SCIENCE

Year 10

What are the aims and intentions of this curriculum?

The aim of our Key Stage 4 Curriculum is to provide the foundations for understanding the material world. Scientific understanding is changing our lives and is vital to the world's future prosperity, and all students should be taught essential aspects of the knowledge, methods, processes and uses of science. They should be helped to appreciate how the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas relating to the sciences which are both inter-linked, and are of universal application.

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	**Physics** • Molecules and matter • Radioactivity **Biology** • Respiration	Students will learn about: • Density, states of matter, changes of state, internal energy, specific latent heat, gas pressure and temperature. • Radioactivity and the nuclear model of an atom, alpha beta and gamma radiations, activity and half-life • Aerobic and anaerobic exercise, metabolism and the liver	Students are able to: • Using the temperature- time graph to find the melting point or the boiling point of a substance. • Measure and calculate specific latent heat. • Explain radioactivity and discovery of nucleus using plum pudding and Rutherford's model. • Calculate activity and half-life. • Compare the processes of aerobic and anaerobic respiration with regard to the need for oxygen. • Explain how your body responds to the increased demands of energy during exercise. Possible careers are: Radiologist, Material engineer, Physiotherapist, Medical careers, Sports trainer	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation
Autumn 2	**Biology** • The human nervous system • Hormonal coordination • Reproduction	Students will learn about: • Homeostasis and the structureand function of the nervous system. • About homeostasis, the human endocrine system, hormones in human reproduction,	Students are able to: • Describe that the body consists of arange of different types of cells and systems. • explain how insulin controls blood glucose (sugar) levels in the body. • Explain Type 1 and Type 2 diabetes • Know the positive associations between	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up

		contraception, hormones in infertility treatment and negative feedback. • About the structure of DNA, genes,chromosomes and genome.	physical activity and promotion of mental wellbeing, including as an approach to combat stress. • State the characteristics and evidence of what constitutes a healthy lifestyle, maintaining a healthy weight, including the links between inactive lifestyle and ill health, including Type 2 diabetes. • Know how to maintain healthy eating and the links between a poor diet and health risks. • Explain that the reproductive system includes the parts of the body concerned with reproduction in humans. • Describe the roles of hormones in human reproduction, including the menstrual cycle. • Explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle. • Evaluate the different hormonal and non-hormonal methods of contraception. • Recall some of the facts about reproductive health, including fertility, and the potential impact of lifestyle on fertility for men and women and menopause. • State the facts about some of the contraceptive choices, efficacy and options available. • Recall the facts around pregnancy. • Recall how the use of alcohol and drugs can lead to risky sexual behaviour. • Know the key facts about puberty, the changing adolescent body and menstrual wellbeing. • Recall the main changes which take place in males and females, and the implications for emotional and physical health. • Explain the Human Genome Project, meiosis, protein synthesis, sexual and asexual reproduction, sex determinationand other	after each investigation

			genetic inheritance. Possible careers are: Radiologist, Material engineer, Molecular scientist, Physiotherapist, Medical careers, Sports trainer, Biomedical scientist, Clinical research associate, Clinical scientist, Genomics, Genetic counsellor, Plant breeder/geneticist, Research scientist (life sciences)	
Spring 1	**Chemistry** • Rates and equilibrium • Crude oil and fuels • Chemical analysis	Students will learn about: • The rate of reactions, reversible reactions and dynamic equilibrium. • Carbon compounds as fuels andfeedstock, fractional distillation, hydrocarbons, cracking and alkenes. • Purity, formulations, chromatography and the identificationof common gases.	Students are able to: • Calculate the mean rate of a reaction from given information about the quantity of a reactant used or the quantity of a product formed and the time taken • Draw, and interpret, graphs showing the quantity of product formed or quantity of reactant used up against time • Draw tangents to the curves on these graphs and use the slope of the tangent as a measure of the rate of reaction • Calculate the gradient of a tangent to the curve on these graphs as a measure of rate of reaction at a specific time. • Explain the effect of increasing temperature and pressure on the rate of a reaction • Explain dynamic equilibrium and Le Chatelier's Principle. Possible careers are: Chemical engineer, Material engineer, Molecular scientist, Data analyst,	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation
Spring 2	**Physics** • Forces in balance • Motion • Forces and motion	Students will learn about: • Vectors and scalar quantities, forces and their interactions, the parallelogram and resolution of forces • Speed and distance-time graph, velocity time-graphs, analysing motion graphs • Force and acceleration, weight and terminal velocity, momentum,	Students are able to: • Interpret a scale diagram to determine the magnitude and direction of a vector. • Use a scale diagram to add two or more vectors. • Draw a scale free-body force diagram showing different types of forces acting on it. • Find the resultant of two forces at an obtuse angle by drawing a scale diagram. • Calculate the distance travelled from a	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation

		forces and elasticity	velocity-time graph. • Use force and extension data to compare the behavior of different materials in deformation using the ideaof proportionality. • Demonstrate that a force can cause an object to speed up, slow up, slow downor change the direction of moving object. Possible careers are: Astrophysicist, Car mechanic, Mechanical engineer, Police, Traffic signalers.	
Summer 1	**Biology** • Variation and evolution • Genetics and evolution • Adaptation, interdependence and competition	Students will learn about: • Variation, evolution by natural selection, selective breeding, genetic engineering and ethics of genetic technologies. • Evidence of evolution, fossils and extinction, antibiotic resistant bacteria. • Traditional binomial classificationand modern methods of classification. • Distribution organisms in their environment, competition in plans and animals, adaptation in plants and animals	Students are able to: • Describe how a lack of biodiversity can affect an ecosystem. • Describe how preserving biodiversity can provide useful products and services for humans. • Describe the problems with classification. • Explain abiotic and biotic factors that affect communities. • How to measure the distribution of living things using quadrats and transect. • Explain the factors that plans and animals compete in a habitat. • Explain how organisms are adapted to survive in many different conditions. Possible careers are: Geneticist, Data scientist, Counsellor, Medical careers, Midwife, Obstetrician, Pediatrics doctor, Ecologist, Environmental field technician, Wildlife specialist, Sustainability consultant, Wildlife biologist, Environmental planner	• Kerboodle end of chapter assessments (Higher and Foundation) • Required Practical to be written up after each investigation
Summer 2	**Chemistry** • The Earth's atmosphere • The Earth's resources	Students will learn about: • The composition and evolution of the Earth's atmosphere, carbon dioxide andmethane as greenhouse gases, and common atmospheric pollutants	Students are able to: • Debate that the Earth is getting warmer-this is called global warming. • Explain using symbol equations, how gases are formed in the atmosphere and how oceans are	• Kerboodle end of chapter assessments (Higher and Foundation)

		and their sources. • Using the Earth's resources and obtaining potable water, treating waste water, extracting metals from ores, life cycle assessment and recycling.	formed. • Evaluate the scale, risk and environmental impact of global climate change. • Explain the stages to make potable water. • Explain how and why waste water is processed before it is released into the environment. • Explain how phytomining and bioleaching extract metals. • Explain that useful products are made from the raw materials found on the Earth. • Explain the importance of LCA and how it can be misused. Possible careers are: Environmental Scientist, Meteorologist for the National Weather Service, Weather analyst for industry, commerce, airlines, government, alternative energy companies, Military weather officer, Renewable Energy Siting and Forecasting, Airline/Boeing Meteorologists	• Required Practical to be written up after each investigation