

Long Term Departmental Planning Overview

Subject: **Sciences**

Intention:

By studying the sciences, students build a solid foundation for understanding the material world. Scientific understanding is changing our lives and is vital to the world's future prosperity. All students should learn essential aspects of the knowledge, methods, processes and uses of science. They should gain appreciation of how the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas that relate to the sciences and that are both inter-linked and of universal application.

Students should study the sciences in ways that help them to develop curiosity about the natural world, that give them an insight into how science works and that enable them to appreciate its relevance to their everyday lives. The scope and nature of the study should be broad, coherent, practical and satisfying. It should encourage students to be inspired, motivated and challenged by the subject and its achievements.

Year	Curriculum Title	HT1 topics	HT2 topics	HT3 topics	HT4 topics	HT5 topics	HT6 topics
7	Exploring Science	<p>7A: Cells, tissues, organs and systems</p> <ol style="list-style-type: none"> 1. Life Processes/MRS 2. GREN 3. Organs 4. Tissues 5. Cells 6. Microscopes 6. Organ Systems <p>7E: Mixtures and separation</p> <ol style="list-style-type: none"> 1. Mixtures 2. Solutions 3. Evaporation (Working Scientifically) 4. Filtration (Working Scientifically) 5. Chromatography 	<p>7I: Energy</p> <ol style="list-style-type: none"> 1. Energy from food 2. Energy transfers 3. Fuels 4. Other energy sources 5. Using resources <p>7B: Sexual reproduction in animals</p> <ol style="list-style-type: none"> 1. Introduction 2. Reproductive Organs 3. Becoming pregnant 4. Gestation and birth 5. Growing up 	<p>7F: Acids and alkalis</p> <ol style="list-style-type: none"> 1. Hazards and safety 2. Indicators 3. Acids and alkalis 4. pH Scale 5. Neutralisation (Working Scientifically) <p>7J: Current electricity</p> <ol style="list-style-type: none"> 1. Introduction and component symbols 2. Series and Parallel Circuits 3. Current and Voltage in Series 4. Current and voltage in parallel 5. Models 	<p>7C: Muscles and bones</p> <ol style="list-style-type: none"> 1. Fitness (working scientifically) 2. Muscles and breathing 3. Blood 4. Skeleton 5. Muscles and moving 6. Drugs <p>7G: The particle model</p> <ol style="list-style-type: none"> 1. Solids, liquids, gases 2. Particle Theory 3. Brownian Motion 4. Diffusion 5. Air pressure 	<p>7K: Forces</p> <ol style="list-style-type: none"> 1. Introduction and examples 2. Springs (working scientifically) 3. Friction (working scientifically) 4. Pressure 5. Balanced/Unbalanced forces 	<p>7D: Ecosystems</p> <ol style="list-style-type: none"> 1. Variation 2. Graphs (working scientifically) 3. Adaptations 4. Effects of the environment 5. Food chain

		(Working Scientifically) 6. Distillation		6. Resistance and plugs			
