

St Peter's CE Middle School Curriculum Overview

Subject: Science

Year 5	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1 and 2
	Topic: To the Stars	Topic: Forces	Topic: Life Cycles	Topic: Animals including humans	Topic: Materials & their properties
	Concept: Spherical bodies, movement of Earth, planets and moon in relation to each other, Earth's rotation – day and night	Concept: A force can change an object's shape, speed or direction	Concept: Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including plants.	Concept: Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird What are the stages of growth and development in humans? What are the stages in the gestation period of humans and how do they differ to animals? What are the life cycles of different mammals?	Concept: Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
	Skills: Take measurements with increasing accuracy, identify scientific evidence that has been used to support or refute arguments, report and present findings in a variety of ways, use test results to make predictions and set up	Skills: Labelling scientific diagrams, measurements – repeating readings, recognising and controlling variables, discussing reasons why conclusions may be uncertain. Being able to measure forces using a Newton meter	Skills: Identify how living things grow sexually and asexually – grow celery and beans.	Skills: Identify changes in how we get older, identify the stages of gestation and compare animals. Learn about Jane Goodall and her work	Skills: Record data of increasing complexity using scientific diagrams and labels reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments

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	further comparative tests.	Being able to draw force diagrams showing the size and direction of the force. Being able to plan and carry out a fair and valid test			
	Outcome: To understand the phases of the moon To know how a shadow is formed.	Outcome: To identify different types of forces To explain that some forces are useful and some are not	Outcome: To understand the difference between asexual and sexual reproduction especially in plants. To identify the parts of a plant and what each part does To understand about seed dispersal	Outcome: To understand the stages of growth and development in humans. To identify the stages in the gestation period of humans and how do they differ to animals? To know the life cycles of different mammals?	Outcome: To be able to sort everyday materials on the basis of their properties. To identify and explain irreversible chemical changes.

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Year 6	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Topic: Electricity	Topic: Light	Topic: Classification	Topic: Evolution and inheritance	Topic: Human Body	Topic: Famous Scientists and Inventors
	Knowledge/ Concepts:	Knowledge/ Concepts:	Knowledge/ Concepts:	Knowledge/ Concepts:	Knowledge/ Concepts:	Knowledge/ Concepts:
	<p>Symbols and circuit diagrams, brightness of bulbs or volume of buzzer or speed of motor related to number and voltage of cells, switches, series and parallel circuits, resistance in wires.</p>	<p>Light travelling in straight lines, how we see objects, the eye, reflection, opaque/transparent and translucent materials, shadows, rainbows and colour spectrum, refraction through water.</p>	<p>Classification into broad groups including animals, plants and microorganisms Giving reasons for classification</p>	<p>Inheritance Offspring and variation Adaptation of animals and plants to suit their environment Evolution Fossils,</p>	<p>parts and functions of the human circulatory system, heart, blood vessels and blood impact of diet, exercise, drugs and lifestyle on bodies transport of nutrients and water within animals, including humans Keeping bodies healthy and damage from drugs and other substances</p>	<p>Work of palaeontologists such as Mary Anning, Mary Leakey, Charles Darwin and Alfred Wallace developing their ideas on evolution. Work of Scientists like Stephen Hawking on Black holes, Alexander Fleming on Penicillin, Marie Maynard Daly findings on diet and heart health, Daniel Hale Williams work on circulatory system, Steve Jobs work on electronics to design computers.</p>
Skills:	Skills:	Skills:	Skills:	Skills:	Skills:	Skills:
<p>Identifying scientific evidence that has been used to support or refute ideas or arguments in the context of the major discoveries made by</p>	<p>Record data of increasing complexity using scientific diagrams and labels, bar and line graphs. Report findings using causal relationships.</p>	<p>Recording data and results of increasing complexity using classification keys.</p>	<p>Record data of increasing complexity using scientific diagrams and labels. Reporting and presenting findings from enquiries,</p>	<p>Planning scientific enquiries, taking measurements, recording data and results, reporting and presenting findings from enquiries,</p>	<p>Report and present findings from enquiries, including causal relationships, in oral and written forms such as displays and other presentations.</p>	

