



Science Curriculum Overview 2020-2021

Department Name:	Science
Head of Department:	Mrs Brooks
Subject Teachers:	Teaching Staff: Miss R Prideaux (Head of Key Stage 4) Miss E Warren (Head of Key Stage 5) Mr Brock (Teaching and Learning Lead) Mr B Hasemore Mr O Badmos Mr J Walsh Mrs C Coldwell Technician Staff: Mrs J Trice (Senior Technician) Mrs M Casey Mr R Beadle
Accommodation and Resources:	Teaching is divided into seven laboratories and a classroom. 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. One laboratory has computer access and there are some notebook computers. 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	Term 1: <u>Sets 1 and 4</u> Transition to secondary school: Science Passport basic skills and vocabulary B1 Chapter 1: Cells Biology RPA – Microscope Test <u>Sets 2 and 3</u> Transition to secondary school: Science Passport basic skills and vocabulary C1 Chapter 1: Particles and Behaviour Chemistry RPA – Melting and boiling points



	Test
	<p>Term 2:</p> <p><u>Sets 1 and 4</u> C1 Chapter 1: Particles and Behaviour C2 Chapter 2: Separating Techniques Chemistry RPA – Melting and boiling points Revision for cumulative assessment DC2 Assessment</p> <p><u>Sets 2 and 3</u> B1 Chapter 1: Cells C2 Chapter 2: Separating Techniques Biology RPA – Microscope Revision for cumulative assessment DC2 Assessment</p>
	<p>Term 3:</p> <p><u>Sets 1 and 4</u> P1 Chapter 1: Forces (5 lessons) P1 Chapter 2: Sound (5 lessons) Physics RPA – Forces DC2 Assessment</p> <p><u>Sets 2 and 3</u> C1 Chapter 2: Elements and Compounds (4 lessons) C1 Chapter 4: Acids and Alkalis (4 lessons) Chemistry RPA – Neutralisation DC2 Assessment</p>
	<p>Term 4:</p> <p><u>Sets 1 and 4</u> C1 Chapter 2: Elements and Compounds C1 Chapter 4: Acids and Alkalis</p> <p><u>Sets 2 and 3</u> P1 Chapter 1: Forces (5 lessons) P1 Chapter 2: Sound (5 lessons) Physics RPA – Forces</p>
	<p>Term 5:</p> <p><u>Sets 1 and 4</u> P2 Chapter 1 Electricity First then Magnetism (8 lessons) Physics RPA – Potential difference Long revision for End of year cumulative assessment DC3 Assessment</p> <p><u>Sets 2 and 3</u> P2 Chapter 1 Magnetism first, then Electricity (8 lessons) Physics RPA – Potential difference Long revision for End of year cumulative</p>



	assessment DC3 Assessment
	Term 6: <u>Sets 1 and 4</u> B1 Chapter 2: Structure and Function of Body Systems (6 lessons) B1 Chapter 3: Reproduction (Just human) (5 lessons) Biology RPA - Diffusion <u>Sets 2 and 3</u> B1 Chapter 2: Structure and Function of Body Systems (6 lessons) B1 Chapter 3: Reproduction (Just human) (5 lessons) Biology RPA – Diffusion
Year 8	Term 1: <u>Sets 1 and 4</u> C1 Chapter 3: Reactions (5 lessons) C2 Chapter 1: Periodic Table (5 lessons) Chemistry RPA – Conservation of mass Revision for term 1 cumulative assessment <u>Sets 2 and 3</u> B2 Chapter 1: Health and Lifestyle (9 lessons) Biology RPA – Food testing (fats, proteins and carbohydrates) Revision for term 1 cumulative assessment
	Term 2: <u>Sets 1 and 4</u> B2 Chapter 1: Health and Lifestyle (9 lessons) Biology RPA – Food testing (fats, proteins and carbohydrates) Revision for Term 2 cumulative assessment <u>Sets 2 and 3</u> C1 Chapter 3: Reactions (5 lessons) C2 Chapter 1: Periodic Table (5 lessons) Chemistry RPA – Conservation of mass Revision for term 2 cumulative assessment
	Term 3: <u>Sets 1 and 4</u> P2 Chapter 2: Energy – Waves (8 lessons) P2 Chapter 3: Motion and Pressure (6 lessons) Physics RPA – Acceleration Revision for Term 3 cumulative assessment <u>Sets 2 and 3</u> B2 Chapter 3: Adaptation and Inheritance B3 Chapter 2: Turning points in biology Biology RPA – Growing microbes



