TWO RIVERS
HIGH SCHOOL

Two Rivers High School

Adventurers – Year 9 & 10

Knowledge and Skills

	Autumn 2022-23		Spring 2022-23		Summer 2022-23	
	Photosynthesis	Ecosystems	Earth and Atmosphere		Electricity and Magnetism	
To define the role of the leaf stomata in gas exchange in plants						
To describe how plants make carbohydrates in their leaves by photosynthesis and gain mineral nutrients and water from soil via their roots						
To draw the cycle of photosynthesis						
To write a summary of the process of photosynthesis						
To identify the adaptations of leaves for photosynthesis						
To define the aerobic and anaerobic respiration in living organisms						
To write a word summary for aerobic respirations						
To describe the process of anaerobic respiration in humans and micro-organisms including fermentation						

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To write a word summary for anaerobic respirations						
To describe the differences between aerobic and anaerobic respirations in terms of the reactants, the products formed and the implications for the organism.						
To define what an ecosystem is						
To describe the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops						
To recap plant reproduction						
To explain the importance of plant reproduction through insect pollination in human food security						
To identify which organisms, affect and are affected by their environment						
To recap biodiversity						
To describe the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material						
To recap the planets in the Solar system						
To draw and label the composition of the Earth						
To draw and label the structure of the Earth						
To write a summary of the composition and structure of the Earth						
To draw the rock cycle						
To describe the formation igneous, sedimentary and metamorphic rocks						

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To draw and label the carbon cycle						
To identify the composition of the atmosphere						
To explain production of carbon dioxide by human activity						
To identify the impact of carbon dioxide on climate						
To explain electric current						
To introduce units of measurements – amperes, volts, ohms						
To describe electric current in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge						
To identify potential difference, measured in volts, battery and bulb ratings; resistance, measured ohms, as the ratio of potential difference to current						
To calculate differences in resistance between conducting and insulating components						
To describe the separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects						
To explain the idea of electric field, forces acting across the space between objects not in contact						
To define magnetic poles, attraction and repulsion						
To plot magnetic fields with compass						

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To describe the Earth's magnetism, compass and navigation						
To give the principles of the magnetic effect of a current, electromagnets, D.C motors						
Working scientifically key skills:						
To pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility						
To understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review						
To evaluate risks.						
To ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience						
To make predictions using scientific knowledge and understanding						
To select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate						
To use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety						
To make and record observations and measurements using a range of methods for						

different investigations; and evaluate the reliability of methods and suggest possible improvements	■				■	■
To apply sampling techniques.	■					
To apply mathematical concepts and calculate results			■		■	■
To present observations and data using appropriate methods, including tables and graphs	■		■		■	■
To interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions		■			■	■
To present reasoned explanations, including explaining data in relation to predictions and hypotheses			■		■	■
To evaluate data, showing awareness of potential sources of random and systematic error	■		■		■	■
To identify further questions arising from their results.	■	■			■	■
To understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature			■			
To use and derive simple equations and carry out appropriate calculations			■		■	■
To undertake basic data analysis including simple statistical techniques.			■			

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	Autumn 2023-24		Spring 2023-24		Summer 2023-24	
	Inheritance and Evolution		Acids & Alkalis	Materials & recycling	Motion & Pressure	Waves
To understand and describe how heredity as the process by which genetic information is transmitted from one generation to the next						
To label a simple model of chromosomes, genes and DNA						
To describe the work undertaken by Watson, Crick, Wilkins and Franklin in the development of the DNA model						
To define the differences between species						
To explain the variation between individuals within a species being continuous and discontinuous including measurements and graphical representation of variation						
To define natural selection						
To describe how environmental changes may leave individuals within a species and an entire species						
To explain the process of extinction						
To define an acid in terms of neutralisation reactions						
To define an alkali in terms of neutralisation reactions						

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To demonstrate effective use of pH scale to measure acids and alkalis						
To investigate reactions of acids with metals to produce a salt plus hydrogen						
To investigate reactions of acids with alkalis to produce a salt plus water						
To describe exothermic and endothermic chemical reactions						
To describe the function of catalysts						
To explain how the Earth is a source of limited resources						
To describe the efficacy of recycling						
To show the cycle of recycling paper						
To list the order of metals and carbon in the reactivity series						
To draw and explain the use of carbon in obtaining metals from metal oxides						
To describe the properties of ceramics, polymers and composites						
To define speed and the quantitative relationship between speed, distance and time						
To represent a journey on a distance-time graph						
To explain relative motion						
To explain the forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion						

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To explain atmospheric pressure, decrease**s** with increasing height as weight of air above decreases with height						
To investigate pressure in liquids						
To use moment as a turning effect of a force						
To explain waves on water as undulations which travel through water with transverse motion						
To explain the frequencies of sound waves measured in hertz						
To explain in more depth sound waves and echoes, reflection and absorption of sound						
To understand that sound needs a medium to travel						
To explain the differences between sound in air, water and solids						
To investigate sound produced by vibrations of objects, in loudspeakers						
To explain that sound waves are longitudinal						
To describe the auditory range of humans and animals						
To explain the similarities and differences between light waves and waves in matter						
To introduce the concept of the speed of light						
To explain the transmission of light through different materials linking in diffusion, scattering and reflection						
To use a ray model to explain imaging in mirrors						

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To explain light transfer from source to absorber leading to chemical and electrical effects						
To investigate colour and the frequency of light						
Working scientifically key skills:						
To pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility						
To understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review						
To evaluate risks.						
To ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience						
To make predictions using scientific knowledge and understanding						
To select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate						
To use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety						

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To make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements					
To apply sampling techniques.					
To apply mathematical concepts and calculate results					
To present observations and data using appropriate methods, including tables and graphs					
To interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions					
To present reasoned explanations, including explaining data in relation to predictions and hypotheses					
To evaluate data, showing awareness of potential sources of random and systematic error					
To identify further questions arising from their results.					
To understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature					
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