



Lower Line (Y7-9)

	Year 7		Year 8		Year 9	
Half Term 1	7G- The particle model: - solids, liquids, and gases - hypotheses and theories - the particle model - Brownian motion - diffusion - air pressure	7I- Energy - Energy from food - Energy transfers and stores - Non-renewable fuels - Renewable fuels	8I- Fluids - The particle model - Changing state - Pressure in fluids - floating and sinking - Drag	8A- Food and nutrition - Nutrients - Uses of nutrients - Balanced Diets - Digestion - Absorption	8I- Fluids - The particle model - Changing state - Pressure in fluids - floating and sinking - Drag	8A- Food and nutrition - Nutrients - Uses of nutrients - Balanced Diets - Digestion - Absorption
Half Term 2	7E - Mixtures and Separation - Types of mixtures - Solutions and solubility - Evaporation - Paper chromatography - Distillation - Safe drinking water	7J - Current electricity - Current - Switches - Models for circuits - Series and parallel circuits - changing current - using electricity	8E- Combustion - Burning fuels - Oxidation - Fire safety - Air pollution - Global warming	8J- Light - Light on the move - Reflection - Refraction - Camera and eyes - Colour	8E- Combustion - Burning fuels - Oxidation - Fire safety - Air pollution - Global warming	8J- Light - Light on the move - Reflection - Refraction - Camera and eyes - Colour
Half Term 3	7K - Forces - Different forces - Springs - Friction - Pressure - Balanced and unbalanced forces	7A- Cells, tissues, organs, and systems - Life processes - Organs - Tissues - Microscopes - Cells	8F- The periodic table - Dalton's atomic model - Chemical properties - Mendeleev's table - Physical trends - Chemical trends	8C- Breathing and respiration - Aerobic respiration - Gas exchange system - Getting oxygen - Comparing gas exchange - Anaerobic respiration	8F- The periodic table - Dalton's atomic model - Chemical properties - Mendeleev's table - Physical trends - Chemical trends	8C- Breathing and respiration - Aerobic respiration - Gas exchange system - Getting oxygen - Comparing gas exchange - Anaerobic respiration



Science Curriculum Overview

	Year 7		Year 8		Year 9	
Half Term 4	7H- Atoms, Elements, and Molecules - Air - Elements in the Earth - Metals and non-metals - Chemical reactions - Making compounds	7B- Sexual reproduction in animals - Sexual vs asexual reproduction - Human reproductive organs - Sexual intercourse - Gestation and birth - Puberty	8G- Metals and their uses - Metal properties - Corrosion - Metals and water - Metals and acids - Pure metals and alloys	8K- Energy transfers - Temperature changes - Transferring energy - Controlling transfers - Power and efficiency - Paying for energy	8G- Metals and their uses - Metal properties - Corrosion - Metals and water - Metals and acids - Pure metals and alloys	8K- Energy transfers - Temperature changes - Transferring energy - Controlling transfers - Power and efficiency - Paying for energy
Half Term 5	7F- Acids and Alkalis - Hazards - Indicators - The pH scale - Neutralisation	7C- Muscles and bones - Breathing and the gas exchange system - The heart and circulatory system - The skeleton and movement - Antagonistic muscles - Drugs	8D- Unicellular organisms - Unicellular or multicellular - Microscopic fungi - Bacteria - Protoctists - Decomposers and carbon	8B- Plants and their reproduction - Classification and biodiversity - Types of reproduction - Pollination - Fertilisation and dispersal - Germination and growth	8D- Unicellular organisms - Unicellular or multicellular - Microscopic fungi - Bacteria - Protoctists - Decomposers and carbon	8B- Plants and their reproduction - Classification and biodiversity - Types of reproduction - Pollination - Fertilisation and dispersal - Germination and growth
Half Term 6	7D- Ecosystems - Adaptations - Inherited variation - Environmental variation - Food chains and populations		8L- Earth and space - Gathering the evidence - Seasons - Magnetic earth - Gravity in space - Beyond the solar system		Core practicals: CB1- Osmosis in potatoes CC2- Investigating inks CP1- Investigating terminal velocity Exam skills: - Command words and structuring longer written answers - accuracy, precision, and outliers - drawing scientific diagrams - independent, dependent, and control variables	



