Science Department Curriculum Overview

Curriculum Overview

Our spiral curriculum ensures the trajectory of scientific learning is seamless from the beginning of KS3 into KS4 and onwards to KS5. We have designed an ambitious and holistic curriculum where we strive to equip all students with the understanding of essential scientific concepts. We aim to engage students in all three science disciplines by making links to material world applications, exploring topical updates in scientific research and discovery, engaging in educating our young people on Women in STEM who have pioneered advancements in scientific fields as well as highlighting science career links.

The aims and objectives of the science curriculum are to enable students to develop:

- essential knowledge and understanding of different aspects of science and how they relate to each other;
- demonstrate a deep appreciation of the skills, knowledge and understanding of scientific methods;
- competence and confidence in a variety of practical, mathematical and problem-solving skills;
- interest in, and enthusiasm for, the three sciences, including developing an interest in further study and careers associated with the subject;
- understanding of how decisions are made relating to scientific issues and how the three sciences contribute to the success of the economy and society.

Year 7 is typically taught as one learning pathway by one teacher (6 hours in total across the two week timetable).
Year 8 is typically taught as two learning pathways by two teachers (8 hours in total across the two week timetable)
Year 9, 10 and 11 is taught by three teachers, where each teacher teaches their science specialism (12 hours in total across the two week timetable).

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	**Introduction to Science and Practical Work** Students will be introduced to the **science laboratory** and **practical investigation skills.** They will become familiar with **hazard symbols** and ways	**Atoms and Bigger Things** Students will learn about **particle theory** and use it to describe and explain **changes of state**. They will also use this knowledge to explain **freezing and boiling points.**	**Working Scientifically and Graph Work** Building on their foundational KS2 graph skills and the new graph techniques introduced in Year 7 maths, students will enhance their	**Exploring the Human Body and Digestion Part 2** Students will learn about **puberty, menstruation and fertilisation in humans**. They will be able to explain the development of the baby. They will	**Periodic Table and Chemical Reactions** ***(Part 1 – Part 2 follows in Year 8)*** Students will define an **element, compound and molecule.** They will represent atoms,	**Plant Reproduction and Ecology** ***(Part 1 – Part 2 follows in Year 8)*** Students will learn the steps that take place when a plant **reproduces** successfully. They

