YEAR 10 HALF TERM 1 SCIENCE LEARNING PROGRAMME

Love God
Serve others
Work hard
Value all

Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
Organisation	Describe the organisation of organisms including cells, tissues, organs and organ systems Know that multiple organs make an organ system Describe the function of the human lungs Explain how the human lungs are adapted for effective gas exchange Describe the structure of the double circulatory system Label the Human Heart including the blood vessels, aorta, pulmonary vein, pulmonary artery, vena cava. Describe the role of the hearts natural pacemaker Describe and explain he differences between veins, arteries and capillaries Explain how the structure of arteries, veins and capillaries are adapted to allow them to perform their function Calculate the rate of blood flow Know the components of blood Describe how the components of blood are adapted to their function	Differentiation, specialised cells, multicellular organisms, lungs, abdomen, ribcage, diaphragm, trachea, coronary arteries, capillaries, haemoglobin, tissues, organ system, phloem, xylem, air flow, humidity, temperature, arteries, muscle tissue, right atrium, right ventricle, left atrium, left ventricle, vena cava, pulmonary artery, pulmonary vein, aorta, valves, coronary arteries, artery, veins, capillaries, back flow, red blood cells, haemoglobin, white blood cells, platelets, clot, plasma, transpiration, translocation, transpiration stream, light intensity, temperature, air flow, humidity, stomata, guard cells	In this section, we will learn about the human digestive system, which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide. In each case, they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system. Damage to any of these systems can be debilitating if not fatal. Although there has been huge progress in surgical techniques, especially with regard to coronary heart disease, many interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle. We will also learn how the plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis. .	Working Scientifically: WS 1.2 Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. WS 1.3 Appreciate the power and limitations of science and consider any ethical issues which may arise. WS 1.4 Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. WS 1.5 Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences. WS 3.5 Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions.	This will be set as either a Vocabulary test or as consolidation questions on a weekly basis.

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Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
Organisation	Describe the structure of the leaves Know that roots, stem and leaves work together as an organ system Describe the role and structure of the xylem and phloem in the transport of water and dissolves sugars through the plant Explain how the xylem, phloem, root hair cells are adapted for their function Describe how light intensity, temperature, air flow and humidity affect the rate of transpiration Calculate the rate of transpiration Describe the role of stomata and guard cells in controlling gas exchange and water loss from leaves Be able to read, draw, and interpret graphs relating to transpiration			2.c. Construct and interpret frequency tables and diagrams, bar charts and histograms 2.g. Use a scatter diagram to identify a correlation between two variables 4.a. Translate information between graphical and numeric form 4.c. Plot two variables from experimental or other data Practical Skills: AT 3 Use of appropriate apparatus and techniques for measuring motion, including determination of speed and rate of change of speed (acceleration/ deceleration) (links to A-level AT a, b and d). AT 4 Making observations of waves in fluids and solids to identify the suitability of apparatus to measure speed/frequency/ wavelength. Making observations of the effects of the interaction of electromagnetic waves with matter (links to A-level AT i and j). AT 5 Safe use of appropriate apparatus in a range of contexts to measure energy changes/ transfers and associated values such as work done	This will be set as either a Vocabulary test or as consolidation questions on a weekly basis.

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Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
Electricity	Draw and interpret circuit symbols Charge flow = current x time and rearrange the equation. Describe the relationship between current, resistance and potential difference	Alternating current (ac) Ammeter Current Diode Direct current (dc) Electric field	Electric charge is a fundamental property of matter everywhere. Understanding the difference in the microstructure of conductors, semi-conductors and insulators makes it possible to design components and build electric circuits	Working Scientifically: WS 1.2 Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations.	

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Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
Electricity	Recall equation: PD = current x resistance Be able to rearrange the equation and state the units for each Investigate the factors affecting the resistance of electrical circuits (length of wire and resistors in series/parallel) Explain how current behaves through an ohmic conductor and draw a Current/PD graph Explain the relationship between Current at PD in a filament lamp, diode and resistors and draw current/PD graphs Explain the application of LDR's in circuits Construct appropriate circuits to investigate the I-V characteristics of a variety of circuit elements e.g. filament lamp, diode and resistor Draw a series circuit and describe how current, PD and resistance behave in series Draw parallel circuits and describe how current, PD and resistance behave in parallel Compare Series and Parallel circuits	Light dependent resistor (LDR) Mains electricity National Grid Ohmic conductor Parallel circuit Potential difference Resistance Series circuit Static electricity Step - down transformer Step - up transformer Thermistor Voltmeter Wires in 3 - core cable	Many circuits are powered with mains electricity, but portable electrical devices must use batteries of some kind. Electrical power fills the modern world with artificial light and sound, information and entertainment, remote sensing and control. The fundamentals of electromagnetism were worked out by scientists of the 19th century. However, power stations, like all machines, have a limited lifetime. If we all continue to demand more electricity this means building new power stations in every generation – but what mix of power stations can promise a sustainable future?	WS 1.4 Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. WS 1.5 Evaluate risks both in practical science and in the wider societal context, including perception of risk in relation to data and consequences. WS 4.5 Interconvert units. Maths Skills: 1.c. Use ratios, fractions and percentages 3.b. Change the subject of an equation 3.c. Substitute numerical values into algebraic equations using appropriate units for physical quantities 3.d. Solve simple algebraic equations 4.c. Plot two variables from experimental or other data 4.d. Determine the slope and intercept of a linear graph 4.e. Draw and use the slope of a tangent to a curve as a measure of rate of change	This will be set as either a Vocabulary test or as consolidation questions on a weekly basis.

