Core Aim

Our core aim is to support our students in their pursuit of knowledge and wisdom, allowing them to flourish as lifelong learners seeking to love God and serve the community.

Curriculum Vision

Regardless of prior attainment or circumstances, all students at St Peter's have equal access to a broad curriculum that is knowledge-rich, inclusive and ambitious. Our curriculum will give students the knowledge, skills and experiences to gain qualifications and the social and cultural capital necessary to flourish both individually and in society. Our curriculum should be a joyful experience for students stimulating a life-long love of learning.

Curriculum Plans & Progress Ladders

This document provides an overview of the topics students will study in each curriculum area, along with information on how their progress will be assessed. In Key Stage 3, each department has set the expected standards for students to achieve by the end of the year or the Key Stage. These standards are detailed as progress ladders, explaining what students should have secured at each step and what they can do to further progress. These are broad statements written to summarise the knowledge and skills a student will have acquired at each stage of their learning. Students will be assessed regularly during their learning and departments may use more specific criteria when designing assessments. This document should be read alongside your child's progress report to help you understand their current level of attainment in each subject.

St Peter's Collegiate Academy

Year 7 Science Curriculum

At St Peter's we believe that a broad and balanced curriculum with a strong academic core is a right for all pupils. We seek to encourage pupils to explore subjects of interest around their in-school learning and to enhance their curriculum experience through enrichment.

Autumn 1 *(8)*	Autumn 2 *(7)*	Spring 1 *(5)*	Spring 2 *(5)*	Summer 1 *(7)*	Summer 2 *(7)*
Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question
• **Safety in Science** • **Acids and alkalis** • **Magnets**	• **Cells** • **Chemical reactions**	• **Reproduction** • **Particles**	• **Forces**	• **Plant Power** • **Energy**	• **Separation** • **Ecosystems**
Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge
Safety in Science • Lab safety rules • Naming basic lab equipment and understanding what they are used for **Acids & Alkalis** • Defining acids and alkalis in terms of neutralisation reactions • The pH scale for measuring acidity/alkalinity; and indicators • Reactions of acids with alkalis to produce a salt plus water **Magnets** • Magnetism is a non-contact force. • Each magnet has two poles – the north pole and the south pole. • To recall two unlike poles attract and two like poles repel and to explain this. • Magnetic field lines run from north to south. • The Earth is a giant magnet where magnetic south is geographic north. • The north pole on a compass is attracted to the magnetic south pole of the Earth.	**Cells** • Cells as the fundamental unit of living organisms • The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, and chloroplasts • The similarities and differences between plant and animal cells • the structural adaptations of some unicellular organisms • The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms • The skeletal and muscular systems as examples of organ systems: ➔ the structure and functions of the human skeleton (support, protection, movement and making blood cells) ➔ the function of muscles and examples of antagonistic muscles **Chemical Reactions** • The difference between chemical and physical changes • Combustion, thermal decomposition, oxidation • exothermic and endothermic chemical reactions • What reversible reactions are • What catalysts do	**Reproduction** • Reproduction in humans, including the structure and function of the male and female reproductive systems, menstrual cycle, gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta **Particles** • The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure • Similarities and differences, including density differences, between solids, liquids and gases • Changes of state in terms of the particle model • Melting, freezing, evaporation, sublimation, condensation • Energy changes on changes of state • The differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition • Changes with temperature in motion and spacing of particles • Diffusion in terms of the particle model	**Forces** • Forces are either contact or non-contact and they are pushes or pulls that occur when two objects interact. • Forces cannot be seen but the effects of forces can be seen and are measured in Newtons (N) by a Newton metre. • Forces usually act in pairs and act in certain directions. • Define a resultant force. • To compare balanced and unbalanced forces. • Compare plastic and elastic deformation and relate this to Hooke's Law: F = k x e • Forces cause objects to turn around a pivot. This is called a moment where a moment (Nm) = Force (N) x distance (m) • The forces muscles exert and the interaction with the skeleton.	**Plant Power** • The dependence of life on earth on photosynthetic organisms • The photosynthesis reaction • Adaptations of leaves for photosynthesis • The role of stomata • Reproduction in plants • Plants gaining water and mineral nutrients from the soil via their roots **Energy** • Energy is a property of matter that can be stored or shifted between stores and is measured in Joules (J). • There is a fixed amount of energy in the universe. • The law of conservation of energy states that energy cannot be created or destroyed. It can only be stored or shifted between stores. • Power is the rate at which energy is transferred measured in Watts. • There are 8 energy stores and 4 energy pathways. • Compare insulators and conductors. • Describe the process of conduction and convection. • Describe how infrared radiation can interact with objects. • Describe the difference between renewable and non-renewable resources and give examples of	**Separation** • The concept of a pure substance • Mixtures and the meaning of dissolving • Mixtures, including dissolving • Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography **Ecosystems** • The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops • The importance of plant reproduction through insect pollination in human food security • How organisms affect, and are affected by, their environment, including the accumulation of toxic materials

				both.	
Skills & Procedural Knowledge	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**
Safety in Science • Setting up and using a Bunsen burner safely • Measuring the volume of liquids using a measuring cylinder • Measuring temperature using a thermometer • Measuring time using a stop clock • Drawing scientific diagrams of basic lab equipment • Tabulating data **Acids & Alkalis** • Identifying hazard symbols • Comparing the properties of acids and alkalis • Investigating the colours seen with different indicators • Measuring volumes using measuring cylinders and pipettes **Magnets** • Draw the magnetic field lines around different combinations of magnets. • Draw the magnetic field around a magnet using a plotting compass. • Draw the magnetic field lines around the Earth.	**Cells** • observe, interpret and record cell structure using a light microscope **Chemical Reactions** • Measuring volumes of solutions and masses of solids • Tabulating data • Measuring the change in mass • Representing reactions using word equations • Using tests to identify gases formed in a reaction • Using colour change to identify a chemical reaction • Measuring the change in temperature using a thermometer • Using a stopwatch to time a chemical reaction	**Particles** • Safely heating water using a Bunsen burner and measuring its temperature. • Plotting a graph of temperature of water against time. • Predicting the state of matter for substances at different temperatures • Investigating diffusion • Using positive and negative numbers for temperature scales to compare melting and boiling points	**Forces** • Measure a force using a Newton metre. • Draw force diagrams for at least the following situations: - Hanging object - Object floating in water - Object standing on the ground/surface • Plot a graph of force against extension for a spring. • Prove Hooke's law experimentally.	**Plant Power** • Investigating germination in broad beans seeds • Investigating seed dispersal • Testing leaves for starch • Using a light microscope to view the cross section of a leaf Dissecting a flower **Energy** • Set up a Bunsen burner safely • Correctly order a sequence of steps to complete a method • Construct and record results in a table • Measure and calculate a temperature change • Write a conclusion • Draw and label a diagram to show convection currents in gases and liquid • Investigating how different materials affect the rate of thermal energy transfer • Calculate power • Calculate energy in kWhs	**Separation** • Representing data using line graphs • Calculation of surface area • Using decanting to separate a mixture of liquids • Investigating chromatography and distillation • Investigating filtration and crystallisation **Ecosystems** • Estimating plant populations using quadrats • Animal sampling techniques such as pooters, sweep nets, pond dipping
Tier 3 Key vocabulary	**Tier 3 Key vocabulary**	**Tier 3 Key vocabulary**	**Tier 3 Key vocabulary**	**Tier 3 Key vocabulary**	**Tier 3 Key vocabulary**
Safety in science Bunsen burner, flammability, , temperature, volume, mass, measuring cylinder, thermometer, conical flask, tripod, gauze, evaporating basin, **Acid and Alkalis** Acid, alkali, corrosive, irritant, hazard symbols, indicator, litmus, universal indicator, pH scale, neutral, neutralisation, salt **Magnets** Electromagnets, north-seeking pole, south-seeking pole, magnetic field, magnetic field line, core, solenoid, coil	**Cells** Cells, nucleus, cytoplasm, cell membrane, cell wall, chloroplast, vacuole, microscope, specialised, tissue, organ, organ system **Chemical Reactions** Indicators, neutralisation, oxidation, catalyst, exothermic, endothermic, combustion, thermal decomposition, displacement.	**Reproduction** Sperm cell, testes, scrotum, semen, sperm duct, urethra, penis, sexual intercourse, egg cell, ovary, oviduct, uterus, cervix, vagina, adolescence, puberty, sex hormones, gametes, fertilisation, cilia, ejaculation, embryo, implantation, gestation, foetus, placenta, umbilical cord, fluid sac, period, menstrual cycle, ovulation **Particles** Matter, solid, liquid, gas, evaporation, boiling, condensation, freezing, melting, sublimation, pressure, bond, compressed, theory, model, evidence	**Forces** Force, Newton, Newtonmeter, Upthrust, Drag, Friction, Gravity	**Plant power** Photosynthesis, sunlight, chloroplast, chlorophyll, water, carbon dioxide, oxygen, sugar, stomata, petal, sepal, stamen, anther, pollen, filament, carpel, stigma, style, ovule, pollination, fruit, seed, germination, seed dispersal **Energy** Appliance, Efficiency, Store, Transfer, Renewable, Non-Renewable, Hydroelectric, Fossil fuels, Equilibrium	**Separation** solution, solvent, solute, mixture, pure, impure, soluble, insoluble, saturated, chromatography, distillation, filtration, evaporation, condensation, chromatogram, miscible, immiscible **Ecosystem** Habitat, adaptation, predator, prey, producer, consumer, photosynthesis, community, population, ecosystem, bioaccumulation, food chain, food web, interdependence, competition
Key Assessment Task (KAT)	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**
Acids & Alkalis KAT	**Year 7 Assessment 1**	**Particles KAT**	**Year 7 Assessment 2**	**Plant Power KAT**	**Year 7 Assessment 3**

St Peter's Collegiate Academy

Yr 7 Science Progress Ladder

At St Peter's we believe that a broad and balanced curriculum with a strong academic core is a right for all pupils. We seek to encourage pupils to explore subjects of interest around their in-school learning and to enhance their curriculum experience through enrichment.

	Biology	Chemistry	Physics
Mastering	Student has an exceptional knowledge and understanding of the topics: cells, reproduction, plant power and ecosystems. Student can apply this knowledge and understanding to the most challenging unfamiliar situations. Student averages 90% or above in assessments.	Student has an exceptional knowledge and understanding of the topics: acids & alkalis, chemical reactions, particles and separation. Student can apply this knowledge and understanding to the most challenging unfamiliar situations. Student averages 90% or above in assessments.	Student has an exceptional knowledge and understanding of the topics: magnets, forces and energy. Student can apply this knowledge and understanding to the most challenging unfamiliar situations. Student averages 90% or above in assessments.
Advancing	Student has an excellent knowledge and understanding of the topics: cells, reproduction, plant power and ecosystems. Student can apply this knowledge and understanding to unfamiliar situations. Student averages 70 - 89% in assessments.	Student has an excellent knowledge and understanding of the topics: acids & alkalis, chemical reactions, particles and separation. Student can apply this knowledge and understanding to unfamiliar situations. Student averages 70 - 89% in assessments.	Student has an excellent knowledge and understanding of the topics: magnets, forces and energy. Student can apply this knowledge and understanding to unfamiliar situations.. Student averages 70 - 89% in assessments.
Securing	Student has a good knowledge and understanding of the topics: cells, reproduction, plant power and ecosystems. Student is starting to be able to apply this knowledge and understanding to unfamiliar situations. Student averages 50 - 69% in assessments.	Student has a good knowledge and understanding of the topics: acids & alkalis, chemical reactions, particles and separation. Student is starting to be able to apply this knowledge and understanding to unfamiliar situations. Student averages 50 - 69% in assessments.	Student has a good knowledge and understanding of the topics: magnets, forces and energy. Student is starting to be able to apply this knowledge and understanding to unfamiliar situations. Student averages 50 - 69% in assessments.
Developing	Student has a basic knowledge and understanding of the topics: cells, reproduction, plant power and ecosystems. Student averages 30 - 59% in assessments.	Student has a basic knowledge and understanding of the topics: acids & alkalis, chemical reactions, particles and separation. Student averages 30 - 59% in assessments.	Student has a basic knowledge and understanding of the topics: magnets, forces and energy. Student averages 30 - 59% in assessments.
Emerging	Student has developed some knowledge and understanding of the topics: cells, reproduction, plant power and ecosystems. Student averages 0 - 29% in assessments.	Student has developed some knowledge and understanding of the topics: acids & alkalis, chemical reactions, particles and separation. Student averages 0 - 29% in assessments.	Student has developed some knowledge and understanding of the topics: magnets, forces and energy. Student averages 0 - 29% in assessments.

St Peter's Collegiate Academy

Yr 8 Science Curriculum

At St Peter's we believe that a broad and balanced curriculum with a strong academic core is a right for all pupils. We seek to encourage pupils to explore subjects of interest around their in-school learning and to enhance their curriculum experience through enrichment.

Autumn 1 *(8)*	Autumn 2 *(7)*	Spring 1 *(5)*	Spring 2 *(5)*	Summer 1 *(7)*	Summer 2 *(7)*
Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question
• **Nutrition and digestion** • **Atoms and elements**	• **Compounds and mixtures** • **Light**	• **Respiration** • **Gas exchange in animals**	• **Sound**	• **Earth and atmosphere** • **Electricity**	• **Space** • **Variation and inheritance**
Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge
Nutrition and digestion • Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed • The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases • The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts) **Atoms and elements** • Identifying elements as metals and non-metals • How the periodic table is organised • The physical and chemical properties of elements • Explaining chemical changes in terms of masses and equations • Distinguishing particles as atoms and molecules	**Compounds and mixture** • Rules for naming simple compounds and identifying formulae • Identifying signs of a chemical change • Writing simple equations using word and symbol equations • Showing and explaining conservation of mass in a chemical reaction **Light** • Waves are a transfer of energy. There are two types of waves, light is a transverse wave. • Light travels in straight lines and can form shadows. • Light travels at 300000000 m/s • Equation for wave speed. • A luminous object emits light and a non-luminous object reflects light. • Reflection is when light bounces off an object. • When we see an object it is because light has reflected off of it into our eyes. • The law of reflection is when the angle of an incidence is equal to the angle of the reflected light ray. • Specular reflection involves a smooth surface and diffuse reflection occurs on a rough	**Respiration** • Cellular respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life • The word equation for aerobic respiration • Mitochondria as the site of aerobic respiration in animal & plant cells **Gas Exchange in animals** • The structure and functions of the gas exchange system in humans, including adaptations to function • The mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases • The impact of exercise, asthma and smoking on the human gas exchange system	**Sound** • Sound is a longitudinal wave with rarefactions and compressions. • • Amplitude and frequency changes the volume and pitch. • An oscilloscope can be used to visualise a sound wave. • Draw and label a diagram of a longitudinal wave. Draw an oscilloscope trace for different sounds. • Sound can't travel through a vacuum. It requires a medium. • Sound travels fastest in solids, then liquids, then gases. • Humans' audible range and animal's hearing. • The human ear consists of an outer ear, middle ear, and inner ear. • Label a diagram of the human ear. • The process of hearing and damage to hearing. • An echo happens when a sound wave bounces off a surface. • Ultrasound frequency and how it can be used.	**Earth and atmosphere** • The structure and composition of the Earth • Igneous, Sedimentary and metamorphic rocks • The rock cycle • Materials from the Earth and recycling • The origin, composition and changes to our atmosphere **Electricity** • Define electric current and charge and how they are measured. • Define potential difference/voltage which is measured by a voltmeter. • Describe the energy shifts involved in circuits. • Recall units for current and voltage and the unit equivalents. • Compare series circuits and parallel circuits. • Compare the behaviour of current and voltage in both series and parallel circuits. • Define resistance which is measured in ohms (Ω) • Potential difference = current x resistance (V = I x R) • Describe what can affect the resistance of a wire or component. • Describe static electricity,	**Space** • Force due to gravity is a non-contact force. • Difference between mass and weight. • Gravitational field strength on Earth is 9.8 N/kg • Satellites including their types, speeds and orbits. • A light year and comparison to the Earth-Sun distance. • Difference between stars and planets. • Our Solar System consists of the Sun (a star) and 8 planets. • A galaxy is a collection of stars our galaxy is called the Milky Way and is has around 100,000,000,000 stars • The Hubble Ultra Deep Field (HUDF) covers a 50 pence piece size of the sky and contains as many as 10,000 galaxies. • A year on Earth is 365.25 days and other planet's year lengths. • Planets rotate as they travel around the Sun and Earth's tilt and effects. • 'Moonlight' is the Moon reflecting the light from the Sun. • Stages of the Moon • Shadows and relevance to the moon.

	surface. ● Refraction occurs when light waves change speed and direction at the boundary between two materials. ● Moving to a more dense material, the ray will bend towards the normal and vice versa the ray will bend away from the normal. ● The difference between convex and concave lenses including uses, shape and their effect on light. ● The structure of the eye and the functions of individual parts. ● Label a diagram of the human eye. ● How a pin-hole camera is a model for how the eye works.			conductors and insulators. ● Charged objects exert a non-contact force on one another. ● Describe when this force is attractive or repulsive. ● Friction causes electrons to transfer from one material to the other.	**Variation and inheritance** ● Heredity as the process by which genetic information is transmitted from one generation to the next. ● A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model ● Differences between species ● The variation between individuals within a species being continuous or discontinuous. ● The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection ● Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction ● The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material
Skills & Procedural Knowledge	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**
Nutrition and digestion ● Comparing energy values of different foods (from labels) (kJ) ● Calculations of energy requirements in a healthy daily diet ● Investigating the relative energy content of different foods ● Carrying out biochemical tests for starch, sugar and protein **Atoms and elements** ● Using temperature scales to identify physical state at a given temperature ● Investigating mass change in a chemical reaction ● Producing and balancing equations ● Working out formulae of molecules	**Compounds and mixture** ● Identifying and contrasting symbols used for elements ● Safe heating in a chemical reaction ● Calculating changes in mass ● Balancing equations ● Linking formulae to chemical reactions and mass changes **Light** ● Draw and label a diagram of a transverse wave. ● Calculate wave speed using the equation. ● Change the subject of the wave speed equation. ● Investigate the law of reflection using a ray box, mirror, and protractor. ● Draw a labelled diagram of reflection. ● Investigate refraction using a ray	**Gas Exchange in animals** ● Simple measurements of lung volume. ● Investigating the effect of exercise on breathing rate.	**Sound** ● Draw and label a diagram of a wave. ● Calculate wave speed using the equation. ● Change the subject of the wave speed equation. ● Draw an oscilloscope trace for different sounds, to include: o High pitch, high amplitude o High pitch, low amplitude o Low pitch, high amplitude o Low pitch, low amplitude.	**Earth and atmosphere** ● Examining and comparing rock types ● Linking the properties of materials to their use ● Researching the causes and effects of Global Warming **Electricity** ● Draw simple circuit diagrams and components. ● Calculate and measure the current, voltage and resistance at different points in series and parallel circuits.. ● Set up and use a testing circuit to measure the resistance of different lengths of wire. ● Carry out a risk assessment addressing hazards, risks and safety.	**Space** ● Describe the mathematical relationships between numbers. ● Calculate weight using the equation. ● Rearrange the equation for weight. ● Calculate the gravitational field strength using the equation. ● Calculate the mass of an object using the equation. **Variation and inheritance** ● measurement and graphical representation of variation.