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	to work safely in a science laboratory, learn how to light and safely **use a Bunsen burner,** learn to identify and use **laboratory equipment** and plan and carry out investigations within a biology, a chemistry and a physics context. Students will also explore and understand key scientific language such as: **aim, hypothesis, accuracy, precision, reliability, reproducibility, conclusion and evaluation.** **Cells and Organisation** Students will learn the **organelles** and their functions in plants and animal cells. They will also learn about **specialised cells** and be able to link structure and function. Students	Students will explain how substances dissolve using the **particle model.** They will learn about **solutes, solvents and solutions.** Students will be able to choose the most suitable technique to **separate** out a mixture of substances. **Physical Changes and Matter** Students will build on their learning in maths to study **density**. They will then begin to decipher the differences between **physical and chemical changes**. Finally, they will be introduced to the concept of **diffusion**, which is developed further in Year 9 before learning about **Brownian motion**.	**working scientifically** abilities through **graph work and data analysis**. This includes **calculating means, identifying and handling anomalies, drawing bar graphs, plotting line graphs and drawing lines of best fits.** **Exploring the Human Body and Digestion Part 1** Students will learn about a **balanced diet,** the different **food nutrients** and their functions. They will learn about the main organs in the digestive system, their functions and the role of proteins, **enzymes**, in digestion. They will then develop their understanding the consequences of **malnutrition** leading imbalances in the diet, including obesity,	also be able to describe different forms of **contraception**. Together with this, they will also take part in **science week** activities to coincide with this year's theme of **Change and Adapt**. Students will learn that there is **variation** between individuals of the same species. Some variation is inherited, some is caused by the environment, and some is a combination. Students will explain how **characteristics of a population** are adapted to environmental conditions.	molecules, elements, mixtures and compounds using **particle diagrams.** Students will learn about the Periodic Table and how it is arranged before exploring the **properties of metals and non-metals** and be able to identify where they are found in the periodic table. They will look at what happens when a metal reacts with oxygen and acid. Building on their chemistry learning, students will then learn that the **pH** of a solution depends on the strength of the acid. They will identify the best **indicator** to distinguish between solutions of different pHs, using data provided, and be able to give examples of **neutralisation** reactions and start	will Identify parts of the flower and link structure to function. They will explain why **seed dispersa**l is important to survival of the parent plant and its offspring. Students will then learn about organisms in a **food chain** and **food web** and how they depend on each other for **nutrients. They will investigate biodiversity in the Bentley Wood grounds.** They will then study **predator-prey relationships** and explain the effects of environmental changes and toxic materials on a species' population. End of Year Exams.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	will also explore how the **skeletal system** and **muscular system** work together to create movement.		starvation and deficiency diseases.		to construct **chemical equations** to explain chemical reactions.	
Year 8	**T1:Breathing and Respiration** Students will study the structure of the **lungs** and **breathing.** They will investigate the impact of exercise on breathing and discuss the **dangers of smoking and the risks of asthma**. Students will learn to describe **respiration** as a chemical reaction, describe the difference between **aerobic and anaerobic** respiration using word equations. **T2: Electricity and Magnetism** Students will be able to draw simple **circuit diagrams**	**T1: Energy, Heating and Cooling** Students will learn to identify **energy stores** and **pathways**. They will describe the **efficiency** of a system by using a **Sankey diagram.** Students will learn about different fuels and energy resources and be able to calculate **work done and power.** **T2: Chemical Reactions Part 2** Students will discover that some reactions are **exothermic,** and some are **endothermic.** They will begin to write	**T1: Earth's Structure Part 1** Students will learn about the structure of the Earth, the **three types of rocks** and how they are connected by the **rock cycle.** They will identify the causes of weathering and erosion and describe how they occur. Students will learn about our **solar system and the planets.** They will explain why places on the Earth experience different daylight hours and amounts of sunlight during the year. **T2: Forces and Pressure Part 1**	**T1: Earth's Structure Part 2** Students will build on **working scientifically skills** (graph work focus) and use the **speed equation** to analyse motion graphs. **T1: Plant Reproduction and Ecology Part 2** Students will learn how green plants and algae make their food by **photosynthesis.** They will use the word equation to describe photosynthesis and show how the rate of photosynthesis is affected by changing conditions. They will explore how **leaves and roots** are vital to this	**T1: Plant Reproduction and Ecology Part 2** Students will learn that there is **variation** between individuals of the same species. Some variation is **inherited**, some is caused by the environment, and some is a combination. They will then apply their learning to analysing and graphically depicting **discrete and continuous data**. Students will then learn about **selective breeding** and how this affects the characteristics of a species. They will then explain how characteristics of a species can result from **competition** and	**T1: Genetics** Students will look at what **heredity** is, explore the structure of **DNA** and have an opportunity to extract DNA from fruit. They will study the theories behind **evolution, natural selection** and **biodiversity.** **T2: Waves** In the final part of their learning on light, students will understand how **primary and secondary colours** are perceived. Students will then learn how the ear works and that sound consists of

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	using circuit symbols. They will explain what current and resistance is and describe how current changes in **series and parallel** circuits. They will learn to model **voltage** as an electrical push from the battery, or the amount of **energy per unit of charge** transferred through the electrical pathway. Students will learn about **static electricity**. They will learn to use **Ohm's law** to calculate the resistance in a circuit. Students will learn about **magnets, electromagnets and** what causes a **magnetic field.** They will investigate ways of varying the strength of an electromagnet.	chemical equations in the context of **combustion** and **thermal decomposition.** Students will learn about the **reactivity series,** define what a **catalyst** is and describe why catalysts are useful in everyday life.	Students will define **contact and non-contact forces** and categorise forces based on this. They will then build on their knowledge of forces by **drawing force diagrams** and describing/ quantifying **resultant forces**. Students will explain the differences between **mass** and **weight** and explore how mass and weight differ on various celestial bodies. They will explore the phenomena of **terminal velocity** and should be able to describe this contextually in everyday examples e.g. swimming in a pool, parachuting from a plane. They will then investigate the effect of **surface area and weight** on reaching terminal velocity.	chemical reaction and how they are **adapted** to best support this. **T2: Forces and Pressure Part 2** Students will investigate **Hooke's law theory** before learning about **pressure** and calculate this based on **weight and area**. Together with this, they will also take part in **science week** activities to coincide with this year's theme of **Change and Adapt**.	those that are best **adapted** to environmental conditions. Finally, students will learn about the **carbon cycle** and the organisms (and processes) that contribute to this. **T2: Waves** Students will learn about the different types of **waves**: **Transverse and longitudinal.** They will expand their knowledge from sound and light to learn about **absorption** and **transmission** of light as well as **reflection and refraction**. They will then learn about the dangers of waves such as **UV damage** but also the benefits and uses of waves such **ultrasound in the medical fields.**	**vibrations** which travel as a **wave** through substances. End of Year Exams.

