Science Curriculum Overview
2023– 2024

Department Name:	Science
Head of Department:	Mrs V Brooks
Subject Teachers:	**Teaching Staff:** Mr B Hasemore (Second in Department) Mr Brock (Teaching and Learning Lead) Mrs R Rattle (Head of Visually Impaired Unit) Mr M Hasemore Mr J Walsh Mrs N George **Technician Staff:** Mr M Rattle Mr R Beadle Mrs J Trice **Support Staff:** Mrs C Coldwell
Accommodation and Resources:	Teaching is divided into seven laboratories. The laboratories are equipped with gas taps, electric sockets, water supply and waste disposal to make a wide variety of practicals for Biology, Chemistry, and Physics available to students. There are also two laboratory preparation areas, where students have access to additional materials and stationery.
What will students learn in each year?	
Year 7	This year is designed to introduce students to the world around them as well as developing key skills for Science. • Transition to secondary school: Passport essential Skills • Separating techniques • The Earth • Life on Earth • Ecosystems • Bright Sparks
Year 8	All topics in year 8 focus on careers in Science and learning some of the knowledge and skills involved. • Nutrition • Researching Reactions • Space • Forensics and CSI investigations

	• Electrician, Drug manufacture, Sports Science • Bungee Jumping, Ecology, and Food and Drink Manufacture
Year 9	**Year 9 is a bridging year so students can embed key skills and knowledge to go into Key Stage 4 with confidence. This is to help secure progress at the end of Key Stage 4. It helps students to have some autonomy over their curriculum decisions, without narrowing their curriculum prematurely.** **Exam Board:** AQA **Qualification:** Combined Science: Trilogy **NEW:** Sequencing and practice for GCSE year 9 2022-2023 onwards
	• **Maths Passport to GCSE Science and the commencement of GCSE AQA Science Trilogy** • **Biology:** Cells, Diseases and Non-Communicable Diseases, Transport, Photosynthesis, Organisation • **Chemistry:** Atoms, Analytical Techniques, Bonding, Quantitative Chemistry, Chemical Changes • **Physics:** Energy, Energy Resources, Heat Transfers, Circuits, Electricity and Magnetism • **Required Practical Assessments**
Year 10	• **Maths Passport to GCSE Physics** • **Biology:** Organisation, Heart, Respiration, Nervous system, Hormonal Coordination, Reproduction, Genetics, Variation, Evolution • **Chemistry:** Temperature Changes, Rates of Reaction, Reversible Reactions, Hydrocarbons, Cracking, Earth's Atmosphere, Earth's Resources • **Physics:** Specific Heat Capacity, Latent Heat, Radioactivity, Waves, Electromagnetic Waves, Electromagnetism • **Required Practical Assessments**
Year 11	• Retrieval Practice, Revision, Walking Talking Mocks, Mocks • **Biology:** Biodiversity, Ecosystems, Adaptations, Ecosystem Organising, Retrieval Practice, Revision, Walking Talking Mocks, Mocks • **Chemistry:** Moles, Reacting Masses, Bonding review, Electrolysis, Retrieval Practice, Revision, Walking Talking Mocks, Mocks • **Physics:** Forces, Motion graphs, Retrieval Practice, Revision, Walking Talking Mocks, Mocks • **Required Practical Assessments**
Year 12	**Exam Board:** OCR A **Qualification:** A Level Biology • **Module 1.1:** Practical skills • **Module 2.1:** Cell ultrastructure and microscopes. • **Module 2.2:** Biological molecules (bonding, water, carbohydrates, lipids and proteins). • **Module 2.5:** Biological membranes: diffusion, osmosis, active processes, factors affecting structure and permeability. • **Required practical – PAG:** 1.2 Microscopy • **Required practical – PAG:** 9.3 Qualitative testing of biological molecules • **Module 2.2:** Practical biochemistry: Qualitative and quantitative tests, chromatography. • **Module 2.4:** Enzymes: action, activity, effect of temperature, pH, substrate and enzyme concentration on the rates of reaction. • **Module 2.6:** Cell division, cell diversity and cell differentiation. • **Module 3.1:** Exchange surfaces and breathing, measuring lung volumes. • **Required practical – PAG:** 6.3 Amino acids in eggwhite using chromatography • **Required practical – PAG:** 4.2 Rates of enzyme-controlled reactions.