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Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
Electricity	Describe mains electricity and describe the difference between AC and DC current Be able to wire a plug Explain the role of the live, neutral and earth wire in a plug Calculate power Power=PD x current OR Power=(current)^2 x resistance Describe how domestic appliances transfer energy Calculate energy transfer Explain how the power of a device is related to the PD and current and energy transfer Describe relationship between power ratings for domestic electrical appliances and changes in energy store Explain the National Grid system **Static (PHYSICS ONLY)** Describe production of static Explain the transfer of electrons in static electricity Draw Electric fields and explain the concept of Electric Fields			AT 7 Use of circuit diagrams to construct and check series and parallel circuits including a variety of common circuit elements (links to A-level AT g).	This will be set as either a Vocabulary test or as consolidation questions on a weekly basis.

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Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
Energy	Describe energy changes in different systems & apply changes to any situation. To be able to calculate the efficiency of an appliance. & explain conservation of energy. To understand how the amount of gravitational potential energy gained by an object raised above the ground level can be calculated. To be able to apply GPE and KE equations to find the velocity of an object. To be able to calculate the amount of elastic potential energy stored in a stretched spring & suggest the effect of changing value of k (spring constant) on the extension and energy of the spring. To be able to describe and calculate the specific heat capacity of a substance. To be able to define the term 'work done' and be able to calculate the amount of energy transferred by electrical work. To be able to calculate Power.	Conservation of energy Dissipated Efficiency Elastic potential energy Global warming Gravitational field strength (g) Gravitational potential energy Joules, J Kinetic energy Mass Non- renewable energy resource Power Renewable energy resource Specific heat capacity Spring constant Sulphur dioxide Thermal conductivity Watts, W Weight Work done	The concept of energy emerged in the 19th century. The idea was used to explain the work output of steam engines and then generalised to understand other heat engines. It also became a key tool for understanding chemical reactions and biological systems. Limits to the use of fossil fuels and global warming are critical problems for this century. Physicists and engineers are working hard to identify ways to reduce our energy usage.	Working Scientifically: WS 1.2 Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. WS 1.3 Appreciate the power and limitations of science and consider any ethical issues which may arise. WS 3.5 Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions. WS 1.4 Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. WS 4.3 Use SI units (eg kg, g, mg; km, m, mm; kJ,J) and IUPAC chemical nomenclature unless inappropriate. WS 4.4	This will be set as either a Vocabulary test or as consolidation questions on a weekly basis.

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Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
Energy	To be able to explain what is meant by conduction and thermal conductivity. To be able to explain how each insulation reduces energy loss and what type of energy transfer it reduces. To be able to explain all stages including role of transformers in the national grid. To be able to evaluate the use of Nuclear power and compare to other forms of energy resources. To be able to compare the ways that different energy resources are used. The uses to include transport, electricity generation and heating.			Working Scientifically: Maths Skills: 1.a.Recognise and use expressions in decimal form 1.c Use ratios, fractions and percentages 2.c Construct and interpret frequency tables and diagrams, bar charts and histograms 3.b Change the subject of an equation 3. c Substitute numerical values into algebraic equations using appropriate units for physical quantities 4.a Translate information between graphical and numeric form Practical Skills: AT 1Use of appropriate apparatus to make and record a range of measurements accurately, including length, area, mass, time, volume and temperature. Use of such measurements to determine densities of solid and liquid objects (links to A-level AT a and b). AT 5 Safe use of appropriate apparatus in	This will be set as either a Vocabulary test or as consolidation questions on a weekly basis.

YEAR 10 HALF TERM 3 SCIENCE LEARNING PROGRAMME

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YEAR 10 HALF TERM 5 SCIENCE LEARNING PROGRAMME

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Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning

YEAR 10 HALF TERM 6 SCIENCE LEARNING PROGRAMME

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