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Year 9	**Chemistry** Students will build on their knowledge separation techniques and **begin to analyse separation techniques** at a KS4 level. *Required Practical -Chromatography, an introduction*. Students will also build on their knowledge of **atomic structure** and apply this to **electronic configuration**, **ions and isotopes**. *NB: **Development of atomic theory** from Dalton to Chadwick will be covered in physics learning but can be examined in either chemistry or physics.*	**Chemistry** Students will learn about the **Periodic Table and its development** from the pioneering work made by **Newlands and Mendeleev**. They will compliment this with how the modern day periodic is arranged (**metals / non-metals**) and **link this to electronic configuration**. Students will be able to **explain trends in reactivity of Group 1 and 7** and **explain the melting point/boiling point trends of Group 7 and 0**.	**Chemistry** Students will learn about **Bonding** (**Ionic, Covalent**). Students will demonstrate their understanding through **diagrams and extended writing**. Students will continue their learning by studying **Giant Covalent Structures. They should be able to describe the properties of ionic complexes, small molecules and giant covalent structures.**	**Chemistry** Students will continue Bonding module by learning about **Metallic Bonding**. Their learning will culminate in explicitly **comparing and contrasting the different bonding types** learnt in the module. Students will then learn about **nanoparticles and** explore **their applications** in everyday life. They will also consider potential risks. .	**Chemistry** Students will then start the next module on the **Earth's Atmosphere** and will **evaluate the composition and the evolution of the Earth's Atmosphere**. Students will learn the principles of the **Greenhouse Effect** and how this links to **Climate Change**. Students will also learn about **pollutants** in the Earth's atmosphere: **how they arise**, **their effects** and how they can be **minimised**. They will then study the **Carbon Footprint** and **evaluate how human activities** contribute to the Greenhouse Effect → Global Warming → Climate Change.	**Chemistry** Students will learn the principles of the **Greenhouse Effect** and how this links to **Climate Change**. Students will begin learning **Using Resources Part 1.** This includes learning about **Finite resources** and how to make **potable water**. End of Year Exams.

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Year 9	**Physics** Students will learn about **energy resources**, supply and demand, and the environmental impacts of supplying energy to homes and industry.	**Physics** Students will learn how **energy stored** in a system can change for example when the object is projected upwards or it hits an obstacle. Students will learn to calculate the amount of energy associated with a moving object, a stretched spring and an object raised above ground level. Students will also learn how energy can be transferred from one form to another and efficiency of a system**.** *Required practical: Hooke's Law* Students will then learn about **power**.	**Physics** Students will learn about **Temperature changes in a system**. Students will learn and be able to apply the equation for **specific heat capacity.**	**Physics** *Required practical: Specific Heat Capacity* *Required practical: Thermal Insulation* Students learning will extend to different **insulating materials and infrared radiation**.	**Physics** Students will learn about the **particle models** and use it to explain the behaviour of **solids, liquids and gases** which are used in many everyday applications. Students will learn to apply and calculate the **density** of material. *Required Practical: Density* Students will then learn about **gas pressure, temperature and its link to volume.**	**Physics** Students will learn about the subatomic particles in the **structure of an atom**, **mass number and atomic number**. Students will extend this knowledge to learn about why **isotopes** exist. Students will also learn about the different types **radioactive decay** and nuclear power plants. End of Year Exams.

