

Science Phase One 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.

Year 7

Overview:

The KS3 curriculum at TASE builds upon science learning in KS2. The spiral structure of the curriculum ensures that learners build upon existing knowledge in a meaningful way, without overloading memory at any one time, thus developing a deeper understanding of scientific concepts. The curriculum is broad and balanced, designed to encompass the entire of the national curriculum. Lessons provide learners with mathematical, scientific and practical skills needed to be able to carry out scientific investigations. This provides learners with the tools needed to become a curious, ambitious and resilient science learner and builds a strong foundation for KS4 learning.

Content:

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Biology – Organs, cells and Microscopes. Chemistry - States of Matter Physics - Forces	Biology - Nutrition and Diet Chemistry - The Periodic Table Physics - Forces and their Effects	Biology - Gas Exchange Chemistry - Chemical Reactions Physics - Gravity	Biology - The skeleton and Muscles. Chemistry - Acids and Alkalis Physics - Earth's Magnetic Field and Seasons	Biology - Plant Reproduction Chemistry - The Rock Cycle Physics - Observed Waves	Biology - Transport Systems Chemistry - Chemical Reactions 2 Physics – Sound
Biology – Organs, cells and Microscopes. This topic builds on previous knowledge of organs and organ system and introduces the concept of cells. Learners use microscopes and prepare an onion cell specimen for observation. Chemistry - States of Matter This topic builds on prior learning about solids, liquids and gases and introduces the particle model. Learners carry out a practical investigation to determine the	Biology - Nutrition and Diet This topic recaps the 5 food groups and introduces learners to the 7 nutrients and their role in a healthy diet. Practical investigations are carried out to determine the energy content of different foods. Chemistry - The Periodic Table This topic introduces learners to the history of the periodic table and how the modern periodic table was constructed. Learners become familiar with	Biology - Gas Exchange This unit builds on previous learning about the respiratory system, introducing learners to the mechanism of breathing and diffusion in plants and animals. Chemistry - Chemical Reactions This topic looks at the signs of a chemical reaction. Learners will carry out simple reactions to make observations and are introduced to combustion and oxidation as chemical reactions.	Biology - The skeleton and Muscles. This unit looks at the function of the skeleton and muscles and introduces learners to antagonistic muscle pairing to allow movement. Chemistry - Acids and Alkalis Learners will gain skills to identify substances as either acid or alkali and understand the dangers of working with chemicals. Physics - Earth's Magnetic Field and Seasons	Biology - Plant Reproduction This topic builds on previous learning of the structure of a flower, learners dissect flowers and identify and name the male and female parts of a flower. The unit finishes looking at seed formation and dispersal in a range of plant species. Chemistry - The Rock Cycle Learners will identify different types of rock and study in detail the formation of each type. Learners are introduced to the	Biology - Transport Systems The role of the heart is studied in detail, learners will be able to describe the flow of blood through the body of a mammal. Learners are introduced to xylem and phloem for transport in plants. Chemistry - Chemical Reactions 2 This unit introduces the concept of conservation of mass and learners carry out investigations to show that reacting masses are equal to products in chemical reactions.

<p>freezing point of stearic acid.</p> <p>Physics - Forces This unit builds on prior knowledge that forces can be pushes or pulls. Learners investigate the uses of unbalanced forces in everyday life and use Newton meters to calculate forces exerted on everyday objects.</p>	<p>using the periodic table.</p> <p>Physics – Energy Transfers Learners are introduced to energy stores and transfers. This then will be applied to conservation of energy in the home and learners will be taught how to calculate the cost of energy.</p>	<p>Physics - Gravity This unit builds on previous knowledge about gravity, introducing it as a non-contact force. Learners will learn the difference between mass and weigh and carry out calculations to determine the weight of everyday objects on Earth and compare this to its weight on other planets.</p>	<p>Learners recap previous learning on magnets and are introduced to the earth as a magnet. The topic looks at how the movement of the earth can affect day, night and seasons.</p>	<p>concept that earths resources are finite and the need for recycling.</p> <p>Physics – Sound Waves and the Ear In this unit, learners learn the names of the parts of transvers and longitudinal waves. They will go on to study the ear and how hearing works as well as ultrasound and its uses.</p>	<p>Physics – Investigation Students will plan and carry out their own investigation into how different variables can affect the speed of a pendulum swing. The aim if this unit is to secure the working scientifically method and encourage students to think, write and speak like a scientist.</p>
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Year 8

Overview:

In year 8 our learners will start to build on their prior learning of science in year 7.