8	Exploring Science	<p>8A: Food and nutrition 1.Nutrients (Working Scientifically) 2. Uses of nutrients 3. Balanced Diets 4. Digestion (+ demo) 5. Absorption (Working Scientifically) 6. Packing and the Law</p> <p>8E: Combustion 1.Burning fuels (Working Scientifically) 2. Oxidation 3. Fire Safety 4. Air pollution 5. Global Warming</p>	<p>8I: Fluids 1.Particle Model 2. Density 3. Changing State 4. Pressure in fluids 5. Floating/Sinking (Working Scientifically) 6. Drag 7. Extreme Pressures</p> <p>8F: The periodic table 1.Atomic Model 2. Chemical Properties 3. Chemical reaction and compounds (7Hd/e) 4. Mendeleev 5. Physical trends 6. Chemical Trends (demo)</p>	<p>8J: Light 1. Light on the move 2.Reflection (working scientifically) 3. Refraction (working scientifically) 4. Cameras/Eyes 5. Colour</p> <p>7L: Sound 1. Making sounds 2.Moving sounds 3. Detecting sounds 4. Using sounds 5. Comparing waves</p>	<p>8C: Breathing and respiration 1. The air we breathe (7H) 2.Aerobic Respiration 3. Gas exchange system 4. Getting Oxygen 5. Comparing gas exchange 6. Anaerobic respiration</p> <p>8G: Metals and their uses 1.Metal and non-metal properties (also recap 7H) 2. Corrosion 3. Metals and water 4. Metals and acid 5. Alloys</p>	<p>8H: Rocks 1. Earths Elements (7H) 2. Rocks and uses 3. Igneous 4. Metamorphic 5. Weathering and erosion 6. Sedimentary</p>	<p>8L: Earth and space 1. Gathering evidence 2.Seasons 3. Magnetic earth 4. Gravity 5. Beyond the Solar System</p>
9	Edexcel Combined Science/Separate Sciences	<p>Biology B1: Key Concepts in Biology (Part 1)</p> <p>Microscopes</p>	<p>Biology B1: Key Concepts in Biology (Part 2)</p> <p>Enzyme Action Enzyme Activity</p>	<p>Biology B2: Cells and Control (Part 1)</p> <p>Mitosis Growth in animals</p>	<p>Biology B2: Cells and Control (Part 2)</p> <p>The Nervous System</p>	<p>Biology B3: Genetics (Part 1)</p> <p>Meiosis DNA DNA Extraction</p>	<p>Biology B3: Genetics (Part 2)</p> <p>Inheritance Gene Mutation Variation</p>

		<p>Plant and Animal Cells <i>Core Practical: Using Microscopes</i> Specialised Cells Inside Bacteria Enzymes and Nutrition</p> <p><u>Separate Sciences only:</u> Testing Foods <i>Core Practical: Testing foods</i></p> <p><u>Chemistry</u> C3: Atomic Structure Structure of an atom Atomic Number and Mass Number Isotopes</p> <p><u>Physics</u> P3: Conservation of Energy (Part 1)</p>	<p><i>Core Practical: pH and Enzymes</i> Transporting Substances <i>Core Practical: Osmosis in Potatoes</i></p> <p><u>Chemistry</u> C4: The Periodic Table Elements and the Periodic Table Atomic Number and the Periodic Table Electron Configuration</p> <p><u>Physics</u> P4/5: Waves, Light and the Electromagnetic Spectrum (Part 1)</p>	<p>Stem Cells</p> <p><u>Chemistry</u> C1/2: States of Matter and Separating Techniques (Part 1) States of Matter Mixtures Filtration Crystallisation Paper Chromatography</p> <p><u>Physics</u> P4/5: Waves, Light and the Electromagnetic Spectrum (Part 2)</p>	<p>Neurotransmission Speeds</p> <p><u>Separate Sciences only:</u> The Brain Brain and Spinal Cord Problems The Eye</p> <p><u>Chemistry</u> C1/2: States of Matter and Separating Techniques (Part 2) <i>Core Practical: Chromatography</i> Distillation <i>Core Practical: Distillation of inks</i> Drinking water</p> <p><u>Physics</u> P4/5: Waves, Light and the Electromagnetic Spectrum (Part 3)</p>	<p>Alleles</p> <p><u>Chemistry</u> C6/7: Covalent Bonding and Types of Substances (Part 1) Covalent Bonding Molecular Compounds Allotropes of Carbon (Graphite and Diamond)</p> <p><u>Physics</u> P7: Radioactivity (Part 1) Atomic Models Inside Atoms</p>	<p><u>Separate Sciences only:</u> Sexual and Asexual Reproduction Protein Synthesis Genetic Variants and Phenotypes Mendel Multiple and Missing alleles</p> <p><u>Chemistry</u> C6/7: Covalent Bonding and Types of Substances (Part 2) Allotropes of Carbon (Graphene and Fullerene) Properties of metals Bonding Models</p> <p><u>Physics</u> P7: Radioactivity (Part 2) Types of radiation</p>