Higher Line (Y10-11) Combined Science

	Year 10	Year 11
Half Term 1	<p>Biology Genetics: DNA structure, Meiosis, Inheritance, Variation</p> <p>Chemistry Covalent bonding, Simple Molecules, Giant Covalent structures Metallic Bonding, Types of structures</p> <p>Physics Waves</p>	<p>Biology Animal Coordination, Control and Homeostasis: Hormones. Hormonal Control of Metabolic Rate, Menstrual Cycle, Control of Blood Glucose, Type 1 and Type 2 Diabetes</p> <p>Chemistry Group Chemistry, Rates of reaction</p> <p>Physics Energy, Work, Forces and their Effects</p>
Half Term 2	<p>Biology Natural Selection and Genetic Modification: Evidence for Human Evolution, Darwin's Theory, Classification, Genes in Agriculture</p> <p>Chemistry Amounts of substances, Acids and alkalis</p> <p>Physics Light and the electromagnetic spectrum</p>	<p>Biology Exchange and Transport in Animals: Efficient Transport and Exchange, The Circulatory System, The Heart, Cellular Respiration</p> <p>Chemistry Rates of reaction, Energy changes</p> <p>Physics Electricity</p>
Half Term 3	<p>Biology Health, Disease and the Development of Medicines: Health and Disease, Non-communicable disease, Pathogens</p> <p>Chemistry Acids and alkalis, Electrolysis</p> <p>Physics Radioactivity</p>	<p>Biology Ecosystems and Material Cycles: Ecosystems, Abiotic Factors, Biotic Factors and Communities, Parasitism and Mutualism, Biodiversity and Humans, Preserving Biodiversity</p> <p>Chemistry Fuels</p> <p>Physics Electromagnetism</p>
Half Term 4	<p>Biology Health continued: Physical and Chemical Barriers, The Immune System Antibiotics</p> <p>Chemistry Oxidation and reduction, Extraction of metals</p> <p>Physics Radioactivity</p>	<p>Biology Ecosystems continued: Nutrient Cycles – water, carbon and nitrogen</p> <p>Revision and Exam preparation</p> <p>Chemistry The atmosphere, Revision</p> <p>Physics Particle Model & Forces and Matter</p>



	Year 10	Year 11
Half Term 5	<p>Biology Plant Structures and Their Functions: Photosynthesis, Factors Affecting Photosynthesis, Absorbing Water and Minerals, Transpiration and Translocation</p> <p>Chemistry Life Cycle assessment, Equilibria</p> <p>Physics Energy, Work, Forces and their Effects</p>	
Half Term 6	<p>Biology Chemistry Physics Revision and end of year exams</p>	

Higher Line (Y10-11) Triple Science

	Year 10	Year 11
Half Term 1	<p>Biology Genetics: Sexual and Asexual Reproduction, DNA structure, Meiosis Protein Synthesis, Mendel and Alleles, Inheritance, Variation</p> <p>Chemistry Covalent bonding, Simple Molecules, Giant Covalent structures, Metallic Bonding, Types of structures, Amounts of substances</p> <p>Physics Waves</p>	<p>Biology Animal Coordination, Control and Homeostasis: Hormones, Hormonal Control of Metabolic Rate, Menstrual Cycle, Control of Blood Glucose, Type 1 and Type 2 Diabetes, Thermoregulation, Osmoregulation (the Kidney)</p> <p>Chemistry Group Chemistry, Rates of reaction</p> <p>Physics Energy, Work, Forces and their Effects</p>
Half Term 2	<p>Biology Natural Selection and Genetic Modification: Evidence for Human Evolution, Darwin's Theory, Classification, Tissue Culture, Genetic Modification, Fertilizers and Biological Control</p> <p>Chemistry Acids and alkalis</p> <p>Physics Light and the electromagnetic spectrum</p>	<p>Biology Exchange and Transport in Animals: Efficient Transport and Exchange, Factors Affecting Diffusion, The Circulatory System, The Heart, Cellular Respiration</p> <p>Chemistry Energy changes, Fuels and alkenes</p> <p>Physics Electricity</p>



Science Curriculum Overview

	Year 10	Year 11
Half Term 3	<p>Biology Health, Disease and the Development of Medicines: Health and Disease, Non-communicable disease, Pathogens, Viruses, Plant Diseases</p> <p>Chemistry Electrolysis, Oxidation and reduction, Extraction of metals</p> <p>Physics Radioactivity</p>	<p>Biology Ecosystems and Material Cycles: Ecosystems, Energy Transfer, Abiotic Factors, Biotic Factors and Communities, Assessing Pollution (Living Indicators)</p> <p>Chemistry The atmosphere, Alcohols, Carboxylic acids</p> <p>Physics Electromagnetism</p>
Half Term 4	<p>Biology Health continued: Physical and Chemical Barriers, The Immune System, Antibiotics, Monoclonal Antibodies</p> <p>Chemistry Equilibria, Transition metals and alloys, Percentage yield and atom economy</p> <p>Physics Radioactivity</p>	<p>Biology Ecosystems and Material Cycles Continued: Parasitism and Mutualism, Biodiversity and Humans, Preserving Biodiversity, Food Security, Nutrient Cycles - water, carbon and nitrogen, Rates of Decomposition</p> <p>Chemistry Polymers, Qualitative analysis, Nanoparticles</p> <p>Physics Particle Model & Forces and matter</p>
Half Term 5	<p>Biology Plant Structures and Their Functions: Photosynthesis, Factors Affecting Photosynthesis, Absorbing Water and Minerals, Transpiration and Translocation, Plant Adaptations, Plant Hormones</p> <p>Chemistry Moles in solution, Gas moles</p> <p>Physics Astronomy</p>	
Half Term 6	<p>Biology Revision and end of year exams</p> <p>Chemistry The Haber process-industrial versus lab preparation of a fertiliser Fuel Cells and batteries, Exams</p> <p>Physics</p>	



Sixth Form (Y12-13) Biology A Level

	Year 12	Year 13
Half Term 1	<p>Biological Molecules: Structure, function and importance of Carbohydrates, Lipids, Water, Inorganic Ions, Proteins and DNA</p> <p>Cells: Eukaryotic and Prokaryotic Cell Structure and Function; names of cell organelles</p> <p>Practical work: Microscopes</p>	<p>Homeostasis: Chemical Control in Animals (hormones) and chemical control in plants (plant growth substances)</p> <p>Practical work: investigating plant growth substances</p> <p>Osmoregulation: structure and function of the human kidney. Control of osmoregulation by the hormone ADH</p> <p>Microbial Techniques - what are 'aseptic techniques'? Understand the phases of growth of a bacterial culture</p> <p>Practical work: Growing bacteria safely in the lab</p>
Half Term 2	<p>Biological Molecules continued: DNA and protein synthesis; Enzymes</p> <p>Practical work: Enzymes Core Practical</p> <p>Viruses: Structure and Classification; case study of Ebola.</p> <p>Cells Continued: The Cell Cycle and Mitosis.</p> <p>Practical work: Root Tip Squash</p>	<p>The Nervous System: What is an Action Potential? Names and functions of different neurones. What happens at a synapse? Structure of the human brain. Effect of drugs on synapses.</p> <p>The Mammalian Eye: Structure of the eye. Photoreception and rod cells.</p> <p>Bacteria as pathogens: Revision of gram positive and gram negative bacteria. How bacteria damage cells, including the production of toxins.</p>
Half Term 3	<p>Gas Exchange: SA:volume ratios, gas exchange in insects, fish and mammals. Gas exchange in flowering plants.</p> <p>Practical work: Dissection of an insect</p> <p>Sexual Reproduction in Mammals - Gametogenesis, fertilisation and early foetal development</p> <p>Sexual Reproduction in Plants - Gametogenesis, pollination and fertilisation</p> <p>Practical work: Pollen Grain Growth</p> <p>Cell Membranes: Structure and transport across membranes</p> <p>Practical work: Investigating membranes</p>	<p>Control of Heart Rate in Mammals - including revision of the heart</p> <p>Understanding Antibiotics - bactericidal and bacteriostatic antibiotics, antibiotic resistance in bacteria.</p> <p>Response to infection - the immune system. Role of different blood cells in immunity. How vaccines work.</p> <p>Origins of Genetic Variation - mutation (gene and chromosome), alleles, monohybrid and dihybrid inheritance. Punnett Squares and predicting outcomes. Linkage and recombination.</p>
Half Term 4	<p>Circulation: Structure of the heart, structure and function of veins, arteries and capillaries. Myogenic stimulation of the heart and the Cardiac Cycle. Interpreting ECG traces. Functions of the blood.</p>	<p>Factors Affecting Gene Expression - role of transcription factors</p> <p>Gene Sequencing - what is PCR?</p>