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Year 9	**Biology** Students will learn how to classify cells as **Eukaryotes** and **Prokaryotes.** They will be able to explain the structure and functions of organelles found in **animal** and **plant cells.** Students will also learn that cells can **specialise** to perform a particular function and explain how **adaptations** of these cells enables them to perform their function. Students will then learn how **microscopy** can enable scientists to understand cells but will also consider the limitations of different microscopes (SEM vs light microscopes). *Required Practical: Microscopy*	**Biology** *Required Practical: Osmosis* Students will learn about how minerals and biological molecules are transported via **Active transport.** Students will learn to develop an understanding of size and scale in relation to **cells, tissues, organs and systems.** Students will build an understanding of the **human digestive system** and the key **nutrients** and their function in the body. *Required Practical: Food Tests* Students should be able to relate knowledge of **enzymes** to **metabolism** and be able to describe the	**Biology** *Required Practical: Enzymes* Students will then develop their **working scientifically** skillset; they will do this by calculating **enzyme rate of reaction from tangent graph work**. Students will learn about the structure of the **heart** and the different types of **blood vessels**. Students will apply this knowledge to further understand non-communicable diseases such as **Coronary Heart Diseases.** This will include the **causes, symptoms, treatment and risks** linked to these diseases. Students will develop their learning further by exploring **plant organs and tissues**.	**Biology** Students will start the half term by exploring **different gaseous exchange systems in animals**. Students will build on their learning of plant transport systems looking specifically at the **xylem and phloem**. They will study their structures and explore their roles linked to **transpiration and translocation** respectively.	**Biology** Students will further build on their Year 8 learning on **photosynthesi**s, by considering the **limiting factors** that can effect this chemical reaction. *Required Practical Investigating the Rate of Photosynthesis* Students will then learn about the **different uses of glucose in a plant**. Again, building on Year 8, students will compare and contrast **aerobic and anaerobic respiration** (also in yeast)**.**	**Biology** Students will investigate the **impact of exercise** in **respiration.** The last half term, culminates in students bridging together cumulative knowledge on metabolism in the body. End of Year Exams.

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	Students will then be introduced to the use of **stem cells** in scientific research and medical fields and will consider the **ethics** surrounding their use. Students will learn about how substances like water and minerals are transported in plants cell through different processes by studying the following concepts **Diffusion and Osmosis.**	**mechanism of enzyme activity**.	Students will then learn about the **lungs** and will be able to explain how the **lungs are adapted for efficient gaseous exchange.**			
Year 10	**Chemistry** Students will continue their learning on **Using Resources Part 2**. Here, they will review and build on their knowledge from Year 9. They will study **treating waste water** and complete the required practical: *Required Practical: Analysis and purification of water*	**Chemistry** Students will learn about **Energy Changes** and will be able to describe both **exothermic and endothermic** reactions and show their differences in **energy profile diagrams**. *Required Practical: Investigate the variables that affect temperature changes in reacting*	**Chemistry** Student learning will then lead onto **Electrolysis** where students should be able to explain **why this method of extraction is used** and **evaluate its disadvantages**. Students will then learn about the extraction of both **molten and aqueous electrolytes**.	**Chemistry** *Required Practical: Preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution.* Students will apply their knowledge of the pH scale to	**Chemistry** Students will learn about **collision theory** and the **factors affecting rate of reaction**. **Students will build on their working scientifically skills by calculating rate of reaction from experimental data, graph work and tangents.**	**Chemistry** They will also learn about how **catalysts** affect the rate of reaction. Students will then study **reversible reactions and dynamic equilibrium.** All students will prepare for their end of year exams.