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		<p>Energy Stores and Transfers Energy Efficiency Keeping Warm Stored Energies Non-renewable Resources Renewable Resources</p>	<p>Describing Waves Wave Speeds <i>Core Practical: Investigating Waves</i> Refraction</p> <p><u>Separate Sciences only:</u> Waves Crossing Boundaries. Ears and Hearing. Ultrasound. Infrasound.</p>	<p><i>Core Practical: Investigating Refraction</i> Electromagnetic waves The Electromagnetic Spectrum</p>	<p>Using the long wavelengths Using the short wavelengths EM radiation dangers</p> <p><u>Separate Sciences only:</u> Ray Diagrams Colour Lenses Radiation and Temperature <i>Core Practical: Investigating Radiation</i></p>	<p>Electrons and Orbits Background Radiation Types of radiation Radioactive Decay Half life Dangers of radioactivity</p>	<p>Radioactive Decay Half life Dangers of radioactivity</p> <p><u>Separate Sciences only:</u> Using Radioactivity. Radioactivity in Medicine. Nuclear Energy. Nuclear Fission. Nuclear Fusion.</p>
10	Edexcel Combined Science/Separate Sciences	<p><u>Biology B4 Natural Selection and Genetic Modification</u> Evidence for evolution. Darwin's Theory. Classification. Breeds and Varieties. Genes in agriculture and medicine.</p> <p><u>Separate Sciences only:</u> Development of Darwin's Theory Tissue Culture</p>	<p><u>Biology B5 Health, disease and medicine (part 1)</u> Spreading pathogens. Physical and chemical barriers. The immune system. Antibiotics.</p>	<p><u>Biology B5 Health, disease and medicine (part 2)</u> Spreading pathogens. Physical and chemical barriers. The immune system. Antibiotics.</p> <p><u>Separate Sciences only:</u> Virus Life cycle. Plant Defences. Plant Diseases. <i>Core Practical: Antibiotics.</i></p>	<p><u>Biology B7 Animal co-ordination, control and homeostasis (part 1)</u> Hormones. Hormonal control of the metabolic rate. The menstrual cycle.</p>	<p><u>Biology B7 Animal co-ordination, control and homeostasis (part 2)</u> Hormones and the menstrual cycle. Control of blood glucose. Type 2 diabetes.</p>	<p><u>Biology B6 Plant Structures and their function</u> Photosynthesis . Factors affecting photosynthesis. <i>Core practical – light intensity and the rate of photosynthesis.</i> Absorbing water and minerals. Transpiration and translocation.</p>

