CAISTOR YARBOROUGH ACADEMY

Curriculum Overview – Science KS4

Year 10	Biology (SS = separate science only)	Chemistry (SS = separate science only)	Physics (SS = separate science only)
Autumn	**Unit 1 Key concepts in Biology** • Microscopes • Plant and animal cells • Using Microscopes • Specialised cells • Bacteria • Enzymes and Nutrition • Enzyme Action and Activity • pH and enzymes • Transporting Substances • Osmosis **Unit 2 Cells and cell control** • Mitosis • Growth in animals • Growth in plants • Stem cells • The brain (SS) • Brain and spinal cord problems (SS) • The nervous system • The eye (SS) • Neurotransmission speeds **Unit 3 Genetics** • Sexual and asexual reproduction (SS) • Meiosis • DNA • DNA replication (SS) • Protein synthesis (SS) • Mendel (SS) • Alleles • Inheritance • Multiple and missing alleles (SS) • Gene mutation • Variation **Unit 4 Natural Selection and genetic modification** • Evidence of human evolution • Darwin's theory • Development of Darwin's theory (SS) • Classification • Breeds and varieties	**Unit 1-2 States of Matter and separating substances** • States of matter • Mixtures • Filtration and crystallisation • Paper chromatography • Distillation • Separating inks • Drinking water **Unit 3 Atomic structure** • Structure of an atom • Atomic number and mass number • Isotopes **Unit 4 The periodic table** • Elements and the periodic table • Atomic number and the periodic table • Electronic configurations and the periodic table • **Unit 5-7 Bonding (ionic, covalent and metallic) and types of substance** • Ionic bonding • Ionic lattices • Properties of ionic compounds • Covalent bonds • Molecular compounds • Allotropes of carbon • Metallic bonding – properties of metals • Bonding models	**Unit 1 Motion** • Vectors and scalars • Distance/time graphs • Acceleration • Velocity/time graphs **Unit 2 Motion and forces** • Resultant forces • Newton's First Law • Investigating acceleration • Mass and weight • Newton's Third Law • Momentum • Stopping distances • Braking distance and energy (SS) • Crash hazards **Unit 3 Conservation of energy** • Energy stores and transfers • Energy efficiency • Keeping warm – insulation • Stored energies – kinetic and gravitational potential energy • Non-renewable energy • Renewable resources **Unit 4 Waves** • Describing waves • Wave speeds • Investigating waves • Refraction • Waves crossing boundaries (SS) • Ears and hearing (SS) • Ultrasound (SS) • Infrasound (SS) **Unit 5 Light and the EM spectrum** • Ray diagrams (SS) • Investigating refraction (SS) • Colour (SS) • Electromagnetic waves • The EM spectrum

			• Uses of long and short wavelengths • Electromagnetic radiation dangers
Spring	**Unit 4 Natural Selection and genetic modification contd** • Tissue culture (SS) • Genes in agriculture and medicine • GM and agriculture (SS) • Fertilisers and biological control (SS) **Unit 5 Health, Disease and development of medicines** • Health and disease • Non communicable diseases • Cardiovascular diseases • Pathogens • Spreading pathogens • Virus life cycles (SS) • Plant defences (SS) • Plant diseases (SS) • Physical and chemical barriers • The immune system • Antibiotics • Monoclonal antibodies (SS)	**Unit 8 Acids and Alkalis** • Acids, alkalis and indicators • Looking at acids • Bases and salts • Preparing copper sulfate • Alkalis and balancing equations • Investigating neutralisation • Alkalis and neutralisation • Reactions of acids with metals and with metals and carbonates • Solubility **Unit 9 Calculations Involving Mass** • Masses and empirical formulae • Conservation of mass • Moles **Unit 10 -13 electrolytic processes, obtaining and using metals, reactions and Transitions metals, Alloys and Corrosion** • Electrolysis • Electrolysis of copper sulfate • Products form electrolysis • Reactivity • Ores • Oxidation and reduction • Lifecycle assessment and recycling • Dynamic equilibrium • Transition metals (SS) • Corrosion (SS) • Electroplating (SS) • Alloying (SS) • Uses of metals and their alloys (SS) •	**Unit 6 Radioactivity** • Atomic structure and isotopes • Inside atoms • Electron orbits • Background radiation • Types of radiation • Radioactive decay • Half life • Using radioactivity • Dangers of radioactivity • Radioactivity in medicine • Nuclear energy • Nuclear fission and fusion (SS) • Nuclear reactors (SS) **Topics 7 Astronomy (SS topic only)** • The solar system • Gravity and orbits • Life cycle of a star • Red shift • Origins of the universe
Summer		**Unit 14 -16 Quantitative analysis, dynamic equilibria, calculations involving volumes of gases, chemical cells and fuel cells (SS only topic)** • Yields • Atom economy • Concentrations • Titrations and calculations • Molar volume of gases • Fertilisers and the Haber process • Factors affecting equilibrium • Chemical cells and fuel cells	**Unit 8 Work and Power** • Work and power • Objects affecting each other • Vector diagrams • Rotational forces (SS) **Topic 14/15** **Particle Model** **Forces and matter** • Particles and density • Investigating densities • Energy and changes of state • Energy calculations • Gas temperature and pressure