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	samples from different sources, including pH, dissolved solids and distillation. They will then learn about the **LCA** , contextualising this to industry today, and build on the knowledge of **Reduce, Reuse and Recycle** they already have from the material world. Students will then study **polymers,** their significance and their limitations, in everyday life. <u>Triple Only:</u> will study **ceramics, polymers and composites** and their links to the material world. *Triple students: Flipped learning of remaining Using Materials topics.*	*solutions such as, eg acid plus metals, acid plus carbonates, neutralisations, displacement of metals.* Students will evaluate energy changes in reactions using **bond energy calculations**. Students will then learn about **Extraction of Metals** via different methods including **Phytomining and Bioleaching**.	Students will also learn about how **aluminium is extracted** from aluminium oxide. *Required Practical - Investigate what happens when aqueous solutions are electrolysed using inert electrodes.* Students will next develop their **acids and bases** knowledge from KS3, by learning about the **pH scale**, **reactions of acids with: metals, bases/alkalis, metal carbonates.** <u>Triple Only</u>: will also learn about **chemical cells and fuel cells evaluate** their use. They will also **investigate how factors such as differences in metal reactivity**, can effect the functioning of a chemical cell.	describe and explain the **principles of strong and weak acids**.	*Required Practicals x2: Investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced <u>and</u> a method involving a change in turbidity.* They will also learn about how **catalysts** affect the rate of reaction. End of Year Revision.	Work Experience will take place for Year 10 students in this half term.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10	**Physics** Students will learn about **Standard circuit diagram symbols** representing different electrical components. Students will also learn about **electric charge** and how the **current** of a component depends on the **resistance and potential difference.** *Required practicals x2: Resistance and IV characteristics.*	**Physics** Students will learn about how electricity gets to our homes by learning about the **National Grid.** Students will also learn about **Energy transfers in everyday appliances** and how **Static Electricity** can be formed.	**Physics** Students will learn about **scalar and vector quantities,** examples and how they can be represented. Students will expand on their knowledge of forces by learning about **contact and non- contact forces, gravity and resultant forces**. *Required practical: Centre of mass.*	**Physics** Students will expand their knowledge about Forces by studying motion. This will include plotting and **analysing motion graphs** (working scientifically skills). *Required practical: F=ma* <u>Triple Only:</u> students will study **fluid pressure and upthrust.**	**Physics** Students will continue their learning on forces by studying **weight and velocity, forces and braking and momentum**. <u>Triple Only:</u> students will study **momentum in further detail and impact forces.**	**Physics** All students will consolidate their learning and prepare for their end of year exams. Work Experience will take place for Year 10 students in this half term.
Year 10	**Biology** Students will begin their studies in **homeostasis** and understand the role **negative feedback** plays in many regulatory pathways.	**Biology** Students will learn about how fertility can be controlled through **contraceptive methods**.	**Biology** **Combined students** will explore the biological processes involved in **vaccinations** and the significance of vaccinations in **herd immunity**. They will also study the history and role of	**Biology** **Combined students** will start their next topic, **Ecology and Communities.** They will learn about the environment including how **organisms adapt** and **compete** with	**Biology** **Combined students** will then explore the consequences of **deforestation** and land use and the importance of **maintaining biodiversity**.	**Biology** **Triple students** will then complete: *Required Practical – Distribution* All students will consolidate their learning and