		<p>GM and Agriculture Fertilisers and Biological Control</p> <p><u>Chemistry</u> C5 Ionic bonding Ionic bonds. Ionic lattices. Properties of ionic compounds.</p> <p><u>Physics</u> P1 Motion Vectors and scalars</p>	<p><u>Chemistry</u> C8 Acids and Alkali (part 1) Acids, Alkali and indicators. Looking at acids. Bases and Salts. <i>Core practical – preparing copper sulfate.</i></p> <p><u>Physics</u> P2 Forces and Motion (part 1) Resultant forces Newton's 1st law</p>	<p>Monoclonal Antibodies.</p> <p><u>Chemistry</u> C8 Acids and Alkali (part 2) Alkalis and balancing equations. <i>Core practical – investigating neutralisation.</i> Reactions of acids with metals and carbonates. Solubility.</p> <p><u>Physics</u> P2 Forces and Motion (part 1) Newton's 3rd law. Momentum. Stopping distances. Crash hazards.</p>	<p><u>Chemistry</u> C9 Mass Calculations Masses and Empirical formula. Conservation of mass. Moles. C10 Electrolysis Electrolysis. <i>Core practical – Electrolysis of copper sulfate solution.</i> Products from Electrolysis.</p> <p><u>Physics</u> P7/8 Energy and Forces Work and power. Objects affecting each other. Vector diagrams.</p>	<p><u>Chemistry</u> C11 Obtaining and Using Metals Reactivity. Ores. Oxidation and Reduction. Life cycle assessment and recycling. C12 Reversible Reactions Dynamic equilibrium.</p> <p><u>Separate Sciences only:</u> Transition metals Corrosion Electroplating Alloying Uses of metals and their alloys</p> <p><u>Physics</u> P9 Electricity and Circuits (part 1) Electric Circuits. Current and potential differences.</p>	<p><u>Separate Sciences only:</u> Plant Adaptations. Plant Hormones. Uses of Plant Hormones.</p> <p><u>Chemistry</u> C13 Groups in the Periodic Table Group 1 Group 7 Halogen Reactivity Group 0</p> <p><u>Physics</u> P9 Electricity and Circuits (part 2) Resistance.</p>
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		Distance time graphs Acceleration Velocity time graphs	Weight and Mass Newton's 2 nd law <i>Core practical- investigating acceleration.</i>	<u>Separate Sciences only:</u> Braking Distance and Energy.	<u>Separate Sciences only:</u> Rotational Forces	Current, charge and Energy.	Resistance of components. <i>Core practical – Investigating Resistance.</i>
11	Edexcel Combined Science/Separate Sciences	<u>Biology</u> B9 Ecosystems and Material Cycles (part 1) Ecosystems. Abiotic factors and communities. <i>Core practical – Quadrats and Transects.</i> Biotic factors and communities. <u>Chemistry</u> C14 Rates of Reaction. Rates of Reaction. Factors affecting rates of reaction. <i>Core practical – investigating reaction rates.</i>	<u>Biology</u> B9 Ecosystems and Material Cycles (part 2) Parasitism and mutualism. Biodiversity and humans. Preserving biodiversity. The water cycle. The carbon cycle. The nitrogen cycle. <u>Separate Sciences only:</u> Energy Transfer. Food Security. Rates of Decomposition. <u>Chemistry</u> C16 Fuels Hydrocarbons in crude oil and natural gas. Fractional distillation of crude oil.	<u>Biology</u> B8 Exchange and Transport in Animals Efficient transport and Exchange. The circulatory system. The heart. Cellular respiration. <i>Core Practical – Respiration rates.</i> <u>Separate Sciences only:</u> Factors affecting Diffusion <u>Chemistry</u> C17 Earth and the Atmosphere The early atmosphere. The changing atmosphere. The atmosphere today. Climate change.	Revision for End of Year Exams. <u>Biology</u> Prepare for Biology Paper 1. <u>Chemistry</u> Separate Sciences only: C14/15/16: Quantitative Analysis, Dynamic Equilibrium and Chemical Cells Yields Atom Economy	Revision for End of Year Exams. Prepare for Biology Paper 2. Prepare for Chemistry Paper 2.	

		<p>Catalysts and activation energy. Exothermic and Endothermic</p>	<p>The alkane homologous series. Complete and incomplete combustion. Combustible fuels and pollution. Breaking down hydrocarbons.</p>		<p>Concentrations. Titrations and Calculations. <i>Core Practical: Titration</i> Molar Volume of Gases. Fertilisers and the Haber Process. Factors affecting Equilibrium. Chemical and Fuel Cells.</p> <p>C22/23/24: Hydrocarbons, Alcohols, Carboxylic Acids and Polymers Alkanes and Alkenes. Reactions of alkanes and alkenes. Ethanol Production. Alcohols. <i>Core Practical: Combustion of Alcohols.</i> Carboxylic Acids. Addition Polymerisation. Polymers and their uses. Condensation Polymerisation. Problems with Polymers.</p>	<p>Prepare for Physics Paper 2.</p>	
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		<p>Physics P9 Electricity and Circuits (part 3) Transferring Energy. Power. Transferring Energy by Electricity. Electrical Safety.</p> <p>Separate Sciences only: Charges and Static Electricity.</p>	<p>Physics P11: Electromagnetic Induction Transformers. Transformers and Energy.</p> <p>Separate Sciences only: Electromagnetic Induction. National Grid.</p>	<p>Physics P13 Forces and Matter Bending and stretching. <i>Core practical – investigating springs.</i> Extension and energy transfers.</p> <p>Separate Sciences only: Gas Pressure and Volume. Pressure in Fluids. Pressure and Upthrust.</p>	<p>C25/26: Qualitative Analysis Flame Tests and Photometry. Tests for Positive Ions. Tests for Negative Ions. Core Practical: Testing for Ions. Choosing Materials. Composite Materials. Nanoparticles.</p> <p>Prepare for Chemistry Paper 1.</p>		
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		<p>Dangers and Uses of Static Electricity. Electric Fields.</p> <p>P10 Magnets and Magnetic fields Magnets and Fields. Electromagnetism Magnetic forces.</p>	<p>P12 Particle model Particles and Density. <i>Core Practical – Investigating Density.</i> Energy and changes of state. Energy calculations. Gas temperature and pressure.</p>				
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		Subject: Biology					
12	Edexcel AS Level 'Biology A'	<p>Topic 1 Lifestyle, Health and Risk</p> <ol style="list-style-type: none"> 1. What is cardiovascular disease? 2. How does circulation work? 3. Atherosclerosis and blood clotting. 4. Who is at risk of cardiovascular disease? <p>Topic 2 Genes and Health</p> <ol style="list-style-type: none"> 1. The role of mucus in the lungs. 2. Gas exchange surfaces. 	<p>Topic 1 Lifestyle, Health and Risk</p> <ol style="list-style-type: none"> 1. Identifying risk factors for cardiovascular disease: <ul style="list-style-type: none"> • Studying cardiovascular disease. • Age and gender. • Blood pressure. • Dietary factors. • Obesity. • Cholesterol. • Genes and coronary heart disease. • Other risk factors. 	<p>Topic 1 Lifestyle, Health and Risk</p> <p>Core practical's 1 & 2</p> <p>Topic 3 Voice of the Genome</p> <ol style="list-style-type: none"> 1. Prokaryotic and eukaryotic cells. 2. Gametes. <p>Topic 4 Biodiversity and Natural Resources</p> <ol style="list-style-type: none"> 1. Why are there so many different species? 2. Niches. 3. Adaptations. 4. Natural selection. 5. Biodiversity. 	<p>Topic 3 Voice of the Genome</p> <ol style="list-style-type: none"> 3. How do gametes form? 4. Sex linkage. 5. Fertilisation. 6. The cell cycle. 7. Early embryonic development – stem cells. <p>Topic 4 Biodiversity and Natural Resources</p> <ol style="list-style-type: none"> 1. Making use of biodiversity. 2. Cell walls. 3. Specialised cells in plant stems. 	<p>Topic 3 Voice of the Genome</p> <ol style="list-style-type: none"> 1. How development is controlled. 2. Gene expression. 3. Nature and nurture. 4. Gene and environment interactions. 5. The epigenome. 6. Cancer. <p>Topic 4 Biodiversity and Natural Resources</p> <ol style="list-style-type: none"> 1. Seeds. 2. Zoos and conservation. 	<p>Topic 7 Run for Your Life</p> <ol style="list-style-type: none"> 1. Respiration – Glycolysis. 2. Respiration – Krebs cycle. 3. Respiration – Chemiosmosis. <p>Topic 5 On the wild Side</p> <ol style="list-style-type: none"> 1. What is an ecosystem? 2. Biotic and abiotic factors. 3. Succession.

