CAISTOR YARBOROUGH ACADEMY

Curriculum Overview – Science

	7	8	9
Autumn	**Cycle 0:** - What is science? - Lab Equipment - Lab Safety - Safety poster competition - Measuring - Lab safety review - Drawing equipment **Cycle 1:** **Cells, tissues, systems, and organisms** - Life processes - Organs - Plant and animal cells - Plant structure and organs - Organ systems **Mixtures and separation** - Investigating saturated solutions - Filtration - crystallisation - Chromatography - Distillation **Particle model** - Solids, Liquids & gases - State Changes - Particle theory - Diffusion - Pressure **End of Cycle Exam** **Cycle 2:** **The human body** - Human body	**Cycle 1** **Plants & reproduction** - 5 Kingdoms - Plant structures - Sexual reproduction - Asexual reproduction - Pollination - Seeds **Metals and their uses** - Properties of metals - Chemical reactions of metals - Reactivity series - Corrosion - Displacement reactions - Chemical equations **Energy & Transfers** - Radiation, conduction, convection - Investigating insulation - Power and efficiency - Payback times - Eco homes – research **End of Cycle Exam** **Cycle 2:** **Breathing and respiration** - Respiratory system - Gas exchange - Aerobic respiration - Anaerobic respiration - Structure of the heart **Atoms, elements, compounds** - Atoms - Molecules	**Cycle 1:** **Cells and specialised cells** - Microscopes - Plant and animal cells - Microscopes – core practical - Specialised cells - Inside bacteria - Standard form **Atoms, isotopes, ions** - Atoms - Isotopes - RFM - RAM - Percentage by mass - Ions - Tests for ions **Speed and motion** - Vectors and scalars - Speed, distance, time - Distance/time graphs - Displacement/ time graphs - Acceleration - Acceleration equations - Velocity/time graphs **End of Cycle Exam** **Cycle 2:** **Enzymes** - Enzymes and nutrition - Enzyme action (Lock and key) - Enzyme activity - Factors that affect enzyme activity

	- Breathing and gas exchange - The circulatory system & blood - Investigating pulse - The skeleton - Muscles & drugs **Acids and Alkalis** - pH scale - Indicators - Neutralisation - Chemical equations - Investigating concentration - Making a salt **Energy** - Types of energy - Energy transfers - Investigating energy in food - Fossil fuels - Renewable energy - Energy Efficiency **End of Cycle Exam**	- Chemical and physical reactions - Elements, compounds, mixtures - -Chemical reactions - -Protons, electrons, neutrons **Fluids** - States of matter - State changes - Pressure in fluids - Investigating melting points - Heating curves - Investigating density **End of Cycle Exam**	- Factors that affect enzyme action – core practical **Particles** - State changes - Cooling curve experiment - Describing cooling curves - Pure and impure - Ions and skills recap **Forces and motion** - Newton's first law - Mass and weight - Newton's second law - Newton's third law - Investigating acceleration - Circular motion, inertial mass, collisions **End of Cycle Exam**
Spring	**<u>Cycle 3:</u>** **Ecosystems** - Animal kingdoms - Habitats - Investigating variation - Adaptations - Food chains and webs - Biotic and abiotic factors **Atoms and elements** - Elements and the periodic table - Elements, compounds, and mixtures - Making compounds - Metals and non-metals - Chemical reactions - Investigating temperature changes	**<u>Cycle 3:</u>** **Unicellular organisms** - Animal, plant, and bacterial cells - Investigating diffusion - Pathogen research (IT) - Pathogens - Aseptic technique - Bacteria - Investigating antibiotics - Useful Bacteria **Reactivity series** - Chemical formulas - Reactivity series of metals and displacement reactions	**<u>Cycle 3:</u>** **Nutrition** - Nutrition - Food tests - Burning food - calorimeter - Diffusion and osmosis - Osmosis – core practical - Active transport **Separation techniques** - Filtration - crystallisation - Chromatography - Simple distillation - Fractional distillation - Drinking water - Separation challenge **Motion** - Recap Newton's laws

