Combined Sciences

The Ripley Academy

Years 9 - 11

Unit Title	Unit Overview	Prior Knowledge / skills	New Learning
B1.1 - Cells and Tissues	Develop an understanding of how cells make up the foundation of all living organisms.	• Animal Cell Structure • Plant Cell Structure • Organelles	• Eukaryotic v Prokaryotic Cells • Magnification • Cell Specialisation
B1.2 – Transport in Cells	Study how substances move between cells in animals and plants.	• Movement of Substances • Cell Structure • Organelles	• Diffusion • Osmosis • Active Transport
B1.3 – Enzymes	Learn about the digestive system and how the body processes food.	• Healthy Lifestyle • Body Systems • Digestion	• Roles of organs in the digestive system • Food Molecules • Digestive Enzymes
B1.4 – Non-communicable Diseases	A study of how the human circulatory system works and how the body is affected by non-communicable diseases such as heart problems and cancer.	• What causes disease • How diseases are spread • Immunity	• Blood and Circulation • Heart Structure and Disease • Heart Disease Treatments • Cancer
B1.5 – Communicable Diseases	Learn how pathogens make people feel ill and how both the body and medicine is able to help fight off these diseases.	• What causes disease • How diseases are spread • Immunity	• Types of Pathogens • Body Defence Mechanisms • Roles of drugs in defeating diseases • How drugs are developed
B1.6 – Photosynthesis	A unit that studies how plants use Photosynthesis to produce their own food source and factors that affect it.	• Plant Cells • How plants create food • Plant Structure	• Photosynthesis as a process • Limiting factors of photosynthesis • Uses of Glucose • Transport mechanisms in plants

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B1.7 – Respiration	In this unit students learn about the process of both aerobic and anaerobic respiration in Plants and Animals.	• Role of the Lungs • Role of the Heart • Organ Systems	• Aerobic Respiration as a process • Anaerobic Respiration as a process • The role and importance of exercise
B2.1 – Homeostasis	Learn how the body controls levels of key components of the body.	• Healthy Lifestyle • Body Systems • Cells and Organisation	• What conditions in the body need to be controlled • How the body controls these conditions • The roles of different organs in controlling conditions
B2.2 – The Nervous System	Students will learn how the brain controls the body's functions and how messages are transmitted using the Nervous System.	• Healthy Lifestyle • Body Systems • Cells and Organisation	• The structure and function of the Central Nervous System • The reflex arc • Investigating reaction times
B2.3 – The Hormonal System	Through this unit of work, students will learn about the functions of hormones, how they are produced and some of the ways the body utilises them.	• Healthy Lifestyle • Body Systems • Cells and Organisation	• The endocrine systems • Diabetes and blood glucose control • Contraception and Fertility
B2.4 – Inheritance	Students will study the basics of genetics and how this leads to characteristics being passed through generations.	• Reproduction (KS3) • Evolution (KS3) • Continuous and Discontinuous Variation (KS3)	• Genes and Genetics • Meiosis • Genetic Inheritance • Genetic Diseases
B2.5 – Variation and Evolution	In this unit, students will study how sexual reproduction and genetic mutations lead to changes within a species. They will also learn how the study of fossils enables us to learn about how species have evolved over time.	• Reproduction (KS3) • Evolution (KS3) • Continuous and Discontinuous Variation (KS3)	• Selective Breeding • Natural Selection • Anti-biotic Resistance • Genetic Engineering • Fossils and Classification
B2.6 – Ecology	Students will learn about Ecosystems and how species are able to co-exist.	• Food chains • Food webs • Interdependence	• Ecosystems • Biotic and Abiotic Factors • Human Impacts

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			• Deforestation
C1.1 – Atomic Structure & The Periodic Table	In this unit, students will be introduced to the structure of the atom and how the Periodic Table can help us find out about key properties of elements.	• Particle Theory (KS3) • Elements / Compounds • Periodic Table (KS3)	• Atomic Structure • History of Atomic Models • Electron Structure • Elements of the Periodic Table
C1.2 – Separating Mixtures	Students will learn how to separate mixtures using a variety of techniques.	• What is a mixture • How can they be separated • Evaporation	• Purity of substances • Formulations • Distillation • Chromatography
C1.3 – Structure and Bonding	A study of how atoms and molecules bond together to produce substances with different properties and why these properties exist.	• Particle Theory (KS3) • Elements / Compounds • Periodic Table (KS3)	• Ionic Bonding • Covalent Bonding • Metallic Bonding • Giant Structures
C1.4 – Quantitative Chemistry	Students will learn how to perform the calculations required in the field of chemistry to find out key information.	• Particle Theory (KS3) • Elements / Compounds • Periodic Table (KS3)	• Moles and M_r • Conservation of Mass • Reacting Mass Calculations (HT) • Concentration
C1.5 – Extracting Metals	Most metals exist naturally as ores, in this unit students will learn the methods that scientists use to extract pure metals from these ores.	• Particle Theory (KS3) • Elements / Compounds • Chemical Reactions (KS3)	• Metal & Oxygen Reactions • Reactivity Series • Carbon Reduction • Phytomining and Bioleaching
C1.6 – Reactions of Acids	Students will learn how different elements react with acids to produce new reactants.	• Acids and Alkalis • The pH scale • Word equations for reactions	• Acid & Metal Reactions • Acids & Carbonates • Neutralisation Reactions • Strong and Weak Acids