Year 11	Biology	Chemistry	Physics
Autumn	**Unit 6 plant structure and their function** • Photosynthesis • Factors that affect photosynthesis • Absorbing water and minerals (SS) • Transpiration and translocation • Plant adaptations (SS) • Plant hormones (SS) • Uses of hormones (SS) **Unit 7 Animal coordination, control and homeostasis** • Hormones • Hormonal control • The menstrual cycle	**Unit 17-19 Groups in the periodic table, Rates of reaction, heat energy changes in chemical reactions** • Group 1 • Group 7 • Halogen reactivity • Group 0 • Rates of reaction • Factor affecting rates of reaction • Investigating reaction rates • Catalysts and activation energy • Exothermic and endothermic reactions • Energy changes in reactions	**Unit 9/10 Electricity and static electricity** • Electric circuits • Current and P.D • Current, charge and energy • Resistance • More resistance • Investigating resistance • Transferring energy • Power • Transferring energy by electricity • Electrical safety • Static electricity (SS) • Danger and uses of static electricity (SS) • Electric fields (SS)
Spring	**Unit 7 Animal coordination, control and homeostasis contd** • Control and blood glucose • Type 2 diabetes • Thermoregulation (SS) • Osmoregulation (SS) • The kidneys (SS) **Unit 8 Exchange and transport in animals** • Efficient transport and exchange • Factors affecting diffusion (SS) • The circulatory system • The heart • Cellular respiration **Unit 9 Ecosystems and material cycles** • Ecosystems • Energy transfer (SS) • Abiotic factors • Biotic factors • Assessing pollution (SS) • Parasitism and mutualism • Biodiversity and humans	**Unit 20-21 Fuels & Earth and the atmosphere** • Hydrocarbons and crude oil/natural gas • Fractional distillation • Alkane homologous series • Complete and incomplete combustion • Fuels and pollution • Breaking down hydrocarbons • The early atmosphere • The changing atmosphere • The atmosphere today • Climate change **Unit 22-24 Hydrocarbons, Alcohols and carboxylic acids, Polymers (SS only topic)** • Alkanes and alkenes • Reactions of alkanes and alkenes • Ethanol production • Alcohols • Carboxylic acids • Polymerisation • Polymer properties and uses • Condensation polymerisation • Problems with polymers	**Unit 12/13 Magnetism and the motor effect, electromagnetic induction** • Magnets and magnetic fields • Electromagnetism • Magnetic forces • Electromagnetic induction (SS) • The national grid • Transformers and energy
Summer	**Unit 9 Ecosystems and material cycles contd** • Preserving biodiversity • Food security (SS) • The water cycle • The carbon cycle • The nitrogen cycle • Rates of decomposition (SS) **Revision**	**Unit 25/26 Qualitative Analysis (SS only topic)** • Flame tests • Tests for positive and negative ions • Choosing materials • Composite materials • Nanoparticles	**Topic 14/15** **Particle Model** **Forces and matter** • Gas Pressure and volume (SS) • Bending and stretching • Extension and energy transfer • Pressure in fluids (SS) • Pressure and upthrust (SS)