Year 8 Science – 110 hours max to include reviews, skills and 4 tests, and investigations

Biology: 36 hours

Topic	KS3 Programme of Study statements	Skills opportunity Investigation Smaths Literacy Applied
Health, nutrition & digestion. **12**	♣ content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed ♣ calculations of energy requirements in a healthy daily diet ♣ the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases ♣ the effects of recreational drugs (including substance misuse) on behaviour, health and life processes. ♣ 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) ♣ the importance of bacteria in the human digestive system	Investigation – burning foods – which has the most energy Comparing energy packets for food content NB done in physics energy section also– use it for hypothesis only and / or making a healthy meal plan. Smaths calculating energy values – per serving or per 100g – balancing in and out. Literacy – keywords for digestive system, story of a food travelling through the digestive system Applied – nutritionist, sports dietician, Unicef nutritionist working around the world in famines etc,
Organ Systems & respiration **11**	♣ the structure and functions of the gas exchange system in humans, including adaptations to function ♣ the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume ♣ the impact of exercise, asthma and smoking on the human gas exchange system ♣ aerobic and anaerobic 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 ♣ the process of anaerobic respiration in humans and micro-organisms, 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.	
Genetics **12**	♣ 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	

	♣ differences between species ♣ the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation ♣ the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection ♣ 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.	

Chemistry: 36 hours

Topic	**KS3 Programme of Study statements**	**Skills opportunity** Investigation Smaths Literacy Applied
Pure and impure, separation techniques	♣the concept of a pure substance ♣ mixtures, including dissolving ♣ diffusion in terms of the particle model ♣ simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography ♣ the identification of pure substances.	
The periodic table and different materials	♣the varying physical and chemical properties of different elements ♣ the principles underpinning the Mendeleev Periodic Table ♣ the Periodic Table: periods and groups; metals and non-metals ♣ how patterns in reactions can be predicted with reference to the Periodic Table ♣ the properties of metals and non-metals ♣ the chemical properties of metal and non-metal oxides with respect to acidity. ♣ the order of metals and carbon in the reactivity series ♣ the use of carbon in obtaining metals from metal oxides ♣ properties of ceramics, polymers and composites (qualitative).	Review composites lessons
More Chemical Reactions	♣ energy changes on changes of state (qualitative) ♣ exothermic and endothermic chemical reactions (qualitative). ♣ conservation of mass, changes of state and chemical reactions ♣ thermal decomposition, combustion and oxidation reactions	

Physics: 36 hours

Topic	KS3 Programme of Study statements	Skills opportunity Investigation Smaths Literacy Applied
Energy	♣ comparing energy values of different foods (from labels) (kJ) ♣ comparing power ratings of appliances in watts (W, kW) ♣ comparing amounts of energy transferred (J, kJ, kW hour) ♣ domestic fuel bills, fuel use and costs ♣ fuels and energy resources. ♣ simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged ♣ 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: use of insulators ♣ other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. ♣ 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, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions ♣ using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes.	
The Particle model	♣ conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving ♣ similarities and differences, including density differences, between solids, liquids and gases ♣ Brownian motion in gases. ♣ diffusion in liquids and gases driven by differences in concentration ♣ the difference between chemical and physical changes. ♣ the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition ♣ atoms and molecules as particles. ♣ changes with temperature in motion and spacing of particles ♣ internal energy stored in materials	
Electricity and Electromagnetism	♣ electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge ♣ potential difference, measured in volts, battery and bulb ratings;	

	♣ 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. Magnetism ♣ magnetic poles, attraction and repulsion ♣ magnetic fields by plotting with compass, representation by field lines ♣ Earth's magnetism, compass and navigation ♣ the magnetic effect of a current, electromagnets, D.C. motors (principles only).	