		<p>3. Protein structure. 4. The fluid mosaic models of cell membranes. 5. Transport across membranes. 6. Regulating mucus water content in the lungs. 7. Why cystic fibrosis lungs cannot regulate the water in mucus.</p>	<ul style="list-style-type: none"> • Reducing the risks of cardiovascular disease. • Drug treatment. <p>Topic 2 Genes and Health</p> <ol style="list-style-type: none"> 1. The effect of cystic fibrosis on the digestive system. 2. Enzyme structure and rates of reaction. 3. The effect of cystic fibrosis on the reproductive system. 4. The structure of DNA. 5. Protein synthesis. 6. DNA replication. 7. How is cystic fibrosis inherited? 8. Testing for cystic fibrosis. 9. Making ethical decisions. 	<p>6. Classification. 7. Genetic variation. 8. Measuring biodiversity.</p>	<p>4. Useful plant fibres. 5. Digitalis and drug development.</p>	<p>3. Reintroducing animals to the wild.</p>	
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13	Edexcel AS Level 'Biology A'	<p>Topic 5 On the wild Side</p> <ol style="list-style-type: none"> 1. Chloroplasts. 2. Photosynthesis. 3. Energy transfer. 4. Evidence for climate change. 5. The greenhouse effect. 6. Global warming. 7. Predicting future climates. <p>Topic 7 Run for Your Life</p> <ol style="list-style-type: none"> 1. Recap respiration 2. Anaerobic respiration. 3. Rate of respiration. 4. Joints and movement. 5. Muscles. 6. Types of muscle fibres. 	<p>Topic 5 On the wild Side</p> <ol style="list-style-type: none"> 4. Changing distribution of species. 5. Altered development. 6. The effect of climate change on evolution. 7. Molecular evidence for evolution. 8. Speciation. 9. The carbon cycle. 10. Sustainability. <p>Topic 7 Run for Your Life</p> <ol style="list-style-type: none"> 1. Cardiac output. 2. Control of heart rate. 3. Breathing. 4. Homeostasis and negative feedback. 5. Excessive exercise and immune suppression. 6. Benefits of exercise. 7. Performance enhancing substances. 	<p>Topic 6 Infection, Immunity and Forensics</p> <ol style="list-style-type: none"> 1. Forensic Biology – identifying the body. 2. Making a DNA profile. 3. Polymerase chain reaction. 4. Determining time of death. 5. Succession. 6. Bacterial and viral structure. 7. Transmission of disease. 8. The non-specific immune system. 9. Specific immunity. 10. The secondary immune response <p>Topic 8 Grey Matter</p> <ol style="list-style-type: none"> 1. Cells of the nervous system. 2. Reflex arcs. 3. Transmission of impulses. 4. Synapses. 5. Comparing nervous and hormonal control. 6. Receptors. 7. Structure of the brain. 8. Brain imaging. 	<p>Topic 6 Infection, Immunity and Forensics</p> <ol style="list-style-type: none"> 1. What is tuberculosis? 2. HIV and AIDS. 3. Protein synthesis. 4. Physical barriers and chemical defences. 5. Immunity and vaccination. 6. Treating AIDS. 7. Antibiotic resistance and hospital-acquired infection. <p>Topic 8 Grey Matter</p> <ol style="list-style-type: none"> 1. Visual development. 2. Depth perception. 3. Learning and memory. 4. Ethics of using animals in research. 5. Problems with the synapses. 	<p>Revision and study of the extended article for A Level paper 3.</p> <p>Exam season.</p>	Exam season.
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					6. The human genome project. 7. Using genetically modified organisms to produce drugs. 8. Concerns about genetic modification.	