Content:

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Biology – Animal Reproduction Chemistry – properties of Elements Physics – Light waves.	Biology – Respiration Chemistry – Acids and Alkalis Physics – Energy transfers	Biology – Plant Structure Chemistry – Separating Mixtures Physics – separating mixtures	Biology – Enzymes Chemistry – The Carbon Cycle Physics - Energy	Biology – Interdependence Chemistry – Material Science Physics – Series and parallel circuits	Biology – DNA Chemistry – Diffusion Physics – Sensory Organs
Biology - Animal Reproduction This unit of learning builds upon knowledge gained in year 7 term 5. Learners will apply their knowledge of reproduction to animals. They look at fertilisation, gestation and birth and compare gestation for a range of different species. Chemistry – Properties of Elements This unit of learning draws together knowledge from year 7	Biology – Respiration After studying the cell extensively in year 7, learners will now look deeper into the life process of aerobic respiration that takes place in the mitochondria and anaerobic respiration that takes place in the cytoplasm. Learners will investigate how anaerobic respiration in microorganisms can be used in bread making and alcohol making.	Biology – Photosynthesis Building upon prior learning of year 7 term 5, learners will be introduced to photosynthesis and adaptations of leaves and roots to allow them to be best suited to their function. Chemistry – Separating Mixtures Learners will build on their knowledge of elements, compounds and mixtures looking at methods for separating	Biology – Enzymes Learners will recap the 7 nutrient groups before looking at how enzymes in animals aid in digestion, in particular the action of amylase. Learners will build upon learning from year 8 term 3 and look at the role of enzymes on the production of carbohydrates in plants. Chemistry – The Carbon Cycle	Biology – Interdependence Learners will build upon prior learning in geography year 7 to look at food chains and food webs. They will consider the use of toxic compounds found in pesticides and its impact on food security as well as bioaccumulation. Chemistry – Material Science Learners will recap their previous learning of the reactivity series	Biology -DNA This topic build on year 7 term 1 learning about variation within species. Learners will be taught about the discovery of DNA and understand how DNA is a cause of genetic variation. Chemistry – Diffusion This topic builds on knowledge gained in year 7 term 3. Learners will be taught the concept of Brownian motion how diffusion

<p>term 2, 3 and 6. Learners will be looking at elements from groups 1, 7 and 0 of the periodic table in detail. Practical opportunities involve making observations of these reactions and comparing secondary data.</p> <p>Physics – Light Waves and the Eye This topic adds to prior learning of year 7 term 5. Learners will be introduced to diffuse and specular reflection. Practical opportunities include using ray boxes and mirrors to draw reflection diagrams. Comparisons will be made between sound waves (year 7 term 6) and light waves as well as learning the parts of the eye and how we see.</p>	<p>Chemistry – Energy in Chemical Reactions This topic builds on previous learning in year 7 term 4. Learners will be introduced to endothermic and exothermic reactions. Practical opportunities will see learners work with reactions metals and acids and neutralisations.</p> <p>Physics - Energy Transfers Learners will build upon prior learning of transverse waves in year 7 term 5 to look at the transfer of heat by conduction, convection and radiation. Practical opportunities will see learners collect data on the best insulating materials and use</p>	<p>mixtures. Practical opportunities include chromatography, crystallisation and evaporation.</p> <p>Physics – Physical and Chemical Changes Learners will recap year 7 term 1 learning of particle theory before being introduced to physical and chemical reactions. Learners will investigate how the law of conservation of mass applied to reactions. Practical opportunities will allow learners to measure the density of regular and irregular objects.</p>	<p>Learners will recall the chemical reactions for respiration, combustion and photosynthesis and consider how these chemical reactions contribute to levels of atmospheric carbon dioxide. This topic finished by looking at the effects of climate change on our atmosphere.</p> <p>Physics - Forces and their Effects Building on the last topic this unit looks at how forces can affect the motion of an object. Practical investigations are carried out to investigate speed.</p> <p>these findings to make recommendations to insulate our homes.</p>	<p>(year 7 term 5) and use this to explain how metals are extracted from their ore using displacement reactions. This topic also covers properties of different materials such as polymers, ceramics and composites and the importance of recycling Earth's materials for sustainability.</p> <p>Physics – Series and Parallel Circuits. This topic will start by recapping prior learning at KS2, before introducing learners to current in series and parallel circuits. Practical opportunities will see learners use ammeters and voltmeters to measure current and potential difference in various circuits.</p>	<p>can differ in hot and cold liquids.</p>
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Year 9

Overview:

Our curriculum develops students' understanding of key scientific concepts through practical investigations, mathematical skills and scientific enquiry, ensuring they are well prepared for the demands of the GCSE curriculum.

Content:

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Biology – Cell Level Systems Students explore cell structure, microscopy, enzymes, respiration, photosynthesis and DNA, developing understanding of how cells function as the fundamental building blocks of life.	Chemistry – Particles Students explore the particle model and atomic structure, developing understanding of how the arrangement and behaviour of particles explain the properties of matter. Physics – Matter Students explore the particle model, states of matter and changes of state, developing understanding of how particle behaviour explains everyday physical phenomena.		Biology – Scaling Up Students explore how multicellular organisms transport substances, exchange materials and grow. They study diffusion, osmosis, active transport, stem cells, mitosis, specialised cells, and the adaptations of plants and animals for efficient transport.	Chemistry – Elements Compounds and Mixtures Students develop their understanding of elements, compounds and mixtures, learning how substances are separated and purified. They explore atomic bonding, the structure and properties of materials, and how different types of bonding determine the physical characteristics and behaviour of everyday substances.	

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