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	<p>scientists in the field of electricity. Record data and results using scientific diagrams and labels. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p>	<p>Planning scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, with increasing accuracy and precision, taking repeat readings when appropriate. using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results.</p>		<p>including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments</p>	<p>including conclusions, identifying scientific evidence that has been used to support or refute ideas or arguments.</p>	<p>Record data using scatter graphs and labelled diagrams.</p>
<p>Outcome:</p> <p>To plan and carry out investigations related to how brightness of lamps is affected by changes to wires/voltages.</p>	<p>Outcome:</p> <p>To know how the human eye works (how we see). To plan and carry out investigations related to shadows/refraction/reflecti on To report findings in tables and graphs and to write conclusions using scientific vocabulary and causal conjunctions to relationships.</p>	<p>Outcome:</p> <p>To be able to read and produce keys to sort and classify living organisms.</p>	<p>Outcome:</p> <p>To use scientific vocabulary to explain clearly: Inheritance Offspring and variation Adaptation of animals and plants to suit their environment Evolution Fossils</p>	<p>Outcome:</p> <p>To know how the human circulatory system works. To plan and carry out investigations related to how exercise affects the human body. To be able to explain how to stay healthy</p>		<p>Outcome:</p> <p>To produce a scientifically relevant presentation both written and oral.</p>

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Year 7	<p>Topic: Organisms: Movement and Cells</p> <p>Earth Structure & Universe</p>	<p>Topic: Matter: - Particles and separation techniques.</p>	<p>Topic: Energy: Energy Costs and Energy Transfer</p> <p>Genes: -Variation and Human Reproduction</p>	<p>Topic: Matter: Periodic Table & Elements</p> <p>Electromagnets: Voltage & Current</p>	<p>Topic: Reactions: - Metals, non-metals, acids and alkalis.</p> <p>Ecosystems: Interdependence & Plant Reproduction</p>
	<p>Concept:</p> <p>Organisms: Cells are the fundamental unit of living organisms Identify the similarities and differences between different cells (animal, plant) Structural adaptations of unicellular organisms Hierarchical organisation of multicellular organisms Understand diffusion Understand the differences between species</p> <p>Earth: The layers of the Earth and how they interact with each other and how they are responsible for some of the characteristics of our planet. The rock cycle</p>	<p>Concept:</p> <p>Matter: All matter is made up of particles* All particles move, when heated they move faster All particles are attracted; some are more attracted than other. Filtration, evaporation, distillation, chromatography Different particles have different properties which can be used to separate them Pure and impure substances Mixtures can form when solutes break down in solvents</p>	<p>Concept:</p> <p>Energy:- Energy can be quantified and calculated Processes involving energy transfer Fuels and energy resources Work done Energy stores</p> <p>Law of conservation of energy</p> <p>Genes: - Some characteristics are passed on by genes, some are caused by your environment How characteristics are passed on from parents to offspring.</p>	<p>Concept:</p> <p>Matter: The varying physical and chemical properties of different elements. The principles underpinning the Mendeleev Periodic Table. The periodic Table: Periods and groups. How patterns in reactions can be predicted.</p> <p>Electromagnets:</p> <p>Electricity is the flow of electrons moving through a conductor. Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge Potential Difference, measured in volts, battery and bulb ratings; resistance, measured</p>	<p>Concept:</p> <p>Reactions: - Key characteristics of metals and non-metals Some metals are more reactive than others (group 1 and 2 metals) Salts can be made when metals and non-metals form a compound. The pH scale Acids and alkalis reacts together to form a salt and water (neutralisation reaction) Examples of every day acids and alkalis Name salts based on the acid used.</p> <p>Ecosystems: - Living organisms depend on each other in a food web There are predators, prey, producers and consumers,</p>