	Current and electricity - Circuit diagrams - Measuring current - Series and parallel circuits - Voltage - Models of electricity - Resistance - Electrical safety and how is electricity made? **End of Cycle Exam** **<u>Cycle 4</u>** **Sexual reproduction** - Human reproductive organs - Internal and external reproduction - Puberty - The menstrual cycle - Gestation & birth - Abortion debate **Periodic table** - The atom - Structure of the periodic table - Protons, neutrons & electrons - Drawing electron diagrams - Mendeleev's table - Drawing atoms **Forces** - Forces - Weight and Gravity - Types of forces - Springs - Isaac Newton - Pressure - Friction - Balanced and unbalanced forces. **End of Cycle Exam**	- Halogens and reactivity - Rusting experiment - Reduction and oxidation - Exothermic and endothermic reactions - Fermentation **Force Fields and magnets** - Magnets - Static electricity - Investigating current in series and parallel - Resistance - Electromagnets **End of cycle test** **<u>Cycle 4</u>** **Plants and growth** - Photosynthesis - Leaf structure - Root hair cells and transpiration - Mineral ions - Plant diseases research **Chemical tests** - Testing for hydrogen - Testing for Carbon dioxide - Testing for oxygen - Testing for chlorine and ammonia - Flame tests - Halide tests **Earth and space** - The solar system - Planets - Orbits - Seasons - Gravity **End of Cycle Exam**	- Stopping and braking distances - Road safety – IT - Work done - Breaking distances and energy - Kinetic energy - Crash hazards **End of Cycle Exam** **<u>Cycle 4</u>** **Cell division** - Mitosis - Differentiation in stem cells - Specialised cells recap - Animal growth and tumours - Meiosis - Sexual and asexual reproduction **History of the atom and periodic table** - Plum pudding model - Rutherford scattering experiment - Dobereiner and Newland periodic table - Mendeleev's periodic table - Modern periodic table - Drawing molecules - Empirical formula **Energy** - Energy stores and transfers - Efficiency - Keeping warm - Energy stores - Renewable and non-renewable energy - Generating electricity **End of Cycle Exam**

Summer	**Cycle 5** **Food and nutrition** - Food groups - Balanced diet - Journey of your food - Digestion and absorption - Food tests - Enzymes **Combustion** - Renewable and non-renewable fuels - Oxidation - Investigating fuels - Greenhouse effect and Global warming - Acid rain - Incomplete combustion **Waves** - Types of waves - Sound waves - The ear - Animals and sound - Comparing waves - Uses of sound **End of Cycle Exam**	**Cycle 5** **Genetics and evolution** - Variation - Inherited variation - DNA - Mitosis - Meiosis - Natural selection **Bonding Introduction** - Ions - Ionic compounds - Covalent Bonding - Molecules - Metallic bonding **Forces and motion** - Resultant force - Conservation of energy - Speed - Moments - Simple Machines **End of Cycle Exam**	**Cycle 5** **Human Body** - Organ, organ systems and stem cells - The brain - CNS - Reflex arc - The eyes - Spinal problems (HT) **Groups of the periodic table** - Bonding - Dot and cross diagrams - The noble gases - Alkali metals - Catalysts - Transition metals - Halogens **Waves** - Waves - Waves speed - Reflection - Refraction - Investigating waves – core practical **End of Cycle Exam**
End of year exams (cycles 1-5)			
	Cycle 6 **Light** - Light and colour - Reflection - Refraction - Refraction practical - Total internal reflection **Project 1-2 weeks** Scientific Skills – core practical's, literacy, research projects- careers, numeracy skills (in depth)	**Cycle 6** **Project 1-2 weeks** Scientific Skills – core practical's, literacy, research projects- careers, numeracy skills (in depth)	**Cycle 6** **Project 1-2 weeks** Scientific Skills – core practical's, literacy, research projects, careers, numeracy skills (in depth)

