St Joseph's RC Middle School

Science Overview

Year 8

	Autumn		Spring		Summer	
	1	2	1	2	1	2
Topic	Digestion	Periodic Table	Forces	Electricity	Respiration/Photosynthesis	Heating/Cooling
Areas of curriculum covered	Describe the content of a healthy human diet: carbohydrate, lipids (fats and oils), proteins, vitamins, minerals, dietary, fibre and water and explain why each is needed. Describe the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food Explain the role of enzymes as biological catalyst. Consider the consequences of the imbalances in the diet, including obesity starvation and deficiency diseases. Calculate energy requirements in a healthy daily diet. Explain the importance of bacteria in the human digestive system.	Describe the varying physical and chemical properties of different elements Describe the principles underpinning THE Mendeleev Periodic Table Describe the Periodic Table: periods and groups; metals and non-metals. Explain how patterns in reactions can be predicted with reference to the Periodic Table. Research the properties of metals and non-metals Describe the order of metals and carbon in the reactivity series. Understand that chemical reactions involve the rearrangement of atoms. Represent chemical reactions using formulae and using equation. Investigate combustion, thermal, decomposition, oxidation and displacement reactions.	Describe forces as pushes of pulls arising from the interaction between two objects Use arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces Describe forces, associated with deforming objects; stretching and squashing – springs; friction between surfaces pushing things out of the way; resistance of air and water. Define forces as measured in newton's measurements of stretch or compression as the force applied is changed. Investigate force-extension linear relation; Hooke's Law Consider work done and energy changes on deformation Investigate non-contact forces; gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to	Describe electric currents, measured in amperes, in circuits series and parallel circuits, currents add where branches meet and current as flow of charge. Investigate potential difference, measured in volts, battery and bulb ratings; resistance measured in ohms, as the ratio of potential difference (p.d) to current. Investigate differences in resistance between conducting and insulating components (quantative) Describe electrostatic forces as the separation of positive or negative charges when objects are rubbed together: transfer of electrons Explain the idea of electric field, forces acting across the space between objects not in contact. Consider magnetic poles, attraction and repulsion	Describe how plants make carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots Give the reactants in, and products of, photosynthesis and a word summary for photosynthesis Explain the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to builds organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere Describe aerobic and anaerobic respiration in living organism, including the breakdown of organic molecules which enables all the other chemical processes necessary for life. Write a word summary for	Compare the starting and the final conditions of a system and describing increases and decreases in the amount of energy associated with movements, temperature (not covered in detail: changes in position in a field, in elastic distortions and in chemical compositions) Describe heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one through contact (conduction) or radiation, such transfers tending to reduce the temperature difference. Access the use of insulators to minimise heat transfer

		Use the PH scale for measuring acidity/alkalinity; and indicators Investigate the reactions of acids with metals to produce a salt plus hydrogen. Investigate the reactions of acids with metals to produce a salt plus hydrogen Investigate the reactions of acids with alkalis to produce a salt plus water Consider the chemical properties of metal and non-metal oxides with respect to acidity. Explain what catalysts do Investigate exothermic and endothermic chemical reactions Describe energy changes on changes of state	static electricity. Describe opposing forces and equilibrium; including weight held by stretched spring or supported on a compressed surface. Study speed and the quantities relationship between average speed distance and time (speed=distance/time) Represent a journey on a distance-time graph Explain the meaning of relative motion: trains and cars passing one another. Describe the forces being needed to casue objects to stop or start moving, por to change their speed or directions of motions (qualitative only) Explain why simple machines give bigger forces but at the expenses of smaller movement (and vice versa): product of force and displacement.	Plot magnetic fields with compass representation by field lines (HW Project) Study Earth's magnetism compass and navigation Investigate the magnetic effect of a current electromagnets D.C motors (principles only)	aerobic respiration Access the process of anaerobic respiration in humans and micro-organisms including fermentation and a word summary for anaerobic respiration. Contrast the differences between aerobic and anaerobic respiration in terms of the reactants the products formed and the implications of the organisms. Explain the structure and functions of the gas exchange system in humans, including adaptations to function Describe the mechanism of breathing to move air in and out of the lungs using a pressure model to explain the movement of gasses including simple measurements of lung volume. Evaluate the impact of exercise asthma and smoking on the human gas exchange system.	

Working Scientifically			
Scientific Attitudes - Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility - Understand that scientific methods and theories develop as earlier explanations are modified to take	**Experimental Skills and Investigations** - Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience - Make predictions using scientific knowledge and understanding	**Analysis and evaluation** - Apply mathematical concepts and calculate results - Present observations and data using appropriate methods, including tables and graphs - Interpret observations and data,	**Measurement** Understand and use SI units and chemical nomenclature Use and derive simple equations and carry out appropriate calculations Undertake basic data analysis including simple statistical techniques

account of new evidence and ideas together with the importance of publishing results and peer review. - Evaluate risks in experimental investigations including the use of CLEAPPS hazards.	- Select plan and carry out the most appropriate types of scientific enquiries to test predictions including identifying in depended, depended and control variables, where appropriate. - Use appropriate techniques apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety. - Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements - Apply sampling techniques	including identifying patterns and using observations measurements and data to draw conclusions. - Present reasoned explanations, including explaining data in relation to predictions and hypotheses. - Evaluate data, showing awareness of potential sources of random and systematic error. - Identify further questions arising from their results	