	Revision for Term 3 cumulative assessment
	<p>Term 4:</p> <p><u>Sets 1 and 4</u> B2 Chapter 3: Adaptation and Inheritance (7 lessons) B3 Chapter 2: Turning points in biology (7 lessons) Biology RPA – Growing microbes Revision for Term 4 cumulative assessment</p> <p><u>Sets 2 and 3</u> P2 Chapter 2: Energy Waves (8 lessons) P2 Chapter 3: Motion and Pressure (6 lessons) Physics RPA – Acceleration Revision for DC3 cumulative assessment</p>
	<p>Term 5: (New Settings) Transition skills for KS4 SOW ASSESSMENT DC3</p> <p><u>Sets 1 and 4</u> Bungee Jumping company (Physics) Body Fitness (Biology) Drug development research (Chemistry)</p> <p><u>Sets 2 and 3</u> Drug development research (Chemistry) Bungee Jumping company (Physics) Body Fitness (Biology)</p>
	<p>Term 6:</p> <p><u>Sets 1 and 4</u> Electrician Business (Physics) Sport Science (Biology) Food and drink manufacture (Chemistry)</p> <p><u>Sets 2 and 3</u> Food and drink manufacture (Chemistry) Electrician Business (Physics) Sport Science (Biology)</p>
Year 9	<p>Exam Board: AQA Qualification: Combined Science: Trilogy NEW: Sequencing and practice for GCSE year 9 2020-2021 onwards</p>
	<p>Term 1:</p> <p>Chemistry: Atomic structure: structure and history of the atom, chemical equations, pure substances and mixtures, various methods of separating mixtures (Ch 1 and 10) Biology: Cell structure and transport:</p>



	<p>specialisation, diffusion, osmosis (Ch 1). Physics: Conservation and dissipation of energy: changes in energy and conservation, GPE, KE, power and work done and energy dissipation. Conservation and dissipation of energy: efficiency, electrical appliances and power calculations, and energy demands (Ch 1 and 3).</p> <p>Assessment</p>
	<p>Term 2: Chemistry: Required practical assessment: chromatography. Chemical analysis, tests for gases. The periodic table: development of the periodic table, links between electronic structure and the periodic table and trends in reactivity of group 1 and group 7 elements (Ch 10 and 2). Biology: Required practical assessment: Osmosis, Cells and organisation: Active transport. Cell division: growth and differentiation, stem cells and dilemmas (Ch 1 and 2). Physics: Energy resources: renewable energy and energy issues. Energy transfer by heating: conduction, heating and insulation (Ch 3 and 2).</p> <p>DC1 Cumulative Assessment</p>
	<p>Term 3: Chemistry: Earth's atmosphere: composition past and present, data interpretation, greenhouse gases, climate change and atmospheric pollutants (Ch 11). Biology: Cell division: Organisation and the digestive system: Tissues and organs, human digestive system, the chemistry of food. Physics: Required practical assessments: 1) density, 2) Specific Heat Capacity (SHC). States of matter and changes, SHC, internal energy, latent heat, gas pressure and temperature (Ch 6).</p> <p>Assessment</p>
	<p>Term 4: Chemistry: Required practical assessment: Water analysis and purification. Maths skills</p>



