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.

Content covered by Separate Science Only is bolded
Highlighted in green are links to PSHE in the curriculum
Highlighted in blue are links to Careers in the curriculum

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	• Atoms, elements, compounds and separating mixtures • The Periodic Table • Conservation and dissipation of energy • Energy transfer by heating	Students will learn about: • Structure of the atoms, chemical equations, separating mixtures, electronic structures, development of the periodic table • States of matter • 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	Students should be able to: • 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. • Describe the energy changes in a range of experiments and account for energy dissipation to the surroundings. • 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. Possible careers are: Engineering, Chemical industry, Theatre and stage props master, Car mechanic, Mechanical engineer, Water treatment worker, Analytical scientists, Farming and agriculture, Engineering, Energy sector.	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation
Autumn 2	• Organisation and the digestive system	Student will learn about:	Students should be able to: • Carry out a food test and record results in a table.	• Kerboodle end of chapter

	• Organizing animals and plants • Communicable diseases	• The digestive system and how it works, food chemistry, catalysts and enzymes, factor affecting enzyme action, making digestion efficient. • Blood, the heart, breathing and gas exchange, transport system in plants, factors affecting transpiration. • Health and disease, pathogens, viral and bacterial diseases, human defense responses	• Plan an experiment to investigate the effect of different pH on the rate of reaction of amylase. • Understand about the science relating to blood and organs. • View blood under a light microscope and recognise components • Use a microscope to identify the different tissues in a cross-section of a leaf. • 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 • Know about personal hygiene, germs including bacteria, viruses, how are they spread, treatment and prevention of infection Possible careers are: Medical careers (doctor, clinician, nurse), Physiotherapist, Counsellor, Nutritionist, Dietician.	assessments (Higher and Foundation) • Required Practical to be written up after each investigation
Spring 1	• Structure and bonding • Chemical calculations	Students will learn about: • Ionic and covalent bonding, giant structures, Fullerenes and graphene, bonding in metals, giant metallic structures • Relative masses expressing concentration.	Students should be able to: • Draw dot and cross diagrams of compounds formed between Group 1 and Group 7 elements. • 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. • Calculate RAM, number of moles, reacting masses and concentration of a solution Possible careers are: Material Engineering, Chemical industry, Car mechanic, Analytical scientists.	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation
Spring 2	• Energy resources • Electric Circuits • Electricity in the home	Students will learn about: • Renewable and non-renewable energy resources to generate electricity and their	Students should be able to: • Describe the main energy sources available. • Distinguish between energy resources that are renewable and energy resources that are non-renewable.	• Kerboodle end of chapter assessments (Higher and Foundation)

		advantages and disadvantages	• Compare ways that different energy resources are used, the uses to include transport, electricity generation and heating. • Understand why some energy resources are more reliable than others. • Show that science has the ability to identify environmental issues arising from the use of energy resources but not always the power to deal with the issues because of political, social, ethical or economic considerations. • Explain the design and use of a circuit to measure the resistance of a component by measuring the current through, and potential difference across, the component. • Draw an appropriate circuit diagram using correct circuit symbols. • Use circuit diagrams to construct and check series and parallel circuits that include a variety of common circuit components. • Describe the difference between series and parallel circuits. • Explain qualitatively why adding resistors in series increases the total resistance whilst adding resistors in parallel decreases the total resistance. • Describe, with examples, the relationship between the power ratings for domestic electrical appliances and the changes in stored energy when they are in use. Possible careers are: Wind turbine technician, Environmental scientist, Sustainability engineer, Solar engineer, Environmental consultant, Air quality engineer, Electrician, Electrical engineer.	• Required Practical to be written up after each investigation
Summer 1	• Preventing and treating diseases • Non-communicable disease • Photosynthesis	Students will learn about: • discovering and developing drugs, preventing infections, Vaccination, Antibiotics and painkillers, discovering new drugs.	Students are able to: • Decide when a painkiller or antibiotic should be used to treat an illness. • 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.	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation

		• Non-communicable diseases, cancer, smoking and the risk of disease, diet, exercise, and disease, alcohol and other carcinogens. • Rate of photosynthesis, the limiting factors and how plants use glucose	• Analyse data to assess the risks and benefits of chemotherapy. • Analyse data to describe evidence for the link between smoking and lung disease. • How to maintain healthy eating and the links between a poor diet and health risks. • The benefits and importance of physical exercise on mental wellbeing and happiness. • The facts and science relating to immunisation and vaccination. • Explain the effects of temperature, light intensity, carbon dioxide concentration, and the amount of chlorophyll on the rate of photosynthesis. • Measure and calculate rates of photosynthesis, extract and interpret graphs of photosynthesis rate involving one limiting factor, plot and draw appropriate graphs selecting appropriate scale for axes, and translate information between graphical and numeric form. Possible careers are: Medical careers (doctor, nurse), Horticulturist, Floral designer, Crop consultant, Environmental scientist, Entomologist, Soil scientist Counsellor, Pharmacists, Pharmacologists, Nutritionist, Dietician.	
Summer 2	• Chemical changes • Electrolysis	Students will learn about: • The reactivity series, displacement reactions, extracting metals, making salts from insoluble bases, neutralization and pH scale, strong and weak acids • Changes at the electrodes during electrolysis, extraction of aluminum,	Students are able to: • Investigate displacement reactions • Making salts from metal oxide and acid • Write the balanced symbol equation for anaerobic respiration in plants and microorganisms, compare and contrast aerobic and anaerobic respiration • 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 • 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.	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation

		electrolysis of aqueous solutions	Possible careers are: Chemical engineer, Electrolysis engineer, Quality control, Data analyst.	