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C1.7 - Electrolysis	In this unit, students will learn about how electrolysis can be used to separate ionic compounds and solutions.	• Acids and Alkalis • Elements & Compounds • Electricity (KS3)	• Electrolysis of Liquids • Electrolysis of Solutions • Half Equations (HT) • Extraction of Aluminium
C1.8 – Energy Changes	A study of how chemical reactions causes energy changes and why they occur.	• Acids and Alkalis • Reactions of Metals & Acids • Chemical Bonding	• Endothermic Reactions • Exothermic Reactions • Reaction Profile Diagrams • Bond Enthalpy Calculations (HT)
C2.1 – Rates of Reaction	Students will learn about the factors that effect rates of reactions and why.	• Particle Theory (KS3) • Elements / Compounds • Periodic Table (KS3)	• How rates of reaction are measured • Factors that impact the rate of a reaction • The role of Catalysts
C2.2 – Reversible Reactions	In this unit, students will learn about why some reactions can be reversed and the properties behind these reactions.	• Acids and Alkalis • Reactions of Metals & Acids • Chemical Bonding	• What is a reversible reaction • Reversible reaction equations • Le Chatelier's Principle (HT)
C2.3 – Organic Chemistry	The study of Hydrocarbons and the properties of the different factions of Crude Oil.	• Particle Theory (KS3) • Elements / Compounds • Chemical Bonding (KS4)	• What is a Hydrocarbon • Properties of Hydrocarbons • Crude Oil and Fractional Distillation • Cracking
C2.4 – Chemical Analysis	Students will learn about how mixtures can be analysed to find key properties and information about them.	• Elements / Compounds / Mixtures • Separating Mixtures (KS4) • Chromatography	• How to analyse a chromatogram • Identifying substances of a mixture from Chromatograms • R_f Values
C2.5 – Chemistry of the Atmosphere	The earths atmosphere as we know it is constantly evolving, in this unit students will study why the present day atmosphere is as it is, and how it was historically. They will also learn about climate change and the impacts of it.	• Solids / Liquids / Gases • Pollution (KS3) • The Earth and it's Atmosphere (KS3)	• Chemistry of the Atmosphere • History of the Atmosphere • Green House Gases • Climate Change and its Impacts

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C2.6 – Using Resources	Students will learn about recycling techniques (including water) and some of the techniques scientists use to ensure that we maximise the use of the resources that we have.	• The Earth and it's Atmosphere (KS3) • The Carbon Cycle • Chemistry of the Atmosphere (KS4)	• Finite and Infinite Resources • Potable Water • Waste Water Treatment • Life Cycle Assessments
P1.1 – Energy	By definition Physics is the study of energy. This unit will introduce students to the concepts of energy stores, and the mathematical analysis of them.	• Energy (KS3) • Motion (KS3) • Forces (KS3)	• Types of Energy Stores • Energy Store Calculations • Conservation of Energy • Heat Transfer • Renewable & Non-Renewable Resources
P1.2 – Electricity	Students will learn about electrical circuits, how they work and the mathematical analysis of circuits.	• Electric Current (KS3) • Building Electric Circuits (KS3) • Analysing Circuits (KS3)	• Electric Charge and Current • Electrical Energy and Potential Difference • Series and Parallel Circuits • IV Characteristics and Resistance • Mains Electricity and the National Grid
P1.3 – Matter	In this unit, students will learn about kinetic theory and how energy affects matter.	• Particle Theory (KS3) • Solids / Liquids / Gases • Measuring Mass (Practical Skills)	• States of matter and changes of state • Density • Specific Heat Capacity • Specific Latent Heat
P1.4 – Atomic Structure	Students will learn about ionising radiation, why it can be a risk and how it can also be useful.	• Particle Theory (KS3) • Atomic Structure (KS4) • Isotopes (KS4)	• History of Atomic Models • Radioactive Decay • Decay Equations • Properties of Radioactive Decay • Half-Life

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P2.1 – Forces	In this unit, students will learn how Newtonian Mechanics can be applied to the world around us.	• Forces (KS3)	• Scalers and Vectors • Forces and Motion • Newton's Laws of Motion • Motion Graphs • Thinking and Breaking Distances • Elasticity
P2.2 – Waves	A study of the mathematical analysis of wave structure and the uses of different wavelengths of the Electromagnetic Spectrum.	• Waves and Sound (KS3)	• Longitudinal and Transverse Waves • Properties of Waves • Wave Calculations • Determining Wavelength • The EM Spectrum and its uses
P2.3 – Magnetism	Students will learn about magnetic fields, how they interact and their uses in the real world.	• Magnetism (KS3)	• Magnetic Fields • Inducted Magnetism • Electromagnetism • Motor Effect