	<p>focus week, Earth's resources: finite and renewable, data interpretation, water treatment for drinking, waste water treatment (Ch 12).</p> <p>Biology: Maths skills focus week Required practical assessments: 1) Food tests 2) Effect of pH on enzymes. Organisation and the digestive system: Enzymes and factors affecting.</p> <p>Physics: Maths skills focus week, Vectors and scalars, forces, centre of mass, resolution of forces and parallelograms Ch8).</p> <p>DC2 Cumulative Assessment</p>
	<p>Term 5:</p> <p>Chemistry: Required practical assessment: Making a copper sulphate salt, Making a salt from metal carbonates. Extraction of metals & environmental life cycle assessments. The reactivity series, displacement reactions for metals, metal extraction, making salt from metals, and insoluble bases (Ch 12 and 5).</p> <p>Biology: Organising animals and plants: Blood, heart, and breathing. Plant structure and transport systems.</p> <p>Physics: Required practical assessment: Force and acceleration. Graphing (drawing and analysing): Distance-Time and Velocity-Time graphs, acceleration, braking, weight and terminal velocity (Ch 9 and 10). Revision.</p> <p>DC3 Cumulative Assessment</p>
	<p>Term 6:</p> <p>Revision for End of Year exams</p> <p>Chemistry: Neutralisation, pH scale, strength of acids, Crude oil: how fuels are manufactured (fractional distillation and cracking), properties of fuels (hydrocarbon chains), alkanes, alkenes formulae and diagrams (Ch 5 and 9).</p> <p>Biology: Communicable diseases: Pathogens and diseases, viral, bacterial, fungal infections.</p> <p>Physics: Required practical assessment: Force and extension. Momentum and, Forces and elasticity (Ch 10). Revision</p> <p>End of year exams</p>
Year 10	Exam Board: AQA



	<p>Qualification: Combined Science: Trilogy</p>
	<p>Term 1: CATCH UP REVIEW OF LOCKDOWN TOPICS Followed by: Chemistry: Electrolysis and required practical assessment: Electrolysis. Biology: Communicable diseases: Pathogens and diseases, viral, bacterial, fungal infections. Preventing and treating disease: vaccinations and antibiotics. Physics: Required practical assessment: force and acceleration. Motion: distance-time and velocity-time graphs. Force and motion: acceleration.</p> <p>Cumulative Assessment 1</p>
	<p>Term 2: Chemistry: Energy changes: reaction profiles, bond energy calculations, and required practical assessment: temperature changes in reacting solutions. Biology: Preventing and treating disease: Discovering and developing drugs. Non-communicable diseases: Cancer, smoking, alcohol and risk factors, diet, exercise, and disease. Physics: Required practical assessment: force and extension for a spring (Hooke's Law). Force and Motion: terminal velocity, braking, momentum and elasticity.</p> <p>Cumulative Assessment 2</p>
	<p>Term 3: Chemistry: Rates of Reaction: collision theory, factors affecting rates of reaction. Biology: Required practical assessment: Photosynthesis. Photosynthesis: rate and factors affecting photosynthesis, use of glucose. Physics: Wave properties: nature and property of waves, inc. calculations, reflection and refraction.</p> <p>Cumulative Assessment 3</p>



	<p>Term 4:</p> <p>Chemistry: Required practical assessment: Rates of reaction effect of concentration. Reversible reactions and equilibrium.</p> <p>Biology: Required practical assessment: reaction times. Making the most of photosynthesis, Respiration: Aerobic and anaerobic respiration, exercise and metabolism. Human Nervous System: Principles of homeostasis and structure and function of the nervous system.</p> <p>Physics: Required practical assessments: 1) waves 2) infrared radiation. Electromagnetic spectrum: types of waves.</p> <p>Cumulative Assessment 4</p>
	<p>Term 5:</p> <p>Chemistry: Crude oil and fuels: Hydrocarbons, fractional distillation, cracking and burning fuels. Chemical Analysis: substances, chromatography.</p> <p>Biology: Human Nervous System: reflex actions, Hormonal Coordination: Control of blood glucose and diabetes, negative feedback, human reproduction.</p> <p>Physics: Electromagnetic waves: communication, x-rays and uses. Electromagnetism: magnetic fields.</p>
	<p>Term 6:</p> <p>Chemistry: Required practical assessment: analysing chromatograms, calculating R_f values. Chemical Analysis: test for gases. Earth's atmosphere: History and evolving atmosphere, greenhouse gases.</p> <p>Biology: Hormonal Coordination: hormonal involvement in the menstrual cycle and controlling fertility. Reproduction: Types of reproduction, cell division in reproduction and DNA.</p> <p>Physics: Electromagnetism: electromagnets, motor effect and revision.</p> <p>Work Experience</p> <p>End of year Mock: Paper 1 for Chemistry, Biology, Physics</p>



