SCIENCE

Year 9

What are the aims and intentions of this curriculum?

The aim of our Key Stage 3 Science Curriculum is to focus on delivering a curriculum that offers all students the opportunity to discover science through hands on investigation, discussions, enquiring skills, developing debating skills and promoting self-sufficient learners. To develop independent learners, to ensure that the topics taught at KS3 are covered in progressively greater depth in order to prepare students for GCSE and extend the students' repertoire of skills through practical experience that prepares them for life beyond school.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	**Biology** Cell structure and transport Cell division Organisation and the digestive system	The world of the microscope, Animal and plant cells, Eukaryotic cells and prokaryotic cells, specialisation in animal cells, diffusion, osmosis, active transport, cell division, stem cells, tissues and organs, the digestive system, food chemistry, catalysts and enzymes,	• use a light microscope • calculate total magnification • write a suitable plan to investigate into the effect of salt or sugar solutions on plant tissue. • attempt to clone a plant by using the apparatus correctly and following safety rules. • verbally communicate well constructed arguments for or against stem cells. • carry out a food test and record results in a table. • plan an experiment to investigate how different catalysts affect the rate of a reaction.	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation
Autumn 2	**Biology** Organizing animals and plants **Physics** Conservation and dissipation of energy Energy transfer by heating	Blood, the heart, breathing and gas exchange, transport system in plants, factors affecting transpiration, Changes in energy stores, energy and work, electrical appliances, energy and efficiency, energy and power, energy transfer by conduction, specific heat capacity, heating and insulating buildings	• view blood under a light microscope and recognise components • use a microscope to identify the different tissues in a cross-section of a leaf. • describe the energy changes in a range of experiments and account for energy dissipation to the surroundings. • can use the equation for work done to calculate distances or size of forces. • investigate the relationship between the energy stored in a spring and the kinetic energy store of an object launched • investigate the efficiency of a motor. • measure the specific heat capacity of a material and find a mean value.	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation

Spring 1	**Physics** Energy resources **Chemistry** Atomic structure The periodic table	Energy demands, energy and the environment, structure of the atoms, chemical equations, separating mixtures, electronic structures, development of the periodic table	• calculate the energy provided by a solar heating system by using the increase in water temperature • perform a range of calculations, including rearrangement of the equation Q=It. • use experimental data to explain the classification of a substance as a compound or a mixture • write word and symbol equations from descriptions of how Group 1 metals react with water. • use data to determine the state of a substance at a given temperature. • draw dot and cross diagrams of compounds formed between Group 1 and Group 7 elements.	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation
Spring 2	**Chemistry** Structure and bonding Chemical calculations **Biology** Communicable diseases Preventing and treating disease	States of matter Ionic and covalent bonding, giant structures, relative masses and moles, Health and disease, pathogens, viral and bacterial diseases, human defence responses, discovering and developing drugs, preventing infections	• generate formula of a wide range of ionic compounds when the charges of the ions are given • draw dot and cross diagrams and ball and stick diagrams for H2, Cl2, O2, N2, HCl, H2O, NH3, and CH4. • communicate to the public about how to stop the spread of a disease • use a model to explain how the body defends itself against disease	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation
Summer 1	**Biology** Non communicable disease Photosynthesis Respiration	Vaccination, Antibiotics and painkillers, discovering new drugs, non-communicable diseases, cancer, smoking and the risk of disease, diet, exercise, and disease, alcohol and other carcinogens, the rate of photosynthesis, making the most of photosynthesis, aerobic and anaerobic respiration, metabolism and liver	• can decide when a painkiller or antibiotic should be used to treat an illness. • can analyse data to draw conclusions on the effectiveness of new antibiotics. • critically analyse the results from a double blind trial. • classify diseases as communicable and non-communicable • draw conclusions from data on risk factors. • analyse data to assess the risks and benefits of chemotherapy. • analyse data to describe evidence for the link between smoking and lung disease. • write the balanced symbol equations for photosynthesis. • interpret and explain graphs of photosynthesis rate involving one limiting factor • can test a leaf for starch and state some safety rules. • Testing fitness • Investigating respiration	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation

Summer 2	**Chemistry** Chemical changes Electrolysis Energy changes	The reactivity series, displacement reactions, extracting metals, making salts, changes at the electrodes, extraction of aluminum, electrolysis of aqueous solutions, endothermic and exothermic reactions, reaction profiles, bond energy calculations.	• Investigate displacement reactions • Making salts from metal oxide and acid • Write a balanced symbol equation including state symbols for the overall electrolysis of a molten ionic compound • describe electrolysis of solutions in terms of movement of ions • can safely electrolyse a solution, with guidance provided, plan and carry out an electrolysis investigation. • Explain, using observations from calorimetry, how to classify a reaction as exothermic or endothermic • label activation energy on a reaction profile diagram generate a specific reaction profile diagram for a given chemical reaction when its energy change is also supplied • identify bonds broken in reactants and new bonds made in products of a reaction.	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation