

Science Key Stage 4 Curriculum



Curriculum Intent

At Trinity Academy St Edwards (TASE) the science curriculum is designed to recognise previous learning in KS2 science topics and develop this into lifelong skills that can be used to interpret and understand the world. Learners will develop skills to feed their **curiosity** for understanding their surroundings, becoming inquisitive and conscientious citizens. Learners will gain the skills, knowledge, and confidence to interact with current global challenges and make a positive contribution to society.

TASE achieves this by delivering a science curriculum that provides a complete and accessible scheme of learning. Topics will be delivered explicitly to ensure that learners gain robust substantive knowledge. Mastery of recall for subject knowledge is an integral part of the day-to-day learning of a TASE science learner. Experiments are embedded into each topic to advance practical skills and enhance disciplinary knowledge, both in a laboratory and in the field.

At the end of year 11 a science learner at TASE will leave with **ambition** to make appositive change in the world. They will have acquired knowledge and become **skilled** in biology, chemistry, and physics. They will be well prepared to use their knowledge and learning to make a sustained, positive contribution to society, with a focus on the impact of human activity on the world, how to protect the world we live in and moral and ethical implications of potential technological advances. Our science learners will be **adaptable** to a constant changing world environment.

Overview

Year 10

Biology – students will study the nervous and endocrine system and consider how organisms maintain internal environments. They will then go on to study ecosystems.

Chemistry – Students will look at energetics in chemical reactions and be introduced to electrolysis and its practical uses. They will gain practical skills in monitoring and controlling chemical reactions.

Physics – Students will be revisiting forces and considering how forces are observed and used in the real world. They will be introduced to Newton's Laws and study forces and elasticity. Students will look at electrical circuits once more and be introduced to static and charge before studying the electromagnetic spectrum.

Year 11

Biology – Students will study genes and inheritance before looking at current global challenges in biology.

Chemistry – Students will complete the chemistry course by using knowledge to look at current global challenges facing chemists.

Physics – Students will study radioactivity and the uses and hazards of radiation before looking at the conservation of energy and power. The physics course will conclude by looking at current global challenges.

Content

Year 10

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Forces	Organism Level Systems	Chemical Reactions	Electricity and magnetism	Community Level Systems	Predict and identify Chemical Reactions
In this unit students transition from studying matter to exploring forces. They examine how interactions between objects produce observable actions, whether through contact or without. The unit emphasizes the significance of vector quantities in predicting actions accurately. Building on their Key Stage 3 science foundation, learners understand the mathematical relationships between speed, distance, and time, graphically represented in distance-time graphs.	The human body's nervous system helps it communicate inside and sense what's happening around it. Students learn from a young age about how living things are organized, from tiny cells to whole organisms. They'll also study hormones, which travel in our blood and affect how our bodies work, like controlling how we reproduce. Homeostasis is another key idea—they'll understand how our bodies keep things balanced, like temperature and sugar levels.	Unit C3: Chemical Reactions builds upon prior knowledge from phase 1 learning (year 7 term 3) and previous phase 2 (C1 and C2) units. The focus now is on chemical symbols, formulae, and reactions. Students explore conservation of mass, changes of state, and atomic-level arrangements during reactions, developing skills in prediction, method writing, and mathematical concepts like the mole and enthalpy changes	In this module on Electricity & Magnetism, students delve into the dynamics between matter and electrostatic fields. Building upon their prior knowledge of magnetic fields from KS3, they explore the interplay between electrical and magnetic fields. Central to this exploration is the concept of charge, which comes in two forms: positive and negative. By understanding the flow of charge, students expand on their grasp of series and parallel	In this unit, students will explore how living organisms form groups of the same species, groups with many different species, and fit into ecosystems. They'll build on their understanding of food webs and how different organisms depend on each other in an ecosystem, learned since KS3. They'll also grasp how variations among living things help them survive in the same ecosystem. Students will learn how feeding relationships indicate ecosystem stability and biomass flow. They'll	This unit builds on what students already know from KS3 and units C1 and C2. They're already familiar with the Mendeleev Periodic Table, which shows the patterns in different elements, like metals and non-metals, and their properties. They also understand how these properties relate to each other and how they can predict how elements will react. During this unit, students will dive deeper into the Periodic Table. They'll learn how it was first created by looking at the similarities and