Subject: Chemistry						
12	AQA Chemistry Year 1	<u>Atomic Structure</u> 1. The atom 2. Atomic Models 3. Relative Mass 4. Mass Spectrometry 5. Using Mass Spectra 6. Electronic Structure 7. Ionisation Energies <u>Amount of substance</u> 1. The Mole 2. Gases and the Mole 3. Chemical Equations 4. Equations and Calculations 5. Titrations	<u>Bonding</u> 1. Ionic Bonding 2. Covalent Bonding 3. Charge Clouds 4. Shapes of Molecules 5. Polarisation 6. Intermolecular Forces 7. Metallic Bonding 8. Properties of metals <u>Energetics</u> 1. Enthalpy 2. Bond enthalpies 3. Measuring Enthalpy Changes 4. Hess's Law <u>Kinetics</u>	<u>Equilibria and redox</u> 1. Reversible Reactions 2. Industrial Processes 3. The Equilibrium Constant 4. Factors affecting the Equilibrium Constant 5. Redox Reactions 6. Redox Equations <u>Periodicity</u> 1. The Periodic Table 2. Periodicity	<u>Group 2 elements and Group 7 elements</u> 1. The Alkaline Earth Metals 2. Group 2 compounds 3. The Halogens 4. Halide Ions 5. Tests for ions <u>Introduction to Organic Chemistry</u> 1. Formulas 2. Functional Groups 3. Nomenclature 4. Mechanisms 5. Isomers 6. E/Z Isomers <u>Alkanes and halogenoalkanes</u> 1. Alkanes and Petroleum 2. Alkanes as fuels 3. Synthesis of Chloroalkanes 4. Halogenalkanes 5. Nucleophilic Substitution 6. Elimination Reactions <u>Organic Analysis</u> 1. Tests for functional groups 2. Mass Spectrometry 3. Infrared Spectrometry	Alkenes and alcohols

		6. Formulas 7. Chemical Yield 8. Atom Economy	1. Reaction Rates 2. Catalysts 3. Measuring reaction rates			
13	AQA Chemistry Year 2	<u>Thermodynamics</u> 1. Enthalpy Changes 2. Born-Haber Cycle 3. Enthalpies of Solution 4. Entropy 5. Free Energy Change <u>Rate equations and K_p</u> 1. Monitoring Reactions 2. Reaction Rates and Graphs 3. Rate Equations 4. The Initial Rates Method 5. Clock Reactions 6. Rate-Concentration Graphs 7. The Rate-determining Step	<u>Electrode Potentials and Cells (Part 2)</u> 3. Electrochemical Series 4. Electrochemical Cells <u>Acids, bases and Ph</u> 1. Acids, Bases and K_w 2. pH Calculations 3. The Acid Dissociation Constant 4. Titrations and pH Curves 5. Titration Calculations 6. Buffer Action 7. Calculating pH of Buffers	<u>Transition metals</u> 1. Transition Metals – The Basics 2. Complex Ions 3. Isomerism in Complex Ions 4. Formation of Coloured Ions 5. Ligand Substitution Reactions 6. Variable Oxidation States 7. Transition Metal Titrations 8. Transition Metal Catalysts 9. Metal-Aqua Ions <u>Isomerism and Carbonyl Compounds</u> 1. Optical Isomerism 2. Aldehydes and Ketones	<u>Aromatic Compounds and Amines</u> 1. Aromatic Compounds 2. Reactions of Aromatics 3. Amines and Amides 4. Reactions of Amines Further Synthesis and Analysis 1. Organic Synthesis 2. NMR Spectroscopy 3. ^{13}C NMR Spectroscopy 4. ^1H NMR Spectroscopy	Revision for examinations

		8. The Arrhenius Equation 9. Gas Equilibria 10. Changing Gas Equilibria <u>Electrode Potentials and Cells (Part 1)</u> 1. Electrode Potentials 2. Standard Electrode Potentials	<u>Period 3 elements</u> 1. Period 3 Elements 2. Period 3 Oxides <u>Polymers</u> 1. Condensation Polymerisation 2. Monomers and Repeating Units 3. Disposing of Polymers	3. Hydroxynitriles 4. Carboxylic Acids and Esters 5. Reactions and Uses of Esters 6. Acyl Chlorides 7. Acid Anhydrides 8. Purifying Organic Compounds <u>Amino Acids, Proteins and DNA</u> 1. Amino Acids 2. Proteins 3. Enzymes 4. DNA 5. Cisplatin	5. Chromatography 6. Gas Chromatography Revision for examinations		