	box and a glass block. • Draw a labelled diagram of refraction through a glass block. • Draw and label ray diagrams to show what happens to light as it passes through concave lenses. To include the principal axis, the focal length, and the principal focus. • Draw and label ray diagrams to show what happens to light as it passes through convex lenses. To include the principal axis, the focal length, and the principal focus. • Build a pinhole camera. • Carry out an eye dissection				
Tier 3 Key vocabulary	Tier 3 Key vocabulary	Tier 3 Key vocabulary	Tier 3 Key vocabulary	Tier 3 Key vocabulary	Tier 3 Key vocabulary
Nutrition and Digestion carbohydrate, protein, fat (lipid), vitamins, minerals, water, fibre, energy, deficiency, obesity, diabetes, oesophagus, stomach, small intestine, pancreas , liver, bile, gall bladder, large intestine, rectum, anus, villi, absorption, egestion **Atoms and Elements** atom, element, compound, molecule, property, physical property, chemical property, symbol, formula, reaction, conductor, insulator, word equation and symbol equation.	**Compounds and Mixtures** atom, element, compound, molecule, property, chemical property, symbol, formula, reaction, conductor, insulator, word equation and symbol equation, reactants, products, reversible, conservation of mass. **Light** Reflection, Refraction, Transparent, Translucent, Opaque, Lens, Convex, Normal, Incidence, Ray, Spectrum, Diffuse, Specular, Medium, Frequency	**Respiration** Respiration, aerobic, mitochondria, anaerobic, lactic acid, energy, glucose, oxygen, carbon dioxide, water **Gas Exchange in Animals** Ventilation, Inhalation, Exhalation, diaphragm, trachea, bronchi, alveoli, carbon dioxide, oxygen	**Sound** frequency, transverse, longitudinal, medium, superposition, amplitude, compression, rarefaction, wavelength, wave speed	**Electricity** Battery, Cell, Bulb, Current, Voltage, Potential Difference, Wire, Switch, Power Supply, Voltmeter, Ammeter, Resistance, Energy Transfer **Earth and Atmosphere** Crust, Mantle, (Inner and Outer) Core, Molten, Magma, Igneous, Sedimentary, Metamorphic, Intrusive, Extrusive, Atmosphere, Greenhouse Effect, Climate, Polymer, Ceramic, Composite material	**Space** gravity, satellite, orbit, star, galaxy, hemisphere, light-year **Variation and Inheritance** DNA, chromosome, gene, variation, species, inherited variation, environmental variation, continuous variation, discontinuous variation, natural selection, extinction, endangered, gene bank, biodiversity
Key Assessment Task (KAT)	Key Assessment Task (KAT)	Key Assessment Task (KAT)	Key Assessment Task (KAT)	Key Assessment Task (KAT)	Key Assessment Task (KAT)
Nutrition and digestion KAT	**Year 8 Assessment 1**	**Respiration and gas exchange in animals KAT**	**Year 8 Assessment 2**	**Electricity KAT**	**Year8 Assessment 3**

St Peter's Collegiate Academy

Yr 8 Science Progress Ladder

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	Biology	Chemistry	Physics
Mastering	Exceptional knowledge and understanding of the topics: nutrition & digestion, respiration, gas exchange in animals and variation & inheritance. Can apply this knowledge and understanding to the most challenging unfamiliar situations. Averages 90% or above in assessments.	Exceptional knowledge and understanding of the topics: atoms & elements, compounds & mixtures and earth & atmosphere. Apply this knowledge and understanding to the most challenging unfamiliar situations. Averages 90% or above in assessments.	Exceptional knowledge and understanding of the topics: light, sound, electricity & space. Apply this knowledge and understanding to the most challenging unfamiliar situations. Averages 90% or above in assessments.
Advancing	Excellent knowledge and understanding of the topics: nutrition & digestion, respiration, gas exchange in animals and variation & inheritance. Apply this knowledge and understanding to unfamiliar situations. Averages 70 - 89% in assessments.	Excellent knowledge and understanding of the topics: atoms & elements, compounds & mixtures and earth & atmosphere. Apply this knowledge and understanding to unfamiliar situations. Averages 70 - 89% in assessments.	Excellent knowledge and understanding of the topics: light, sound, electricity & space. Apply this knowledge and understanding to unfamiliar situations. Averages 70 - 89% in assessments.
Securing	Good knowledge and understanding of the topics: nutrition & digestion, respiration, gas exchange in animals and variation & inheritance. Starting to be able to apply this knowledge and understanding to unfamiliar situations. Averages 50 - 69% in assessments.	Good knowledge and understanding of the topics: atoms & elements, compounds & mixtures and earth & atmosphere. Starting to be able to apply this knowledge and understanding to unfamiliar situations. Averages 50 - 69% in assessments.	Good knowledge and understanding of the topics: light, sound, electricity & space. Starting to be able to apply this knowledge and understanding to unfamiliar situations. Averages 50 - 69% in assessments.
Developing	Basic knowledge and understanding of the topics: nutrition & digestion, respiration, gas exchange in animals and variation & inheritance. Averages 30 - 59% in assessments.	Basic knowledge and understanding of the topics: atoms & elements, compounds & mixtures and earth & atmosphere. Averages 30 - 59% in assessments.	Basic knowledge and understanding of the topics: light, sound, electricity & space. Averages 30 - 59% in assessments.
Emerging	Developed some knowledge and understanding of the topics: nutrition & digestion, respiration, gas exchange in animals and variation & inheritance. Averages 0 - 29% in assessments.	Developed some knowledge and understanding of the topics: atoms & elements, compounds & mixtures and earth & atmosphere. Averages 0 - 29% in assessments.	Developed some knowledge and understanding of the topics: light, sound, electricity & space. Averages 0 - 29% in assessments.