<p>They are introduced to Newton's laws of motion, understanding the relationship between force, mass, and changes in motion. Additionally, students learn about balanced and unbalanced forces, enhancing their scientific inquiry skills through investigations into motion and Hooke's law.</p>	<p>Students will also do experiments, like testing reaction times. This helps them learn how to predict, plan, and improve their experiments, while practicing math skills like rounding and graphing.</p>		<p>circuits introduced in KS3. Through familiarizing themselves with circuit components and their properties, they gain the ability to construct and analyse diverse electrical circuits. Key topics covered include electrical current, potential difference, and resistance, with an emphasis on understanding their interconnectedness within conventional circuits. Students further investigate the relationship between the movement of charge and magnetism, starting with an exploration of magnets and the magnetic fields they generate around magnets and current-carrying wires. Concepts such as attractive and repulsive forces, as well as the field shapes around bar magnets, which were introduced</p>	<p>understand the crucial role of plants in generating energy through photosynthesis, enabling other organisms to carry out vital life processes. The unit will cover how energy moves through food chains, with some loss through respiration, waste disposal, and excretion. Students will also learn about the role of microorganisms in chemical cycling in ecosystems. Throughout, students will practice interpreting data from tables and graphs to draw conclusions about the impact of both non-living and living factors on organisms.</p>	<p>differences between elements. They'll explore how the arrangement of elements in groups and periods helps us understand their behaviours better. By linking these behaviours to the structure of atoms, students will be able to explain why certain patterns and trends occur. Students will also develop their scientific skills by conducting experiments to see how reactive different elements are. They'll make predictions, identify what they're changing, and draw conclusions based on their observations. Plus, they'll work on analysing data from graphs and tables to describe and explain trends.</p>
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Year 11

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
<p>Monitoring and Controlling Chemical Reactions</p> <p>Students investigate how changing conditions affect the rate and yield of reactions, using the particle model to explain their findings. They also explore reversible reactions and equilibrium, applying practical experiments and calculations to deepen their understanding.</p>	<p>Biology – Global Challenges</p> <p>Students apply their knowledge of biological systems to real-world issues such as biodiversity loss, food security, and disease control. They explore how human activity impacts ecosystems, population health, and sustainability, while learning about disease transmission, immunity, and defences. Through practical investigations, including sampling techniques and testing antibiotics, students develop key scientific and mathematical skills.</p>	<p>Chemistry – Global Challenges</p> <p>Students explore how chemistry can be applied to real-world issues such as sustainability, resources, and improving quality of life. Building on prior knowledge of topics like the carbon cycle, reactivity, and electrolysis, they revisit familiar experiments with new perspectives. Through data analysis and practical work such as purifying copper, students develop skills in interpreting evidence, identifying trends, and evaluating hypotheses.</p>	<p>Physics – Global Challenges</p> <p>Students apply their understanding of forces, motion, and energy to global issues such as sustainability, safety, and electricity supply. They explore how physics underpins technologies from car design to household power systems, evaluating the advantages and disadvantages of different energy resources. This topic consolidates key ideas while showing how physics contributes to improving lives and shaping a sustainable future.</p>	<p>In the final stage of the course, students will revisit and consolidate all topics from the GCSE Science curriculum. Through targeted revision, practice questions, and exam-style tasks, they will strengthen their knowledge and skills in preparation for their final examinations.</p>	
<p>Physics – Energy Transfers and Efficiency</p> <p>Students study energy in terms of stores and transfers, building on earlier knowledge of energy types. They</p>					

apply this to real-world systems, evaluating efficiency and methods to reduce energy waste in the home.					
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Who to contact about Phase One Science:

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