	Year 12	Year 13
	<p>Transport of Gases in the Blood – understanding dissociation curves. Formation and function of lymph.</p> <p>Classification- definitions of the term species. Importance of DNA analysis (gel electrophoresis) in classification. The three domains.</p> <p>Natural Selection- process of evolution. Importance of the term ‘niche’</p> <p>Biodiversity and conservation.</p>	<p>Stem Cells and Gene Technology - totipotent, pluripotent and multipotent stem cells. How recombinant DNA can be produced, including the role of restriction endonucleases and DNA ligase</p> <p>The Nature of Ecosystems – abiotic and biotic factors, ecological techniques, statistical tests (Spearman’s Rank, T test).</p> <p>Practical work: Investigating living things in their environments.</p>
Half Term 5	<p>Transport in Plants: Structure of xylem and phloem. Mechanisms of transpiration and translocation. Factors that affect the rate of transpiration.</p> <p>Practical work: Using potometers</p> <p>Aerobic Respiration: reaction pathway of respiration, structure of the mitochondrion, differences between aerobic and anaerobic respiration.</p> <p>Practical work: Using a respirometer</p> <p>Photosynthesis: variety of photosynthetic pigments. Light Dependent and Light Independent Reactions. Structure of a chloroplast.</p> <p>Practical work: Chlorophyll Chromatography</p> <p>Practical work: Investigating Photosynthesis</p>	<p>Gene Pools – what is a gene pool? How do migration and mutation affect gene pools? Hardy-Weinberg equation.</p> <p>Changes in Ecosystems – succession (primary and secondary). Human effects on ecosystems including climate change.</p>
Half Term 6	Revision and end of year exams	<i>Exam period</i>

Sixth Form (Y12-13) Chemistry A Level

	Year 12	Year 13
Half Term 1	<p>Inorganic Reactions, Equations and Yields</p> <p>Amount of Substance</p> <p>Calculating Amounts in Reactions Using Moles</p> <p>Calculating Concentration and Carrying Out Titrations</p> <p>Structure of Atoms and the Periodic Table</p> <p>Mass Spectrometry and the Formation of Ions</p> <p>Electron Orbitals</p> <p>Electronic Configuration and Periodicity</p> <p>Ionic and Covalent Bonding</p> <p>CORE PRACTICAL 1: Measure the molar volume of a gas</p>	<p>Chemistry of Carboxylic Acids and Derivatives</p> <p>Chemistry of Arenes – Structure of Benzene</p> <p>Chemistry of Arenes – Electrophilic Substitution Reactions</p> <p>Redox Equilibria – Electrode Potentials</p> <p>Redox Equilibria – Uses of E_{cell}</p> <p>CORE PRACTICAL 5: The oxidation of ethanol</p> <p>CORE PRACTICAL 10: Investigating some electrochemical cells</p>