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	Students learning will then lead to understanding the role of the **nervous system, synapses and the reflex arc**. *Required Practical: Reaction Time* Students will then study the **human endocrine system** with a specific focus on how **blood glucose levels** are regulated by **insulin and glucagon**. This will then lead to understanding **diabetes** and the treatments tailored to Type 1 and Type 2. Students will then study the **menstrual cycle**, building on their KS3 learning. They will further learn on how **hormones** regulate the stages of this cycle. <u>Triple Only:</u> Students will also study the **eyes and**	<u>Triple Only:</u> Students will then study **dialysis and transplants**. They will extend their learning on hormones by exploring **plant hormones**. *Required Practical: Plant Hormones* **Combined students** will start the new module in their learning on **immunity and infection**. Students will learn about the different types of pathogens causing **communicable diseases**: **viral, bacterial, fungal and protist diseases** how they are spread and can be reduced. Students will learn about the **human defence system** before studying the	**antibiotics** in treating infections. Students will then learn about **non-communicable diseases (focus: cancer)** and how **drugs are developed.** **Triple students** will then start the new module in their learning on **immunity and infection**. Similar to the combined pathway, students will learn: **the different types of pathogens causing communicable diseases; the human defence system + mechanisms of actions; vaccination; antibiotics**. <u>Triple Only:</u> *Required Practical: Growing Bacteria*	each other and their role in **food webs**. Students will learn more about their environment by studying topical issues such as **material cycling**, **pollution and waste management**. Similar to combined, **triple students** will learn about **discovering and developing new drugs**. <u>Triple Only:</u> They will then learn about **plant diseases** and how these can be treated. **Triple students** will start their next topic, **Ecology and Communities.** They will learn about the environment including how **organisms adapt** and **compete** with each other.	Learning will then focus on **sampling techniques** to understand biodiversity in a given area. *Required Practical: Sampling* Students will learn about the environment including how **organisms adapt** and **compete** with each other and their role in **food webs**. Students will learn more about their environment by studying topical issues such as **global warming, deforestation** and **maintaining biodiversity** *Required Practical – Distribution* **Triple students** will learn about Trophic Levels (<u>Triple Only</u>), food webs and interdependence. Students will learn	prepare for their end of year exams. Work Experience will take place for Year 10 students in this half term.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	their associated disorders. Their learning will also focus on the **kidney, dialysis and transplants**. They will extend their learning on hormones by exploring **plant hormones**. *Required Practical: Plant Hormones*	**mechanisms of action of the immune system**.	Students will learn about how **monoclonal antibodies** are made and used. Again, similar to combined, they will then learn about **non-communicable diseases e.g. cancer**.		more about their environment by studying topical issues such as **material cycling**. <u>Triple Only:</u> *Required Practical – Decomposition* Students will then explore the consequences of **deforestation** and land use and the importance of **maintaining biodiversity**. Learning will then focus on **sampling techniques** to understand biodiversity in a given area. <u>Triple Only</u>: students will explore **food production** and its wider ramifications.	
	Chemistry Students continue their rates and equilibria module by studying **Le Chatelier's Principle**. They will	**Chemistry** <u>Mock 1 continues.</u> **Combined students** will then learn the **mole equation** and apply this to **calculating reacting**	**Chemistry** <u>Mock 1 continues.</u> **Combined students** will start the new term by learning **how to identify limiting reagents**	**Chemistry** <u>Mock 2 continues.</u> **Combined students** will review and build on their knowledge of **mixtures and pure**	**Chemistry** Based on data analysis from mock 1 and 2 exams, students will follow a tailored revision	**Chemistry** <u>Public Exams.</u>

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 11	be able to explain how altering reaction conditions affects the position of the equilibrium. Triple Only: will then apply their learning to the **Haber Process, its economics and NKP fertilisers**. Students will learn about **Quantitative Chemistry** by first describing the **Law of Conservation of Mass**. Students will then calculate **relative formula masses and percentage by mass of elements in compounds**. **Triple students** will then learn the **mole equation** and apply this to **calculating reacting masses from balanced symbol equations** as well as calculating **concentrations**.	**masses from balanced symbol equations** as well as calculating **concentrations**. **Triple students** will apply their learning to calculating **percentage yields and atom economies**. They will then learn how to calculate concentrations from **titration calculations** (Triple Only). Triple Only*:* *Required Practical: Determination of the reacting volumes of solutions of a strong acid and a strong alkali by titration.*	**through reacting masses calculations.** **All students** will then start by building their knowledge of fossils fuels to apply this to **formation, use and extraction of crude oil** and **cracking**. Triple Only: will then extend their learning to **alkenes, alcohols and carboxylic acids.** Mock 2 starts.	**substances** by applying this to **formulations**. Students will then build on their learning from Year 9 on **chromatography**, by **evaluating solubilities** of compounds separated using Rf value calculations. *Required Practical: Investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate Rf values.* Students will learn about **testing for gases**. Triple Only**:** will extend their **addition polymer learning from Year 9 to condensation polymers.** *NB: amino acids and*	curriculum focusing on key "EBI" areas. Public Exams.	