St Peter's Collegiate Academy

Yr 9 Science Curriculum

At St Peter's we believe that a broad and balanced curriculum with a strong academic core is a right for all pupils. We seek to encourage pupils to explore subjects of interest around their in-school learning and to enhance their curriculum experience through enrichment.

Autumn 1 *(8)*	Autumn 2 *(7)*	Spring 1 *(5)*	Spring 2 *(5)*	Summer 1 *(7)*	Summer 2 *(7)*
Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question
• **Chemical and physical changes** • **Motion**	• **B1.1: Cell structure** • **Patterns of reactivity**	• **B1.2: Biological molecules** • **B1.2: DNA structure** • **Separation**	• **B1.2 Enzymes** • **P1: Matter**	• **P1: Matter** • **Atomic Structure**	• **B1.3: Respiration** • **B1.4: Photosynthesis**
Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge
Chemical and Physical changes • The particle model of solids, liquids and gases. • Changes of state as an example of a physical change • Explaining gas pressure, diffusion and Brownian in terms of the movement of particles • Identifying elements, mixtures and compounds using particle diagrams • Identifying chemical changes using particle diagrams • Identifying and explaining chemical changes • Representing substances using chemical symbols and formulae • Representing reactions using word and symbol equations • Identifying and explaining chemical changes • Representing substances using chemical symbols and formulae • Representing reactions using word and symbol equations **Motion** • Explain what is meant by the term 'average speed'. • Use distance-time graphs to calculate speed. • Explain that the motion in a circle involves constant speed but changing velocity.	**B1.1: Cell structure** • B1.1a: describe how light microscopes and staining can be used to view cells • B1.1b: explain how the main sub-cellular structures of eukaryotic cells (plants and animals) and prokaryotic cells are related to their functions • B1.1c: explain how electron microscopy has increased our understanding of sub-cellular structures **Patterns of reactivity** • Identifying burning and combustion reactions • Identifying thermal decomposition reactions • Oxidation reactions and the link to metal and non-metal compounds • Identifying and explaining displacement reactions • Reactions of metals with acids • Reactions of acids and alkalis • Reactivity linked to the periodic table • Comparing the reactivity of metals in the reactivity series • Extracting metals using carbon • Environmental impact of metal extraction • Recycling metals	**B1.2: Biological molecules** • Use of the terms monomer and polymer to describe biological molecules • explain the importance of sugars in the synthesis and breakdown of carbohydrates • explain the importance of amino acids in the synthesis and breakdown of proteins • explain the importance of fatty acids and glycerol in the synthesis and breakdown of lipids • The biochemical tests for sugars, starch, protein, lipids. **B1.2: DNA Structure** • B1.2a: describe DNA as a polymer • B1.2b: describe DNA as being made up of two strands forming a double helix • B1.2c: describe that DNA is made from four different nucleotides; each nucleotide consisting of a common sugar and phosphate group with one of four different bases attached to the sugar • B1.2c: the pairs of complementary bases (A-T and G-C) **Separation** • Limitations of the particle model • Identifying pure and impure substances	**B1.2: Enzymes** • B1.2g: explain the mechanism of enzyme action including: the role of enzymes in metabolism, the role of the active site, enzyme specificity (lock and key hypothesis) • B1.2g: factors affecting the rate of enzyme controlled reactions (pH, temperature, substrate and enzyme concentration) • B1.2f describe experiments that can be used to investigate enzymatic reactions **P1 :Matter** • Describe the arrangement of particles in solids, liquids and gases and the properties of each. • Describe changes to particle arrangement and movement during a change of state • Define internal energy • Describe heating and changes of state in terms of kinetic and potential energy stores • Describe different methods of heat transfer including conduction and convection. • Specific heat capacity is the energy required to raise 1 kg of substance by 1 degree Celsius. • Describe latent heat of vaporisation and fusion and	**P1: Matter** • Recall density = mass / volume and the respective units. • Use the particle model to explain gas pressure. • Explain why changing the temperature of a gas affects the pressure. • Describe how volume changes affect pressure • Use the particle model to explain how changes in volume can result in changes in pressure • Explain how work done affects the internal energy of a gas. **Atomic structure** • Grouping elements and the Newlands periodic table • Mendeleev's periodic table • History of the atom • Atomic structure in terms of protons, neutrons and electrons • Atomic structure of isotopes • Electron arrangements and their link to the periodic table • Identifying groups and periods in the periodic table. • Metal and non-metal atoms forming ionic bonds	**B1.3: Respiration** • B1.3a: describe cellular respiration as a universal chemical process, continuously occurring that supplies ATP in all living cells • B1.3b: describe cellular respiration as an exothermic reaction • B1.3c: compare the processes of aerobic respiration and anaerobic respiration in animals and plants/fungi to include: the different conditions, substrates, products and relative yields of ATP. **B1.4: Photosynthesis** • B1.3a: describe photosynthetic organisms as the main producers of food and therefore biomass for life on Earth • B1.4b: describe the process of photosynthesis (reactants and products, two stage process, location of the reaction [in the chloroplasts]) • B1.4c: describe photosynthesis as an endothermic reaction • B1.4d: Describe experiments to show the consequences of light exclusion on photosynthesising plants (testing geraniums for starch) • B1.4e: explain the effect of temperature, light intensity and carbon dioxide concentration on

