable disease • Cardiovascular disease • Treatment Communicable disease • STI's • Physical and chemical defences • Immune system • Immunisation • Antibiotics • Drug development Hormones • Adrenalin • Thyroxine • Menstrual cycle • Contraception • Diabetes	Ionic bonding • Ionic bonds • Ionic formulae • Properties of ionic compounds Covalent bonding • Covalent compounds • Molecular compounds • Allotropes • Metallic properties • Bonding models Acids and bases • Indicators • Bases and salts • Preparing a salt • Balancing equations • Neutralisation • Acids and carbonates • Solubility	Electrolysis • Electrolysis of copper sulfate • Products of electrolysis Reactivity series • Products from Ores • Oxidation and reduction Lifecycle assessment Dynamic equilibrium	Electricity and circuits • Circuit symbols • Current • Potential difference • Charge and energy • Resistance • IV graphs • Power • Energy transfer • Electrical safety Particle model • Density • Energy and changes in state • Graphs • Energy calculations	Gas pressure Elasticity • Force and extension • Hooke's Law • Energy transfers Radioactivity • Atomic models • Atomic structure • Isotopes • Background radiation • Types of radiation • Properties of ionizing radiation • Radioactive decay • Decay equations • Half-life • Dangers

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2

Year 11	Exchange and transport
	• Efficient transport
	• Circulatory system
	• Heart
	• Respiration
	Fuels
	• Hydrocarbons
	• Fractional distillation
	• Alkanes
	• Combustion
	  ○ Complete
	  ○ Incomplete
	• Pollution
	• Break down
		Atmospheric science
		• Early atmosphere
		• Changing atmosphere
		• Current atmosphere
		• Climate change
		Magnetism
		• Uses
		• Magnetic fields
		Electromagnetism
		• Magnetic fields
		• Solenoids
		• Motor effect
		• Left hand rule
		Transformers
		• Structure and function
		• Calculation
		• National grid
		Electromagnetic induction
			Core practical review	Core practical review		