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Triple Only: students will calculate **concentration and volume of gases**. Mock 1 starts.			*DNA will be covered in biology learning but can be examined in either chemistry or biology.* **Triple students** will have *flipped learning on the first part of **chemical analysis*** before learning about **Instrumental Analysis** and how this used in everyday life. They will then learn how to test for and **identify positive and negative ions.** *Required Practical: Use of chemical tests to identify the ions in unknown single ionic compounds.*		
Year 11	**Physics** **Combined students** will start by learning about **Magnetism and Electromagnetism: Permanent and induced magnetism, magnetic forces**	**Physics** Mock 1 continues. **Combined students** start by investigating: *Key Practical: Reflection and Refraction of Light*	**Physics** **Combined students** will then learn **properties of electromagnetic waves, uses and applications of electromagnetic waves: UV, X-rays and Gamma Rays.**	**Physics** Mock 2 continues. Based on data analysis from mock 1 and 2 exams, students will follow a tailored revision curriculum focusing on key "EBI" areas.	**Physics** Revision. Based on data analysis from mock 1 and 2 exams, students will follow a tailored revision curriculum focusing on key "EBI" areas.	**Physics** Public Exams.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	and fields, the motor effect. **They** will next learn about the different types of **waves**: **transverse and longitudinal waves and properties of waves**. *Required Practical: Investigating waves in solids and liquids and light* Students will learn about **light. reflection, refraction, and diffusion of light**. <u>Triple Only:</u> Students will learn about **Space Physics** before starting **Magnetism and Electromagnetism: Permanent and induced magnetism, magnetic forces and fields, the motor effect.** <u>Triple Only:</u> **Electromagnetic Induction**	They will then expand on their knowledge of waves to learn about the **types of electromagnetic wave, properties of electromagnetic waves, uses and applications of electromagnetic waves: visible light, IR, microwaves and radiowaves.** *Required practical: IR radiation Leslie Cube* **Triple students** will start this half term by learning about **transformers** and link this back to their year 9 learning. Similar to combined pathway, students will then learn about **light. reflection, refraction, and diffusion of light**. *Required Practical: Investigating*	Students will also learn about **Magnetism and Electromagnetism: Permanent and induced magnetism, magnetic forces and fields, The motor effect.** <u>Mock 2 starts.</u>		<u>Public Exams.</u>	

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	Mock 1 starts.	*waves in solids and liquids and light* *Core practical: Investigating waves in solids and liquids and light* *Required Practical Triple Only: Reflection and Refraction of Light* Triple Only: Students will then study light and colour before learning about lenses and exploring their uses in the material world. Students will then expand on their knowledge of waves to learn about the **types of electromagnetic wave, properties of electromagnetic** **waves, uses and applications of**				

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		electromagnetic waves. *Required practical: IR radiation Leslie Cube* <u>Triple Only:</u> Students will study black body radiation.				
Year 11	**Biology** Students will build on their KS3 genetics learning and will focus on **sexual and asexual reproduction, meiosis and mitosis.** They will then explore **DNA and the Human Genome Project.** **Combined students** will then explore **inheritance in action (combination of inherited alleles)** and apply their learning to **inherited disorders** such as **sickle cell anaemia, cystic fibrosis, Huntington's disease.** Students will look at the role	**Biology** <u>Mock 1 continues.</u> **Combined students** will learn about **Selective breeding** in agriculture as well as domestic pets. They will then study **genetic engineering** and the potential this offers scientific research. **Triple students** will look at the role of **genetic screening.** They will then study the cause and importance of **variation** in a given population before studying **selective breeding and genetic engineering.**	**Biology** All students will learn at how important it is to understand **fossils** in understanding **evolution and extinction** and also how to **classify organisms.** <u>Triple only:</u> students will study the process of **cloning and the ethics** surrounding this. They will then explore the context surrounding accepting **Darwin's ideas**. <u>Mock 2 starts.</u>	**Biology** <u>Mock 2 continues.</u> Based on data analysis from mock 1 and 2 exams, students will follow a tailored revision curriculum focusing on key "EBI" areas.	**Biology** Based on data analysis from mock 1 and 2 exams, students will follow a tailored revision curriculum focusing on key "EBI" areas. <u>Public Exams.</u>	**Biology** <u>Public Exams.</u>

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	of **genetic screening.** They will then study the cause and importance of **variation** in a given population. **Triple students** will follow a similar learning journey but will also study **protein synthesis and the history of genetics surrounding Mendel** (both Triple Only). Mock 1 starts.					