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	<p>Tsunamis, Earthquakes and volcanic eruptions The solar system can be modelled as planets rotating on tilted axes while orbiting the Sun, moons orbiting planets and sunlight spreading out and being reflected. This explains day and year length, seasons and the visibility of objects from Earth. Our solar system is a tiny part of a galaxy, one of many billions in the Universe. Light takes minutes to reach Earth from the Sun, four years from our nearest star and billions of years from other galaxies.</p>	<p>In a mixture there are no fixed ratios, but the ratios can be measured</p>	<p>Some knowledge of genetic disorders and their symptoms</p> <p>Natural selection vs survival of the fittest</p> <p>Reproduction in humans including the structure and function of the male & female reproductive systems, menstrual cycle, gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta.</p> <p>The variation between species and between individuals of the same species and the effect on natural selection. Changes in the environment may leave individuals within some species less well adapted to compete and to successfully reproduce which may in turn may lead to extinction.</p>	<p>in ohms, as the ratio of potential difference (p.d.) to current. Differences in resistance between conducting and insulating components (quantitative)</p>	<p>herbivores, carnivores and omnivores Understanding why keeping track of the numbers of organisms in species is important Describing how toxins can accumulate in a food chain and identifying some things species compete for to survive. Understanding how different species are adapted in different ways to their environment. Reproductive organs of flowering plants. Adaptations in seed dispersal</p>
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			The importance of biodiversity and the use of gene banks to preserve hereditary material.		
<p>Skills: Microscope, making slides, drawing scientific diagrams</p> <p>Presenting work to the class (in different ways) Research skills (ICT and books) Meeting deadlines Working in groups/team work</p>	<p>Skills: Basic lab skills, measuring using precise tools. Be able to use Bunsen burners safely Being able to use lab equipment safely, being able to separate different types of mixtures using several separation techniques</p>	<p>Skills: Planning and carrying out a fair test, measuring energy changes, plotting graphs, calculating averages and spotting pattern in data. Carrying out a fair test, analysing and finding patterns in data.</p>	<p>Skills: Being able to use a model to explain things we cannot see Being able to draw particle diagrams of elements and compounds Being able to make a simple compound. Make a simple circuit using basic components such as bulbs and switches. Being able to measure the current and potential difference in a circuit</p>	<p>Skills: Describing the reactions of group 1 metals with water Using different techniques to distinguish between metals and non-metals Using (universal) indicator to identify acids and alkalis Safe use of chemicals and lab equipment and being able to identify risks</p>	
<p>Outcome:</p> <p>Organisms: Being able to prepare slides and get a clear image under the microscope</p> <p>Multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes.</p>	<p>Outcome:</p> <p>Explain the properties of solids/liquid, and gas samples using the particle model Explain dissolving (using particles) Explain diffusion (using particles) Explain some of the effects of air pressure</p>	<p>Outcome:</p> <p>Energy: Being able to explain energy transfer using previously gained knowledge of particles Identify energy transfers and stores Explain how energy dissipates. Name renewable and non-renewable energy resources.</p>	<p>Outcome:</p> <p>State the unit of potential difference Describe the effect of a larger potential difference Use appropriate equipment to measure potential difference State one difference between series and parallel circuits State how potential difference varies in series and parallel circuits State what current is</p>	<p>Outcome:</p> <p>Reactions: Understanding the use of metals and alloys in everyday life Understanding the use of acids and alkalis in cleaning products. Understanding the dangers of acids and alkalis</p> <p>Ecosystems: Interpret secondary data to describe simple predator-prey relationships.</p>	

