Bishop Rawstorne Academy – Science Curriculum Area

Year 8 Curriculum- Knowledge and Skills

Year 8 unit of work	NC statement -Knowledge	NC statement -Skills
Health and lifestyle	• Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre, and water, and why each is needed. • Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. • Simple food tests for starch, simple (reducing) sugars, protein, and lipids. • Calculations of energy requirements in a healthy daily diet. • The consequences of imbalances in the diet, including obesity, starvation, and deficiency diseases. • The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts). • Enzymes simply as biological catalysts. • The importance of bacteria in the human digestive system. • The effects of 'recreational' drugs (including substance misuse) on behaviour, health, and life processes. • The effect of maternal lifestyle on the fetus through the placenta. • The effects of 'recreational' drugs (including substance misuse) on behaviour, health, and life processes. • The effect of maternal lifestyle on the fetus through the placenta.	• Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety. • Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements. • Present observations and data using appropriate methods, including tables and graphs.
Ecosystem processes	• The reactants in, and products of, photosynthesis, and a word summary for photosynthesis. • The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use	• Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety.

	sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere. • The adaptations of leaves for photosynthesis. • The role of leaf stomata in gas exchange in plants. • Plants making carbohydrates in their leaves by photosynthesis and gaining minerals, nutrients, and water from the soil via their roots. • Undertake basic data analysis including simple statistical techniques. • Chemosynthesis in bacteria and other organisms. • Aerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life. • A word summary for aerobic respiration. • Anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life. • The process of anaerobic respiration in humans and microorganisms, including fermentation, and a word summary for anaerobic respiration. • The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed, and the implications for the organism. • The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops. • How organisms affect, and are affected by, their environment, including the accumulation of toxic materials. • The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops.	• Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements. • Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas. • Select, plan, and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent, and control variables, where appropriate. • Biology • Evaluate data, showing awareness of potential sources of random and systematic error. • Present observations and data using appropriate methods, including tables and graphs. • Apply sampling techniques.
Adaptations and inheritance	• The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. • Differences between species.	• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. Present observations and data using appropriate methods, including tables and graphs. • Understand that scientific methods and theories develop as earlier explanations are modified to take account of new

	• Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. • Differences between species. • The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation. • Heredity as the process by which genetic information is transmitted from one generation to the next • A simple model of chromosomes, genes, and DNA in heredity, including the part played by Watson, Crick, Wilkins, and Franklin in the development of the DNA model. • How organisms affect, and are affected by, the environment • The variation between species and between individuals of the same species, natural selection. • Present reasoned explanations, including explaining data in relation to predictions and hypotheses. • Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. • The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.	evidence and ideas, together with the importance of publishing results and peer review. • 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.
The periodic table	• The Periodic Table: metals and non-metals. • The properties of metals and non-metals. • The chemical properties of metal and non-metal oxides with respect to acidity. • The Periodic Table: periods and groups. • The principles underpinning the Mendeleev Periodic Table. • The varying physical and chemical properties of different elements. • How patterns in reactions can be predicted with reference to the Periodic Table. • The varying physical and chemical properties of different elements.	• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. Apply mathematical concepts and calculate results. • Chemistry • Make and record observations and measurements using a range of methods for different investigations. • Evaluate risks

	• How patterns in reactions can be predicted with reference to the • The varying physical and chemical properties of different elements. • How patterns in reactions can be predicted with reference to the Periodic Table.	
Separation techniques	• The concept of a pure substance. • Mixtures, including dissolving. • The identification of pure substances. • Mixtures, including dissolving. • The identification of pure substances. • Mixtures, including dissolving. • Simple techniques for separating mixtures: filtration, evaporation. • Simple techniques for separating mixtures: evaporation, distillation. • Simple techniques for separating mixtures: chromatography.	• Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. Select, plan, and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent, and control variables, where appropriate. • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety.
Metals and acids	• The order of metals and carbon in the reactivity series. • The order of metals and carbon in the reactivity series. • The order of metals and carbon in the reactivity series. • Combustion, thermal decomposition, oxidation, and displacement reactions. • The order of metals and carbon in the reactivity series. • Make predictions using scientific knowledge and understanding. • The order of metals and carbon in the reactivity series. • The use of carbon in obtaining metals from metal oxides. • Properties of ceramics (qualitative). • Properties of polymers (qualitative). • Properties of composites	• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. • Select, plan, and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent, and control variables, where appropriate
The Earth	• The composition of the Earth. • The structure of the Earth. • The composition of the atmosphere.	• Present observations and data using appropriate methods, including tables and graphs.