• Interpret lines and slopes to determine acceleration. • Determine distance travelled by an object (or displacement of an object) from a velocity-time graph. • Describe and recognise terminal velocity.		• Separation by dissolving and filtering • Separating by evaporation and crystallisation • Separating rock salt • Separating liquids using distillation • Using fractional distillation to separate a mixture of liquids • Investigating mixtures using paper chromatography • Calculating Rf values and the use of different solvents	recognise them on a graph		the rate of photosynthesis • B1.4f: explain the interaction of temperature, light intensity and carbon dioxide concentration in limiting the rate of photosynthesis
Skills & Procedural Knowledge	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**
Chemical and Physical changes • Identifying states from models • Identifying the state of a substance at a given temperature using the melting and boiling points • Writing word equations • Balancing symbol equations • Linking the number of particles present to the concentration **Motion** • Drawand interpret distance-time and velocity-time graphs from measurements. • Use an equation to calculate acceleration and speed using the correct units.	**B1.1: Cell Structure** • Use a light microscope to view biological specimens under a range of magnifications. • Prepare a microscope slide of onion epidermis to be viewed under a light microscope. • Biological drawing skills. Use a light microscope to produce labelled scientific drawings of biological specimens. • the use and manipulation of the magnification formula **Patterns of reactivity** • Identifying signs of a chemical change • Comparing the reactions of different elements • Linking observations to reactivity • Identifying a gas formed in a reaction	**B1.2: Biological molecules** • Qualitative testing for the presence of biological molecules **Separation** • Use distillation to separate a mixture of liquids • Use and manipulation of the Rf formula • Suggesting a sequence of separation methods linked to the properties of the substances in a mixture • Recognising the link between the mass of crystals formed and the removal of water by evaporation	**B1.2: Enzymes** • Investigating enzyme activity, including: identification of variables, numerical analysis of data, graphical representation of results,describing and explaining trends, evaluation of the experimental procedure. • Calculation of rates of reaction **P1: Matter** • Use the specific heat capacity equation to calculate any value when given the others. • Use an equation to calculate energy, mass, or latent heat values. • Complete multi-step energy calculations.	**P1: Matter** • Measure the density of regular and irregular solids. • Make and record measurements. • Plot data to show the effect of temperature on gas pressure and describe the pattern shown • Calculate the resulting pressure or volume when one is changed using an equation **Atomic Structure** • Calculate the number of subatomic particles present in an atom when supplied with the atomic and mass numbers • Linking the position of an element in the periodic table to its electron arrangement • Representing the transfer of electrons in ionic bonding through drawing dot and cross diagrams	**B1.3: Respiration** • Investigate the effect of exercise on pulse rate/ventilation rate and recovery **B1.4: Photosynthesis** • Investigate the effect of light intensity on the rate of photosynthesis including: identification of variables, numerical analysis of data, graphical representation of results,describing and explaining trends, evaluation of the experimental procedure.
Tier 3 Key vocabulary	**Tier 3 Key vocabulary**	**Tier 3 Key vocabulary**	**Tier 3 Key vocabulary**	**Tier 3 Key vocabulary**	**Tier 3 Key vocabulary**
Motion Speed, Velocity, Acceleration, Displacement, Scalar, Vector, LIne graph. **Chemical and Physical Changes** Matter, solid, liquid, gas, evaporation, boiling, condensation, freezing, melting, sublimation, pressure, bond, compressed, theory	**Patterns of Reactivity:** Combustion, thermal decomposition, oxidation, displacement, metal, acid, salt, hydrogen, alkali, neutralise, redox, base, chemical properties, physica properties, soluble, insoluble, decompose, release, exothermic **Cell Structure** Cells, nucleus, cytoplasm, cell membrane, cell wall, chloroplast, vacuole, microscope, specialised, tissue, organ, organ system	**Separation:** Solution, solvent, solute, mixture, pure, impure, saturated, chromatography, distillation, crystallisation, filtration, evaporation, condensation, chromatogram, miscible, immiscible, atom, element, compound, property, symbol, formula, reaction, conductor, insulator, word equation and symbol equation, reactants, products, reversible, conservation of mass. **Biological molecules:**	**Matter** Conduction, Convection, Radiation, Insulation, Internal Energy, Kinetic Energy, Potential Energy, Temperature, Equilibrium **Enzymes** Enzyme, Substrate, active site, denature, temperature, pH, concentration	**Matter** • Density • Compress • Flow • Pressure • Work • Volume • Atmospheric pressure • Hydraulic • **Atomic Structure** Proton, Neutron, Electron, Nucleus Energy level, Ion, Isotope, Charged,	**Respiration** Aerobic, anaerobic,energy, glucose, oxygen, carbon dioxide, water, lactic acid, ethanol, yeast **Photosynthesis** Chloroplast, Chlorophyll, Light, Energy, Glucose, Oxygen, Water, Carbon dioxide, Temperature, stomata