Year 11	
	<p>Exam Board: AQA Qualification: Combined Science: Trilogy</p>
	<p>Term 1: Chemistry: Global climate change, atmospheric pollutants, finite and renewable resources, water (drinking, waste), RPA Water purification and tests, extracting metals, recycling, LCAs. Biology: Reproduction: cell division, DNA, inheritance, genetics, inherited disorders and screening. Variation and evolution: variation, natural selection, selective breeding, ethics of genetic engineering. Genetics and evolution: evolution, fossils, extinction, classification and antibiotic resistant bacteria. Physics: Required practical assessments: 1) waves 2) infrared radiation. Electromagnetic spectrum: types of waves, communication, x-rays and gamma rays. Electromagnetism: magnetic fields, motor effect.</p>
	<p>Term 2: Biology (All lessons): Required practical assessment: transects. Adaptations, interdependence and competition: communities, organisms and the environment, competition, adaptation. Organising an ecosystem: carbon cycle and feeding relationships. Revision for Mocks Mock Exams</p>
	<p>Term 3: Chemistry: Revision – paper 1 and 2 rotated every 2 weeks. Resource packs, topics revisited, RPA practicals, practice exam paper questions. Biology: Revision – paper 1 and 2 rotated every 2 weeks. Resource packs, topics revisited, RPA practicals, practice exam paper questions. Physics: Revision – paper 1 and 2 rotated every 2 weeks. Resource packs, topics revisited, RPA practicals, practice exam paper questions.</p>
	<p>Term 4: Chemistry: Revision – paper 1 and 2 rotated every 2 weeks. Resource packs, topics revisited, RPA practicals, practice exam paper questions. Biology: Revision – paper 1 and 2 rotated every 2 weeks. Resource packs, topics revisited, RPA</p>



	<p>practicals, practice exam paper questions. Physics: Revision – paper 1 and 2 rotated every 2 weeks. Resource packs, topics revisited, RPA practicals, practice exam paper questions.</p>
	<p>Term 5: Chemistry: Revision – paper 1 and 2 rotated every 2 weeks. Resource packs, topics revisited, RPA practicals, practice exam paper questions. Biology: Revision – paper 1 and 2 rotated every 2 weeks. Resource packs, topics revisited, RPA practicals, practice exam paper questions. Physics: Revision – paper 1 and 2 rotated every 2 weeks. Resource packs, topics revisited, RPA practicals, practice exam paper questions.</p>
	<p>Term 6: Chemistry: Revision. – paper 2 practice exam paper questions. Biology: Revision – paper 2 practice exam paper questions. Physics: Revision – paper 2 practice exam paper questions.</p>
Year 12	<p>Exam Board: OCR A Qualification: A Level Biology</p>
	<p>Term 1: maths skills: statistical analysis Module 2: cell structure and biological molecules: polysaccharides, amino acids, polypeptides, lipid structure, measuring cells, cytoskeleton, and organelles. Required practical – PAG: Amino acids in egg white using chromatography</p>
	<p>Term 2: Module 2: cell membranes and enzymes: membrane transport, substrate concentration, enzyme catalysis. Required practical – PAG: water potential of potato; Rate of diffusion through a membrane</p>
	<p>Term 3: Module 2: cell division and nucleic acids: mitosis, meiosis, animal and plant tissues, stem cells, DNA replication and protein synthesis. Module 3: exchange surfaces: gas exchange and efficiency.</p>



	Required practical – PAG: Using a light microscope to study mitosis
	Term 4: Module 3: transport animals and transport plants: circulatory system, the heart and cardiac cycle, transpiration, evaporation and factor affecting. Required practical – PAG: Examine lung tissue using a light microscope
	Term 5: Module 4: biodiversity, communicable diseases, classification and evolution: habitats, species evenness and species richness, maintaining biodiversity, malaria, TB, AIDS, deadly diseases, antibodies, immune response, developing new drugs, plant defences, geonomics and proteomics, Charles Darwin, standard deviation, statistics.
	Term 6: Revision Mock
Year 13	Exam Board: AQA Qualification: Level 3 Extended Certificate Applied Science
	Term 1: Unit 5: Investigation into factors affecting fermentation in the brewery industry Trials, main experiments and first draft write up Unit 6a: microbiology research, practical experiments: microorganisms: growing, staining, and testing factors to eliminate microorganisms. First draft write up. Unit 4: examined unit The human body: digestive system and diet, muscular-skeletal system and movement. Lockdown Revision catch up: Unit 1 & 3
	Term 2: Unit 5: final write up and submission Unit 6a: final write up and submission Unit 4: examined unit The human body: Oxygen transport in the blood, physiological measurements and application, structure and function of nervous system and brain, nerve impulses.



	Revision: Unit 1 & 3
	<p>Term 3: Unit 2, 5 and 6a: Amendments to coursework for resubmission to improve grades. Unit 1,3 & 4: Revision and exam</p>
	<p>Term 4: Unit 2, 5 and 6a: Amendments to coursework for resubmission to improve grades. Final resubmission of coursework elements. Unit 1, 3 and 4 revision for retakes if required.</p>
	<p>Term 5: Unit 1, 3 and 4 revision for retakes for grade improvement if required.</p>
	<p>Term 6: Exams 1, 3 and 4</p>
Year 13 Biology (OCR)	<p>Exam Board: OCR Qualification: A Level Biology A</p> <p><u>Term 1</u> Teacher 1 (EWA): Teach and complete module 5.3 Neuronal communication with assessment and 5.5 Plant and animal responses. Complete 2 PAGES (choice of 6, 32 and 33) Teacher 2 (VBR): complete module 6.5 Ecosystems and assessment for topic. Teacher 3 : (RPR) Complete module 5.2 Excretion as an example of homeostatic control.</p>
	<p><u>Term 2</u> Teacher 1 (EWA): Assess module 5.5 (1 lesson). Teach and complete module 5.7 Respiration with assessment (1 lesson) and 6.1 Cellular control. End of term cumulative assessment (1-2 lessons). Teacher 2 (VBR): complete module 6.6 Populations and sustainability. Include a PAG (choice of 8 or 9) Teacher 3: (RPR) Assess module 5.2 (2 lessons). Teach module 5.4 Hormonal communication.</p>



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	<p>Term 3:</p> <p>Teacher 1 (EWA): Review of the cumulative test (1 lesson). Complete PAG 34 (1 lesson). Teach Module 6.2 Patterns of inheritance.</p> <p>Teacher 2 (VBR): Start module 6.4 Cloning and biotechnology.</p> <p>Teacher 3: (RPR) Assess module 5.4 (1 lesson). Teach module 5.7 Photosynthesis.</p>
	<p>Term 4:</p> <p>Teacher 1 (EWA): Teach module 6.3 Manipulating genomes. Assessment and review (2 lessons). Revision. Mock exam (2 lessons).</p> <p>Teacher 2 (VBR): Finish module 6.4 and complete PAGs (choice of 20, 29 and 30)</p> <p>Teacher 3: (RPR) complete PAG 36 and 18 (2 lessons), assess module 5.6 (2 lessons). Begin revision.</p>
	<p>Term 5:</p> <p>Teacher 1 (EWA): Review mock (2 lessons). Complete any outstanding PAGS. Revision in particular past paper practice.</p> <p>Teacher 2 (VBR): Finish PAGs and then revise over topics taught as well as past paper practice.</p> <p>Teacher 3: (RPR) Complete any extra PAGS. Revise over topics taught and past paper practice.</p>
	<p><u>Term 6</u></p> <p>All teachers: remaining lessons will be focused on gaps in knowledge and past paper questions.</p>