



TWO RIVERS
HIGH SCHOOL

Two Rivers High School
Adventurers – Year 7 & 8
Knowledge and Skills

	Autumn 2022-23	Spring 2022-23	Summer 2022-23	
	Cells and Organisation	States of matter & separating mixtures	Energy changes	Space
Key content:				
To explain cells as the fundamental unit of living organisms				
To use a light microscope to observe interpret and record cell structure				
To label and define the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts				
To explain the differences between plant and animal cells				
To explain the role of diffusion in the movement of materials in and between cells				
To identify the structural adaptations of some unicellular organisms				
To describe the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems of organisms				



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To label the structure and define the functions of the human skeleton, which includes support, protection, movement and making blood cells				
To explain biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles				
To explain the function of muscles and give examples of antagonistic muscles.				
To introduce the particle model				
To define the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure				
To explain the similarities and differences, including density differences between solids, liquids and gases				
To explain changes of state in terms of the particle model				
To introduce core vocabulary of melting, freezing, evaporation, sublimation, condensation and dissolving				
To look at conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation and dissolving				
To explain the difference in arrangements in motion and in closeness of particles explaining changes of state, shape and density				



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To research and explain the anomaly of ice-water transition					
To explain atoms and molecules as particles					
To describe changes with temperature in motion and spacing of particles					
To identify the internal energy stored in materials					
To explain energy changes on changes of state					
To introduce the concept of a pure substance					
To define a pure substance					
To identify pure substances					
To explain the Brownian motion in gases					
To describe diffusion in terms of the particle model					
To describe diffusion in liquids and gases driven by differences in concentration					
To identify simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography					
To understand energy as a quantity that can be quantified and calculation; the total energy has the same value before and after a change					
To compare the starting with the final conditions of a system and to describe increases and decreases in the amounts of energy associated with movements, temperatures, changes up positions in a field,					



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in elastic distortions and in chemical compounds						
To use physical processes and mechanisms, rather than energy, to explain intermediate steps that bring about such changes						
To identify that simple machines, give bigger force but at the expense of smaller movement (and vice-versa): product of force and displacement unchanged						
To understand and explain the heating equilibrium						
To compare energy values of different foods						
To compare power ratings of appliances						
To compare amounts of energy transferred						
To look at domestic fuel bill to identify consumption and costs						
To understand and define gravity force, weight = mass x gravitational field strength (g), on Earth $g = 10\text{N/kg}$, different on other planets and stars, gravity forces between Earth and Moon, and between Earth and Sun (qualitative only)						
To explain our Sun as a star, stars in our galaxy, other galaxies						
To explain the seasons in relation to the Earth's tilt						
To explain day length at different times of the year and in different hemispheres						



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To describe the light year as a unit of astronomical distance						
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						



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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.						



Skills	Autumn 2023-24		Spring 2023-24		Summer 2023-24
	Reproduct ion	Health and the Huma n body	Atoms and the period ic table	Chemi cal reacti ons	Forces
Key content:					
To identify the structure and function of the male and female reproductive systems					
To explain the menstrual cycle (without details of hormones)					
To look at the cycle of gametes, fertilisation, gestation and birth					
To identify key features of maternal lifestyle which could affect the foetus through the placenta					
To look at the differences between human and plant reproduction					
To explain flower structure, wind and insect pollination, fertilisation and fruit formation and dispersal					
To describe the structure and functions of the gas exchange system in humans, including adaptations to function					



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To describe the mechanism of breathing in to move air in and out of the lungs, including pressure model and simple measurements of lung volume					
To identify and explain the impact of exercise, asthma and smoking on the human gas exchange system					
To explain the function and necessity of carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water					
To calculate energy requirements in a healthy daily diet					
To explain how obesity, starvation and deficiency diseases can occur in relation to diet					
To draw and label the digestive system					
To explain the role of tissues and organs in the digestive system					
To explain the importance of bacteria in the human digestive system					
To explain a simple (Dalton) atomic model					
To describe the differences between atoms, elements and compounds					
To look at the different chemical symbols formulae for elements and compounds					
To understand the principles behind the Mendeleev Periodic Table					
To use the Periodic Table to retrieve information					



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To identify how patterns in reactions can be predicted using the Periodic Table					
To describe the properties of metals and non-metals					
To explain the differences between chemical and physical changes					
To describe the conservation of mass in changes of state and chemical reactions					
To define chemical reactions as the rearrangements of atoms					
To represent chemical reactions using formulae and using equations					
To understand and explain combustion, thermal decomposition, oxidation and displacement reactions					
To describe forces as pushes or pulls					
To use force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces					
To describe 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					
To explain how force is measured in newtons					
To describe measurements of stretch or compression as force is changed force extension linear relation					



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To describe Hooke's Law and explain why it is a special case						
To explain non-contact forces; gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity						
To identify opposing forces and equilibrium						
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						



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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					



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To use and derive simple equations and carry out appropriate calculations					
To undertake basic data analysis including simple statistical techniques.					