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	Year 12	Year 13
	<i>CORE PRACTICAL 2: Prepare a standard solution from a solid acid</i>	
Half Term 2	Calculating Concentration and Carrying Out Titrations Redox Reactions Chemistry of Group 1 and 2 Chemistry of Group 7 Explaining Redox Reactions of Group 7 Using Oxidation Numbers Types of Structure Electro-negativity, Bond Polarity and Intermolecular Forces Formation of Solutions Predicting Structure VSEPR Introduction to Carbon Chemistry <i>CORE PRACTICAL 3: Find the concentration of a solution of hydrochloric acid</i>	Organic Compounds Containing Nitrogen Condensation Polymers and Amino Acids NMR Spectroscopy Redox Equilibria – Redox Titrations Kinetics <i>CORE PRACTICAL 11: Redox titration</i> <i>CORE PRACTICAL 13a: Rates of reaction</i> <i>Following the rate of the iodine-propanone reaction by a titrimetric method</i> <i>CORE PRACTICAL 13b: Rates of reaction</i> <i>Following the rate of a reaction using a 'clock reaction' (Harcourt-Esson, iodine clock).</i>
Half Term 3	Enthalpy Changes Using Hess's Law Kinetics Introduction to Carbon Chemistry Chemistry of Alkanes <i>CORE PRACTICAL 8: To determine the enthalpy change of a reaction using Hess's Law</i>	Chromatography Identifying Organic Structures Planning how to Synthesise Compounds Kinetics Properties of Transition Metals and their Compounds Transition Metal Complexes and Ligands and Redox Reactions of Transition metals <i>CORE PRACTICAL 14: Finding the activation energy of a reaction</i> <i>CORE PRACTICAL 12: The preparation of a transition metal complex</i>
Half Term 4	Equilibria Born Haber Entropy Radical Substitution Reactions Chemistry of Alkenes Electrophilic Addition Reactions Preparation, Uses and Disposal of Polymers Instrumental Methods to Find the Structure of Organic Compounds	Planning how to Synthesise Compounds Carrying out Preparations of Organic Compounds Stability of Complexes and use of d-Block Elements/ Compounds as Catalysts <i>CORE PRACTICAL 15-Identifying inorganic and organic unknowns</i> <i>CORE PRACTICAL 16: The preparation of aspirin</i>



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	Year 12	Year 13
Half Term 5	Gibbs Free energy Equilibrium Expressions Acid-base Equilibria Reactions of Haloalkanes Trends in Reactivity of Nucleophilic Substitution Reactions CORE PRACTICAL 4: Investigation of the rates of hydrolysis of some halogenoalkanes CORE PRACTICAL 7: Analysis of some inorganic and organic unknowns	
Half Term 6	Titration Curves and Buffer Solutions Buffers Reactions and Uses of Alcohols Chemistry of Carbonyl Compounds CORE PRACTICAL 9: Finding the K_a value for a weak acid CORE PRACTICAL 5: The oxidation of ethanol CORE PRACTICAL 6: Chlorination of 2-methylpropan-2-ol using concentrated hydrochloric acid	

Sixth Form (Y12-13) Physics A Level

	Year 12	Year 13
Half Term 1	Topic 1: Working as a Physicist / Practical Techniques Topic 5: Waves and Particle Nature of Light	Topic 6: Further Mechanics Topic 7: Electric and Magnetic Fields
Half Term 2	Topic 1: Working as a Physicist / Practical Techniques Topic 5: Waves and Particle Nature of Light	Topic 8: Nuclear and Particle Physics Topic 9: Thermodynamics
Half Term 3	Topic 2: Mechanics Topic 5: Waves and Particle Nature of Light	Topic 10: Space Topic 11: Nuclear Radiation
Half Term 4	Topic 3: Electric Circuits Topic 5: Waves and Particle Nature of Light	Topic 12: Gravitational Fields Topic 13: Oscillations
Half Term 5	Topic 4: Materials Topic 5: Waves and Particle Nature of Light	
Half Term 6	Topic 6: Further Mechanics / Revision	