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Subject: Physics							
12	AQA Physics	Topic 1 Measurements and their errors <ul style="list-style-type: none"> • Use of SI units and their prefixes • Limitation of physical measurements • Estimation of physical quantities 	Topic 3 Waves <ul style="list-style-type: none"> • Progressive waves • Longitudinal and transverse waves • Principle of superposition of waves and formation of stationary waves • Interference 	Topic 4 Force, energy and momentum <ul style="list-style-type: none"> • Scalars and vectors • Moments • Motion along a straight line • Motion along a straight line • Newton's laws of motion • Momentum 	Topic 4 (Part 2) Materials <ul style="list-style-type: none"> • Bulk properties of solids • The Young modulus 	Topic 5 Electricity <ul style="list-style-type: none"> • Basics of electricity • Current–voltage characteristics • Resistivity • Circuits • Potential divider • Electromotive force and internal resistance 	Electricity Continued Revision and End of Year Exams

		<p>Topic 2 Particles and radiation</p> <ul style="list-style-type: none"> • Constituents of the atom • Stable and unstable nuclei • Particles, antiparticles and photons • Particle interactions • Classification of particles • Quarks and antiquarks • Applications of conservation laws <p>Topic 2 (Part 2) Electromagnetic radiation and quantum phenomena</p> <ul style="list-style-type: none"> • The photoelectric effect • Collisions of electrons with atoms • Energy levels and photon emission • Wave-particle duality 	<ul style="list-style-type: none"> • Diffraction • Refraction at a plane surface 	<ul style="list-style-type: none"> • Work, energy and power • Conservation of energy 			
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Year 13	AQA Physics	<p>Topic 6 Further Mechanics</p> <ul style="list-style-type: none"> • Periodic motion • Circular motion • Simple harmonic motion (SHM) • Simple harmonic systems • Forced vibrations and resonance <p>Topic 6 (Part 2) Thermal Physics</p> <ul style="list-style-type: none"> • Thermal energy transfer • Ideal gases • Molecular kinetic theory model 	<p>Topic 7 Fields and their consequences</p> <ul style="list-style-type: none"> • Fields • Gravitational fields • Newton's law • Gravitational field strength • Gravitational potential • Orbits of planets and satellites • Electric fields • Coulomb's law • Electric field strength • Electric potential <p>Topic 7 (Part 2) Capacitance</p> <ul style="list-style-type: none"> • Capacitance • Parallel plate capacitor • Energy stored by a capacitor • Capacitor charge and discharge <p>Topic 8 Magnetic fields</p>	<p>Topic 8 Nuclear physics</p> <ul style="list-style-type: none"> • Radioactivity • Rutherford scattering • α, β and γ radiation • Radioactive decay • Nuclear instability • Nuclear radius • Mass and energy • Induced fission • Safety aspects <p>Topic 9 (OPTION) Astrophysics</p> <ul style="list-style-type: none"> • Telescopes • Astronomical telescope consisting of two converging lenses • Reflecting telescopes • Single dish radio telescopes, I-R, U-V and X-ray telescopes • Advantages of large diameter telescopes • Classification of stars • Classification by luminosity 	<p>Topic 9 (OPTION) Astrophysics</p> <ul style="list-style-type: none"> • Continued 	<p>Revision and past papers</p> <p>Exam season.</p>	<p>Exam season.</p>
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