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<p>There are many types of cell. Each has a different structure or feature so it can do a specific job. Explain why multi-cellular organisms need organ systems to keep their cells alive. Explain how uni-cellular organisms are adapted to carry out functions that, in multi-cellular organisms, are done by different types of cell. Describe the structure and function of joints. Interpret observations in a chicken wing to describe how the muscles work together to cause movement. Use a diagram to predict the result of a muscle contraction or relaxation.</p> <p>Earth:</p> <p>Name some objects in the Solar System Explain how we see planets Identify some patterns in the Solar System Describe differences between seasons</p>	<p>Being able to identify the correct separation technique to be used Application of taught knowledge to an unknown mixture.</p>	<p>State one advantage and one disadvantage of fossil fuels Name a renewable resource used to generate electricity</p> <p>Genes: - Understand what is meant by the term variation State that variation is caused by the environment or inheritance Record observations of variations between different species of gull State that there are two types of variation Give a possible reason for adaptation or extinction. Identify human reproductive organs and their role. Describing the developmental stages from a fertilised egg cell to a foetus Being able to explain the terms ovulation, menstruation and fertilisation</p>	<p>Use an ammeter to measure current Identify the pattern of current in series and parallel circuits Describe how to charge insulators State the two types of charge State what surrounds charged objects Describe what happens when you bring similarly charged object together, and when you bring differently charged objects together</p>	<p>Combine food chains to form a food web. Explain issues with human food supplies in terms of insect pollinators. Interpret secondary data to describe trends and draw conclusions about predator–prey relationships. Explain how toxic materials can accumulate in human food sources. Make a deduction based on data about what caused a change in the population of a species. Explain why seed dispersal is important to survival of the parent plant and its offspring.</p>
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<p>Describe the motion of the Sun, stars, and Moon across the sky Name some phases of the Moon Show the different phases of the Moon using models provided To understand that our planet is changing and that it can have major consequences to the human population.</p>				
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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Topic: Organisms: Breathing & Digestion	Topic: Ecosystems: Respiration & Photosynthesis Matter: Periodic Table & Elements	Topic: Reactions: Chemical Energy & Types of Reaction Earth: Climate & Earth Resources	Topic: Forces: Contact Forces & Pressure Electromagnets & Magnetism	Topic: Genes: Evolutions & Inheritance Waves: Wave Properties & Wave effects	Topic: Energy: Work & Heating & Cooling
Year 8	Concept: Identify the different organs in the human body and describe their function. Understand how organs work together in an organ system (skeletal system, digestive system, muscular system, respiratory system, circulatory system). Balanced Diets Food Tests. (skeletal system, digestive system, muscular system, respiratory system, circulatory system) Balanced diet Food Tests.	Concept: Ecosystems: Reaction equation for photosynthesis and the factors affecting the rate. Plants use the glucose from photosynthesis to make many other substances and well as using it as an energy source in respiration. Reaction equations for aerobic and anaerobic respiration If insufficient oxygen is supplied anaerobic respiration takes place in muscles. The incomplete oxidation of glucose causes a build-up of lactic acid and creates an oxygen	Concept: Reactions: Some elements are more reactive than others What are the signs of a chemical reaction taking place? What is the difference between a chemical reaction and a physical change? What are exo- and endothermic reactions. Earth: Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans and the Earth's crust (such as photosynthesis and	Concept: Forces: Moment as the turning effect of a force. Forces associated with deforming objects; stretching and squashing-springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. Forces measured in Newtons, measurements of stretch or compression as force is changed. Force- extension linear relation; Hooke's Law as a special case	Concept: Genes: Some characteristics are passed on by genes, some are caused by your environment How characteristics are passed on from parents to offspring. Some knowledge of genetic disorders and their symptoms Natural selection vs survival of the fittest. Waves: When a wave travels through a substance, particles move to and fro. Energy is transferred in the direction of movement of the wave.	Concept: Work done is energy transferred Effort can be reduced by using simple machines Heat energy can be transferred through conduction, convection and radiation. - energy transfers from the hotter to the cooler object. - 3.3.4 Explain observations about changing temperature in terms of energy transfer. - 3.3.4 Describe how an object's temperature changes over time when heated or cooled. Thermal energy is