	Biology	Physics	Chemistry
10I Autumn	**Unit 2 Recap sensory system** **Unit 3 Genetics** • Sexual and asexual reproduction • Meiosis • DNA • DNA replication • Protein synthesis • Mendel • Alleles • Inheritance • Multiple and missing alleles • Gene mutation • Variation **Unit 5 Health, Disease and development of medicines** • Health and disease • Non communicable diseases • Cardiovascular diseases • Pathogens • Spreading pathogens • Viruses life cycles • Plant defences • Plant diseases • Physical and chemical barriers • The immune system • Antibiotics • Monoclonal antibodies	**Topic 6 Radioactivity** • Atomic structure and isotopes • Background radiation • Alpha beta gamma radiation • Alpha beta gamma decay • Half life • Nuclear fission and fusion(SS) • Nuclear reactor(SS) **Topics 7 Astronomy (SS)** • The solar system • Gravity and orbits • Life cycle of a star • Red shift • Origins of the universe	***Topic 8/9*** *Will come back to Unit 8 (Acids and alkalis) and 9 (Calculations involving mass). Units are skipped to suit ability, and reorder in a more pupil friendly way, which allows other skills to develop to help with Topic 8 and 9* **Unit 10 – 13 electrolytic processes, obtaining and using metals, reactions and Transitions metals, Alloys and Corrosion** • Electrolysis • Reactivity • Ores • Oxidation and reduction • Dynamic equilibrium • Transition metals • Corrosion • Electroplating • Alloying Uses of metals

10I Spring	**Unit 4 Natural Selection and genetic Modification** • Evidence of human evolution • Darwin's theory • Development of Darwin's theory • Classification • Breeds and varieties • Tissue culture • Genes in agriculture and medicine • GM and agriculture • Fertilisers and biological control **Unit 6 plant structure and their function** • Photosynthesis • Factors that affecting photosynthesis • Absorbing water and minerals • Transpiration and translocation • Plant adaptations • Plant hormones • Uses of hormones	**Unit 8 Work and Power** • Work and power • Objects affecting each other • Vector diagrams • Rotational forces **Unit 9/10 Electricity and static electricity** • Electric circuits • Current and P.D • Current, charge and energy • Resistance • Transferring energy • Power • Transferring energy by electricity • Static electricity # • Danger and uses of static electricity Electric fields	**Unit 9 Calculations Involving Mass** • Masses and empirical formulae • Conservation of mass • Moles **Unit 8 Acids and Alkalis** • Indicators • Neutralisation • Symbol equations • Preparing copper sulphate • Investigating neutralisation
10I Summer	**Unit 7 Animal coordination, control and homeostasis** • Hormones • Hormonal control • The menstrual cycle • Control and blood glucose • Type 2 diabetes • Thermoregulation • Osmoregulation • The kidneys	**Unit 12/13 Magnetism and the Motor Effect and Electromagnetic Induction** • Magnets and magnetic fields • Electromagnetism • Magnetic Forces • Electromagnetic Induction • National grid • Transformers and Energy	**Unit 17-19** • Group 1 • Group 7 • Halogen Reactivity • Group 0 • Rates of reaction • Factors effecting reaction rates • Catalysts and activation energy • Exothermic and Endothermic reactions • Energy changes in chemical reactions

10J Autumn	**Unit 3 Genetics** • Sexual and asexual reproduction • Meiosis • DNA • DNA replication • Protein synthesis • Mendel • Alleles • Inheritance • Multiple and missing alleles • Gene mutation • Variation **Unit 4 Natural Selection and genetic Modification** • Evidence of human evolution • Darwin's theory • Development of Darwin's theory • Classification • Breeds and varieties • Tissue culture • Genes in agriculture and medicine • GM and agriculture Fertilisers and biological control	**Topic 6 Radioactivity** • Atomic structure and isotopes • Background radiation • Alpha beta gamma radiation • Alpha beta gamma decay • Half life	**Unit 5-7 Types of substance** • Ionic bonding • Ionic lattices • Properties of ionic compounds • Molecular compounds • Types of substance • Covalent bonds ***Topic 8/9*** *Will come back to Unit 8 (Acids and alkalis) and 9 (Calculations involving mass). Units are skipped to suit ability, and reorder in a more pupil friendly way, which allows other skills to develop to help with Topic 8 and 9* **Unit 10 – 12 electrolytic processes, obtaining and using metals, reactions and Transitions metals, Alloys and Corrosion** • Electrolysis • Reactivity • Ores • Oxidation and reduction • Dynamic equilibrium
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	• Monoclonal antibodies **Unit 6 plant structure and their function** • Photosynthesis • Factors that affecting photosynthesis • Absorbing water and minerals • Transpiration and translocation • Plant adaptations • Plant hormones • Uses of hormones	• Danger and uses of static electricity • Electric fields	
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10K Autumn	**Unit 2 Recap sensory system –reflex arc** **Unit 3 Genetics** • Sexual and asexual reproduction • Meiosis • DNA • DNA replication • Protein synthesis • Mendel • Alleles • Inheritance • Multiple and missing alleles • Gene mutation • Variation	**Topic 5 Light and the EM spectrum** • The EM spectrum • Uses of long and short wavelengths • Dangers of long and short wavelengths • Refraction **Topic 6 Radioactivity** • Atomic structure and isotopes • Background radiation • Alpha beta gamma radiation • Alpha beta gamma decay • Half life	**Unit 3&4 Structure of the Atom & Periodic table** • Structure of an atom • Atomic number and mass number • Isotopes • Elements of the periodic table • Atomic number and the periodic table • Electronic configuration **Unit 5-7 Types of substance** • Ionic bonding • Ionic lattices • Properties of ionic compounds

