Science Phase One Curriculum 2023-24

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

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.

Year 7

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 freezing point of stearic acid.	**Biology - Nutrition and Diet** This topic recaps the 5 food groups and introduces learners to the 7 nutrients and their roe 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 using the periodic table.	**Biology - Gas Exchange** This unit build 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. **Physics - Gravity**	**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** Learners recap previous learning on magnets and are	**Biology - Plant Reproduction** This topic build 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 concept that earths resources are finite	**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.

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.	**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.	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.	introduced to the earth as a magnet. The topic looks at how the movement of the earth can affect day, night and seasons.	and the need for recycling. **Physics - Observed Waves** In this unit, learners learn the names of the parts of waves and study waves in everyday situations. Observations are carried out using a ripple tank to allow the calculation of resultant height of a wave during superposition.	**Physics – Sound** This unit looks at the properties of soundwaves, learners carry out investigations to calculate the speed of sound using echoes and describe uses of insulating materials in everyday life.

Year 8

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	**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	**Biology – Plant Structure** Building upon prior learning of year 7 term 5, learners will be introduced to photosynthesis and adaptations of leaves	**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	**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	**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

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 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 involver making observations of these reactions and comparing secondary data. **Physics – Light Waves** 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.	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. **Chemistry – Acids and Alkalis** 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. **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.	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 mixtures. Practical opportunities include chromatography, crystallisation and evaporation. **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.	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** 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. **Physics - Energy Transfers** Learners will build upon prior learning of transvers 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	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 (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. **Physics – Series and Parallel Circuits.** This topic will start by recapping prior learning at KS2, before introducing leaners to current in series and parallel circuits. Practical opportunities will see learners use ammeters and voltmeters to measure	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 can differ in hot and cold liquids. **Physics – Sensory Organs** After previously studying light waves and sound waves learners will now look at different adaptations of the body allow animals to collect data about the world around them. The eye and ears will be studied in this topic.

			these findings to make recommendations to insulate our homes.	current and potential difference in various circuits.	

Year 9

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Biology: Cell Level Systems	**Chemistry: Particles**	**Physics: Matter**	**Biology: Scaling Up**	**Chemistry: Elements, Compounds and Mixtures**	**Physics: Forces**
Cells are the fundamental units of living organisms. Cells contain many subcellular structures that are essential for the functioning of the cell. Microscopy is used to examine cells and sub-cellular structures. Students will carry out investigations into photosynthesis to determine how light intensity od linked to the rate.	Students are reintroduced to the particle model and its explanation of different states of matter. A simple particle model can be used to represent the arrangement of particles in the different states of matter and to explain observations during changes in state building on Y7 T1 chemistry. Students are introduced to the structure of the atom.	This section develops the understanding of pressure in gases and liquids. Pressure in gases builds on the particle model, and in liquids the increase in pressure with depth is explained as the weight of a column of liquid acting on a unit area. This topic builds upon Y7 T1 and Y8 T5 knowledge.	Cells transport many substances across their membranes by diffusion, osmosis and active transport. Stem cells are found in both plants and animals. These stem cells can divide, differentiate, and become specialised to form tissues, organs and organ systems. This topic builds on the foundations of cellular biology that were set in Y7 and Y8 science lessons.	In this topic student will build on their previous knowledge of atoms and the periodic table to discuss how electron structure links to the properties of elements. This topic builds on Y7 T2 learning.	Having looked at the nature of matter which makes up objects, we move on to consider the effects of forces. We will also consider the importance of the direction in which forces act to allow understanding of the importance of vector quantities when trying to predict the action. This topic builds on physics learning from both Y7 and Y8 forces topics.

Who to contact about Phase One: Louise Ledger
Email: lledger@stedwards.trinitymat.org