Sixth Form (Y12-13) BTEC Applied Science (Certificate & Diploma)

	Year 12	Year 13
Half Term 1	<p>Unit 1: Principles and applications of science I Structure and bonding, cell structure and specialisation working with waves</p> <p>Diploma only Unit 12: Disease and Infection Part A: Analyse how an infectious and a non-infectious disease will progress over time. Part B: Explain how infectious diseases can be transmitted and prevented. Evaluate the role of organisations in limiting the spread of infectious diseases Part C: Analyse different treatment methods to combat disease process and evaluate why treatments may not always be accessible, or appropriate.</p>	<p>Diploma only Unit 4 Part D: Laboratory techniques and their application Understanding how scientific information may be stored and communicated in a workplace laboratory.</p> <p>Unit 5: Principles and applications of science II Properties and uses of substances, The cardiovascular system, gas exchange and the respiratory system Thermal physics, Materials and fluids.</p>
Half Term 2	<p>Unit 1: Principles and applications of science I Production and uses of substances in relation to properties, tissue structure and function, waves in communication and use of electromagnetic waves.</p> <p>Diploma only Unit 12: Disease and Infection Continue with parts A, B and C Part D: specific and the non-specific immune system</p>	<p>Diploma only Unit 4 Part D: Laboratory techniques and their application Understanding how scientific information may be stored and communicated in a workplace laboratory.</p> <p>Unit 5: Principles and applications of science II Reactions & properties of organic compounds, materials in domestic & industrial applications, urinary system, cell transport, energy changes in industry, fluids in motion.</p>
Half Term 3	<p>Unit 1: Principles and applications of science I – Production and uses of substances in relation to properties, tissue structure and function, waves in communication and use of electromagnetic waves.</p>	<p>Diploma only Unit 6: Investigative project – undertake a literature review, produce a project proposal, produce a plan, undertake the project, collect & analyse data and present the results.</p>



	Year 12	Year 13
	<p>Unit 2 Part A and B Practical scientific procedures and techniques A: Titration and colorimetry B: Cooling curves.</p> <p>Diploma only Unit 5: Principles and applications of science II – Properties and uses of substances, the cardiovascular system, thermal physics, materials and fluids.</p>	<p>Unit 12: Disease and Infection Part A: Analyse how an infectious and a non-infectious disease will progress over time, and the effects this may have on affected individuals.</p> <p>Part B: Explain how infectious diseases can be transmitted and prevented. Evaluate the role of organisations in limiting the spread of infectious diseases</p>
Half Term 4	<p>Unit 2 Part C and D Practical scientific procedures and techniques C: Undertaking chromatographic techniques. D: Review personal development of scientific skills for laboratory work.</p> <p>Diploma only Principles and applications of science II – respiratory system, urinary system, reactions & properties of organic compounds, materials in domestic & industrial applications.</p>	<p>Diploma only Unit 6: Investigative project – undertake a literature review, produce a project proposal, produce a plan, undertake the project, collect & analyse data and present the results.</p> <p>Unit 12: Disease and Infection Part C: Analyse different treatment methods to combat disease process and evaluate why treatments may not always be accessible, or appropriate.</p> <p>Part D: specific and the non-specific immune system</p>
Half Term 5	<p>Unit 5: Principles and applications of science II – energy changes in industry, urinary system, cell transport, fluids in motion.</p>	<p>Diploma only Unit 6: Investigative project – Review the project using correct scientific principles.</p>
Half Term 6	<p>Unit 8 Physiology of human body systems – understanding the impact of musculoskeletal, lymphatic and digestive disorders and their associated corrective treatments.</p>	



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