	Unit 5 Health, Disease and development of medicines Health and disease • Non communicable diseases • Cardiovascular diseases • Pathogens • Spreading pathogens • Viruses life cycles • Plant defences • Plant diseases • Physical and chemical barriers • The immune system • Antibiotics • Monoclonal antibodies		
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	• Uses of hormones		
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Provisional depending on the progress made from year 9

	Biology	**Chemistry**	**Physics**
11I Autumn	**Topic 8 Exchange and transport in animals** • Efficient transport and exchange • Factors affecting diffusion • The circulatory system • The heart • Cellular respiration	**Unit 20-21 Fuels & Earth and the atmosphere** • Hydrocarbons and crude oil • Fractional distillation • Alkane homologous series • Complete and incomplete combustion • Fuels and pollution • Breaking down hydrocarbons **22-24 Hydrocarbons, Alcohols and carboxylic acids, Polymers(separate)** • Alkanes and alkenes • Reactions of alkanes and alkenes	**Unit 9/10 Electricity and static electricity** • Electric circuits • Current and P.D • Current, charge and energy • Resistance • Transferring energy • Power • Transferring energy by electricity • Static electricity • Danger and uses of static electricity • Electric fields

		• Ethanol production • Alcohols • Carboxylic acids • Polymerisation • Polymer properties and uses • Condensation polymerisation • Problems with polymers	
11I Spring	**Topic 9 Ecosystems and material cycles** • Ecosystems • Energy transfer • Abiotic factors • Biotic factors • Assessing pollution • Parasitism and mutualism • Biodiversity and humans • Preserving biodiversity • Food security • The water cycle • The carbon cycle • The nitrogen cycle • Rates of decomposition	**Unit 17-19 Groups in the periodic table, Rates of reaction, heat energy changes in chemical reactions** • Group 1 • Group 7 • Halogens • Rates of reaction • Factor affecting rates of reaction • Catalysts and activation energy • Exothermic and endothermic reactions • Energy changes in reactions	**Unit 12/13 Magnetism and the motor effect, electromagnetic induction** • Magnets and magnetic fields • Electromagnetism • Magnetic forces • The national grid • Transformers and energy **Topic 14/15** **Particle Model** **Forces and matter** • Particles and density • Energy and changes of state • Energy calculations • Gas temperature / pressure and volume • Bending and stretching • Extension and energy transfer • Pressure in fluids • Pressure and upthrust
11I Summer	**Revision**	**Unit 14/15/16 Quantitative analysis, dynamic equilibria, calculations involving volumes of gases, chemical cells and fuel cells (separate only)** • Yields • Atom economy • Concentrations • Titration • Molar volume of gases • Fertilisers and the Haber process	**Revision**

		• Factors affecting equilibrium chemical cells and fuel cells	
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		• Polymer properties and uses • Condensation polymerisation • Problems with polymers	
11K Summer	**Revision**	**Unit 14/15/16 Quantitative analysis, dynamic equilibria, calculations involving volumes of gases, chemical cells and fuel cells (separate only)** • Yields • Atom economy • Concentrations • Titration • Molar volume of gases • Fertilisers and the Haber process • Factors affecting equilibrium chemical cells and fuel cells	**Revision**