	• The formation of sedimentary rocks. • The formation of igneous and metamorphic rocks. • The rock cycle. • The carbon cycle. • The production of carbon dioxide by human activity and the impact on climate. • The production of carbon dioxide by human activity and the impact on climate. • Earth as a source of limited resources and the efficacy of recycling.	• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. • Make predictions using scientific knowledge and understanding. Present observations and data using appropriate methods. • Apply mathematical concepts and calculate results.
Electricity and magnetism	• Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects. • The idea of electric field, forces acting across the space between objects not in contact. • Non-contact forces: forces due to static electricity. • Using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about changes in systems. • Electric current, measured in amperes in circuits. • Current as a flow of charge. • Using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about changes in systems. • Potential difference, measured in volts. • Battery and bulb ratings. • Series and parallel circuits, currents add where branches meet. • Resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. • Differences in resistance between conducting and insulating components (quantitative). • Magnetic poles, attraction and repulsion.	• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety. • Select, plan, and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent, and control variables, where appropriate. • Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements. • Make predictions using scientific knowledge and understanding. • Identify further questions arising from their results.

	• Magnetic fields by plotting with compass, representation by field lines. • Earth's magnetism, compass, and navigation. • Non-contact forces: forces between magnets. • Using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about changes in systems. • The magnetic effect of a current, electromagnets, D.C. motors (principles only).	
Energy	• Comparing energy values of different foods (from labels) (kJ). • Fuels and energy resources. • Energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change. • Comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperature, changes in positions in a field, in elastic distortions and in chemical compositions. • Other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. • Energy changes on deformation. • Heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one. • Changes with temperature in motion and spacing of particles. • Heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction); such transfers tending to reduce the temperature difference; use of insulators.	• Present reasoned explanations, including explaining data in relation to predictions and hypotheses. • Make and record observations and measurements using a range of methods for different investigations. Evaluate data, showing awareness of potential sources of random and systematic error. • Evaluate risks. • Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. • Make predictions using scientific knowledge and understanding • Evaluate data, showing awareness of potential sources of random and systematic error.

	• Temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through radiation. • Domestic fuel bills, fuel use, and costs. • Fuels and energy resources. • Comparing power ratings of appliances in watts (W, kW). • Comparing amounts of energy transferred (J, kJ, kWh). • Domestic fuel bills, fuel use, and costs. • Work done • Examples of processes that cause change with forces (work = force × distance) levers and gears reducing force by increasing distance simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged.	
Light	• The similarities and differences between light waves and waves in matter. • Light waves travelling through a vacuum; speed of light. • The transmission of light through materials: absorption, diffuse scattering, and specular reflection at a surface. • The transmission of light through materials: absorption, diffuse scattering, and specular reflection at a surface. • Use of ray model to explain imaging in mirrors. • Differential colour effects in absorption and diffuse reflection. • The refraction of light and action of convex lens in focusing (qualitative); the human eye. • Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. • Use of ray model to explain the pinhole camera. • The refraction of light and action of convex lens in focusing (qualitative); the human eye. • Colour and the different frequencies of light, white light, and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.	• Evaluate data, showing awareness of potential sources of random and systematic error. • Use appropriate techniques and apparatus during fieldwork and laboratory work, paying attention to health and safety. • Present and record observations using appropriate methods, including tables and graphs. • Make predictions using scientific knowledge and understanding