		Starch, carbohydrates, lipids, proteins, sugars, glucose, benedict, biuret, Iodine, Ethanol, amino acids, fatty acid, glycerol **DNA Structure** Polymer, Double Helix, Phosphate, Deoxyribose sugar, adenine, thymine, cytosine, guanin, nucleotide		atom, compound, bond, molecule, element, pure, impure, electron shell, periodic table,	
Key Assessment Task (KAT)	Key Assessment Task (KAT)	Key Assessment Task (KAT)	Key Assessment Task (KAT)	Key Assessment Task (KAT)	Key Assessment Task (KAT)
Year 9 KAT 1	**Year 9 Assessment 1**	**Year 9 KAT 2**	**Year 9 Assessment 2**	**Year 9 KAT 3**	**Year 9 KAT 4**

St Peter's Collegiate Academy

Yr 9 Science Progress Ladder

At St Peter's we believe that a broad and balanced curriculum with a strong academic core is a right for all pupils. We seek to encourage pupils to explore subjects of interest around their in-school learning and to enhance their curriculum experience through enrichment.

	Biology	Chemistry	Physics
Mastering	Student has an exceptional knowledge and understanding of the topics: cell structure, biological molecules & DNA, enzymes, respiration and photosynthesis. Student can apply this knowledge and understanding to the most challenging unfamiliar situations. Student averages 90% or above in assessments.	Student has an exceptional knowledge and understanding of the topics: chemical & physical changes, patterns of reactivity, separation and atomic structure. Student can apply this knowledge and understanding to the most challenging unfamiliar situations. Student averages 90% or above in assessments.	Student has an exceptional knowledge and understanding of the topics: motion and matter. Student can apply this knowledge and understanding to the most challenging unfamiliar situations. Student averages 90% or above in assessments.
Advancing	Student has an excellent knowledge and understanding of the topics: cell structure, biological molecules & DNA, enzymes, respiration and photosynthesis. Student can apply this knowledge and understanding to unfamiliar situations. Student averages 70 - 89% in assessments.	Student has an excellent knowledge and understanding of the topics: chemical & physical changes, patterns of reactivity, separation and atomic structure. Student can apply this knowledge and understanding to unfamiliar situations. Student averages 70 - 89% in assessments.	Student has an excellent knowledge and understanding of the topics: motion and matter. Student can apply this knowledge and understanding to unfamiliar situations.. Student averages 70 - 89% in assessments.
Securing	Student has a good knowledge and understanding of the topics: cell structure, biological molecules & DNA, enzymes, respiration and photosynthesis. Student is starting to be able to apply this knowledge and understanding to unfamiliar situations. Student averages 50 - 69% in assessments.	Student has a good knowledge and understanding of the topics: chemical & physical changes, patterns of reactivity, separation and atomic structure. Student is starting to be able to apply this knowledge and understanding to unfamiliar situations. Student averages 50 - 69% in assessments.	Student has a good knowledge and understanding of the topics: motion and matter. Student is starting to be able to apply this knowledge and understanding to unfamiliar situations. Student averages 50 - 69% in assessments.
Developing	Student has a basic knowledge and understanding of the topics: cell structure, biological molecules & DNA, enzymes, respiration and photosynthesis. Student averages 30 - 59% in assessments.	Student has a basic knowledge and understanding of the topics: chemical & physical changes, patterns of reactivity, separation and atomic structure. Student averages 30 - 59% in assessments.	Student has a basic knowledge and understanding of the topics: motion and matter. Student averages 30 - 59% in assessments.
Emerging	Student has developed some knowledge and understanding of the topics: cell structure, biological molecules & DNA, enzymes, respiration and photosynthesis. Student averages 0 - 29% in assessments.	Student has developed some knowledge and understanding of the topics: chemical & physical changes, patterns of reactivity, separation and atomic structure. Student averages 0 - 29% in assessments.	Student has developed some knowledge and understanding of the topics: motion and matter. Student averages 0 - 29% in assessments.