	• **Required practical – PAG:** 8.1 water potential of potato; Rate of diffusion through a membrane • **Module 2.3: DNA:** Nucleic acids: replication, codes for polypeptides. • **Module 3.2:** Transport in animals (heart, oxygen). • **Module 3.3:** Transport in plants (tissues, transpiration, translocation). • **Module 4.1:** Communicable diseases: pathogens and defenses)**.** • **Required practical – PAG:** 2.1 Dissection • **Required practical – PAG:** 10.1 Investigating DNA Structure using RasMol. • **Module 4.1:** Immune response, antibodies, vaccination, drug development. • **Module 4.2:** Biodiversity: sampling, calculations for biodiversity. • **Module 4.3:** Classification and evolution, natural selection, adaptation, statistics, standard deviation. • **Module 5.1:** Homeostasis: communication systems and temperature control. • **Module 4.2:** Conservation and protection of species and habitats. • **Module 5.**2 Excretion: Liver and kidney structure and function, osmoregulation, kidney failure. • **Module 5.3:** Neuronal communication: Receptors, neurons structure and function, nerve impulses and synapses. • **Module 5.4:** Hormonal communications: endocrine, adrenal glands, pancreas, regulating blood glucose, diabetes. • **Module 5.5:** Plant and animal responses: (PLANTS) plant growth, tropisms, commercial uses of plant hormones. • **Required practical – PAG:** 5.2 Determining glucose concentration (colorimeter) • **Required practical – PAG:** 3.1 The calculation of species diversity. • **Module 5.5:** Plant and animal responses: (ANIMALS) Mammalian nervous system, brain, coordinated responses, and muscle. • Walking Talking Mocks • Revision • **Mock**
Year 13	• **Module 5.6:** Photosynthesis: Inter-rationships, light dependent, light independent, factors affecting photosynthesis. • **Module 5.7:** Respiration: glycolysis, structure of mitocondrian, Krebs cycle, oxidated phosphorylation. • **Module 6.1:** Cellular control: gene mutation and expression. • **Module 6.2:** Patterns of inheritance: Genetic variation and monogenic inheritance. • **Module 6.4:** Cloning and Biotechnology: • Cloning in plants and animals, using biotechnology and culturing microorganisms. • **Required Practical – PAG:** 7.1 The effects of antibiotics on microbial growth. • **Required Practical – PAG: 12.3** Investigating the rate of oxygen production in pondweed. • **Module 5.7:** Respiration: Anaerobic respiration, Investigating respiration. • **Module 6.2:** Patterns of inheritance: Dihybrid inheritance, alleles, and sex linkage. • **Module 6.3:** Manipulating genomes: DNA sequencing and profiling. • **Module 6.5:** Ecosystems: Biomass, recycling and succession. • **Module 6.6:** Populations and Sustainability: Population, conservation and sustainable management. • **Required Practical – PAG:** 11.1 Investigation into the effect of exercise on the heart rate. • **Module 6.2:** Patterns of Inheritance: Variation, Chi-squared test, and epistasis. • **Module 6.3:** Manipulating Genomes: PCR, electrophoresis, genetic engineering, and gene therapy. • **Module 6.6:** Populations and Sustainability: Balancing conflict between human needs and

	conservation and controlling effects of human activities. • **Revision and MOCK exam** • **Module 6.2:** Patterns of Inheritance: Hardy-Weinburg principle, isolating mechanisms, and artificial selection. • **Walking Talking Mocks.** • Revision. • Exam Packs and past paper questions.