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	<p>debt. During long periods of vigorous activity muscles become fatigued and stop contracting efficiently.</p> <p>Metabolism is the sum of all the reactions in a cell or the body.</p> <p>Matter:</p> <p>All material is made up of particles. The simplest type of particle is called an atom.</p>	<p>respiration) as well as human activities (burning fuels). Greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore the temperature has been rising as the concentration of those gases has risen. Scientists have evidence that global warming caused by human activity is causing changes in climate</p>	<p>Work done and energy changes on deformation.</p> <p>Non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity.</p> <p>Electromagnets:</p> <p>How the strength of an electromagnet can be changed.</p>	<p>Waves of higher amplitude or higher frequency transfer more energy. Explain how audio equipment converts sound into a changing pattern of electric current. Waves of higher amplitude or higher frequency transfer more energy. Explain differences in the damage done to living cells by light and other waves, in terms of their frequency.</p>	<p>transferred through different pathways, by particles in conduction and convection, and by radiation.</p> <p>- 3.3.4 Explain how a method of thermal insulation works in terms of conduction, convection, and radiation.</p> <p>- 3.3.4 Sketch diagrams to show convection currents in unfamiliar situations. Thermal energy is transferred through different pathways, by particles in conduction and convection, and by radiation.</p> <p>- 3.3.4 Explain how a method of thermal insulation works in terms of conduction, convection, and radiation.</p>	
	<p>Skills:</p> <p>Simple food tests Dissection of a lungs</p>	<p>Skills:</p> <p>Investigate the effect of light intensity on the rate of photosynthesis using</p>	<p>Skills:</p> <p>Being able to carry out safe experiments using the Bunsen burner</p>	<p>Skills:</p> <p>Make an electromagnet.</p>	<p>Skills:</p> <p>Predict genetic outcomes – using Punnett squares Research on genetic disorders</p>	<p>Skills:</p> <p>Being able to carry out safe practical work Being able to get accurate results</p>

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		<p>an aquatic organism such as pondweed Plot and draw appropriate graphs selecting appropriate scale for axes . Being able to use a model to explain things we cannot see Being able to draw particle diagrams of elements and compounds Being able to make a simple compound</p>	<p>Being able to observe closely and take accurate readings Being able to recognise and interpret an energy profile for exo- and endothermic reactions. ICT skills Interpreting graphs and understand use of models to make scientific predictions</p>		<p>Data analysis of predator-prey cycles.</p>	<p>Being able to plot a graph based on results and analyse data collected.</p>
<p>Outcome: Research of organ systems going wrong Being able to identify organs Being able to explain how organ systems work together Being able to design a menu for different people. Carry out simple food tests.</p>	<p>Outcome: Ecosystems: Be able to describe photosynthesis a reaction in which energy is transferred from the environment to the chloroplasts by light. Be able to describe cellular respiration as a reaction which is continuously occurring in living cells. Be able to recall the word equations for aerobic, anaerobic respiration and</p>	<p>Outcome: Reactions: Classify unknown reactions Earth: Use a diagrams and models to show how carbon is recycled in the environment and through living things. Describe how human activities affect the carbon cycle. Describe how global warming can impact on climate and local weather patterns.</p>	<p>Outcome: Forces: Use Hooke's Law to identify proportional stretching State how you know from a graph that a relationship is linear, present data in a line graph, and identify a pattern. State the law of moments State the equation to calculate a turning force Describe the motion of particles in a fluid Calculate fluid pressure with support</p>	<p>Outcome: Genes: Natural selection is a theory that explains how species evolve and why extinction occurs. Use evidence to explain why a species has become extinct or adapted to changing conditions. Predict and explain the changes in a population over time due to natural selection. Waves:</p>	<p>Outcome: Understanding that heat is always transferred from an area where there is more to an area where there is less energy Describe how an object's temperature changes over time when heated or cooled. Explain how a method of thermal insulation works in terms of conduction, convection and radiation.</p>	

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		<p>alcoholic fermentation.</p> <p>Matter: Being able to identify elements and compounds from particle diagrams Being able to classify metals and non-metals and describe the key properties Being able to find basic elements in the periodic table Know the symbols for the first 20 elements in the periodic table</p>		<p>State simply what happens to pressure with depth Describe characteristics of some objects that float and some that sink Write down the equation for calculating fluid pressure State the equation of stress Use ideas of stress to describe familiar situations qualitatively Predict qualitatively the effect of changing area and/or force on stress</p> <p>Electromagnets: Test the effect of changing an electromagnet. State some uses of electromagnets.</p>	<p>Name some waves of the electromagnetic spectrum Name the electromagnetic wave with the biggest wavelength Name an electromagnetic wave that can be harmful to living cells. Define 'transverse' Describe a model of a light wave Define 'superpose'</p>	<p>Sketch diagrams to show convection currents in unfamiliar situations.</p>
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