

# Science faculty

## Year 11 separate science topic check list.

The sub-topics in italics are separate only content.

Topic	Pages in the relevant revision guide	Revised?
<b>Biology content in both paper 1 and 2.</b>		
<b>Key concepts in biology</b> <ul style="list-style-type: none"> <li>- Microscopes</li> <li>- Plant and animal cells (core practical: using microscopes)</li> <li>- Specialised cell</li> <li>- Inside bacteria</li> <li>- Enzymes and nutrition</li> <li>- <i>Testing foods (Core practical: testing foods)</i></li> <li>- Enzyme action</li> <li>- Enzyme activity (core practical: Enzymes and pH)</li> <li>- Transporting substances (core practical: Osmosis in potatoes)</li> </ul>	1-14	
<b>Biology content in paper 1 only</b>		
<b>Cells and control</b> <ul style="list-style-type: none"> <li>- Mitosis</li> <li>- Growth in animals</li> <li>- Growth in plants</li> <li>- Stem cells</li> <li>- <i>The brain</i></li> <li>- <i>Brain and spinal cord problems</i></li> <li>- The nervous system</li> <li>- <i>The eye</i></li> <li>- Neurotransmission speeds</li> <li>-</li> </ul>	15-25	
<b>Genetics</b> <ul style="list-style-type: none"> <li>- <i>Sexual and asexual reproduction</i></li> <li>- DNA</li> <li>- DNA extraction</li> <li>- <i>Protein synthesis</i></li> <li>- <i>Genetic variants and phenotypes</i></li> <li>- <i>Mendel</i></li> <li>- Alleles</li> <li>- Inheritance</li> </ul>	26-38	

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<ul style="list-style-type: none"> <li>- <i>Multiple and missing alleles</i></li> <li>- Gene mutation</li> <li>- Variation</li> </ul>		
<b>Natural selection and genetic modification</b> <ul style="list-style-type: none"> <li>- Evidence for human evolution</li> <li>- Darwin's theory</li> <li>- <i>Development of Darwins theory</i></li> <li>- Classification</li> <li>- Breeds and varieties</li> <li>- Genes in agriculture and medicines</li> <li>- <i>GM and Agriculture</i></li> <li>- <i>Fertilisers and biological control</i></li> </ul>	40-48	
<b>Health disease and the development of medicines</b> <ul style="list-style-type: none"> <li>- Health and disease</li> <li>- Non-communicable disease</li> <li>- Cardiovascular disease</li> <li>- Pathogens</li> <li>- Spreading pathogens</li> <li>- <i>Virus life cycles</i></li> <li>- <i>Plant defences</i></li> <li>- <i>Plant diseases</i></li> <li>- Physical and chemical barriers</li> <li>- The immune system</li> <li>- Antibiotics</li> <li>- <i>Antibiotics (core practical: Antibiotics).</i></li> <li>- <i>Monoclonal antibodies.</i></li> </ul>	49-67	
<b>Biology content in paper 2 only</b>		
<b>Plant structure and their functions</b> <ul style="list-style-type: none"> <li>- Photosynthesis</li> <li>- Factors that affect photosynthesis (core practical: light intensity and photosynthesis)</li> <li>- Absorbing water and mineral ions</li> <li>- Transpiration and translocation</li> <li>- <i>Plant adaptions</i></li> <li>- <i>Plant hormones</i></li> <li>- <i>Uses of plant hormones</i></li> </ul>	68-79	
<b>Animal coordination, control and homeostasis</b> <ul style="list-style-type: none"> <li>- Hormones</li> <li>- Hormone control of metabolic rate</li> <li>- The menstrual cycle</li> <li>- Hormones and the menstrual cycle</li> <li>- Control of blood glucose</li> <li>- Type 2 diabetes</li> <li>- <i>Thermoregulation</i></li> </ul>	80-92	

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<ul style="list-style-type: none"> <li>- <i>Osmoregulation</i></li> <li>- <i>The kidneys</i></li> </ul>		
<b>Exchange and transport in animals</b> <ul style="list-style-type: none"> <li>- Efficient transport and exchange</li> <li>- The circulatory system</li> <li>- The heart</li> <li>- Cellular respiration (core practical: respiration rates)</li> </ul>	<b>93-103</b>	
<b>Ecosystems and material cycles</b> <ul style="list-style-type: none"> <li>- Ecosystems</li> <li>- <i>Energy transfer</i></li> <li>- Abiotic factors and communities (core practical: Quadrats and transects)</li> <li>- Biotic factors and communities</li> <li>- <i>Assessing pollution</i></li> <li>- Parasitism and mutualism</li> <li>- Biodiversity and humans</li> <li>- <i>Preserving biodiversity</i></li> <li>- <i>Food security</i></li> <li>- Preserving biodiversity</li> <li>- The water cycle</li> <li>- The carbon cycle</li> <li>- The nitrogen cycle</li> <li>- <i>Rates of deposition</i></li> </ul>	<b>104-118</b>	
<b>Chemistry content in paper 1 and 2</b>		
<b>Key chemistry concepts</b> <ul style="list-style-type: none"> <li>- Formulae</li> <li>- Equations</li> <li>- Ionic equations</li> <li>- Hazards, risks and precautions.</li> </ul>	<b>1-4</b>	
<b>Atomic structure</b> <ul style="list-style-type: none"> <li>- Structure of an atom</li> <li>- Atomic number and mass number</li> <li>- Isotopes</li> </ul>	<b>5-6</b>	
<b>The periodic table</b> <ul style="list-style-type: none"> <li>- Elements and the periodic table</li> <li>- Atomic number and the periodic table</li> <li>- Electronic configuration</li> </ul>	<b>7-9</b>	

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<b>Ionic bonding</b> <ul style="list-style-type: none"> <li>- Ionic bonds</li> <li>- Ionic lattices</li> <li>- Properties of ionic compounds</li> </ul>	10-12	
<b>Covalent bonding</b> <ul style="list-style-type: none"> <li>- Covalent bonds</li> <li>- Molecular compounds</li> </ul>	13-14	
<b>types of substances</b> <ul style="list-style-type: none"> <li>- Allotropes of carbon</li> <li>- Properties of metals</li> <li>- Bonding models</li> </ul>	15-18	
<b>Calculations involving masses</b> <ul style="list-style-type: none"> <li>- Masses and empirical formula</li> <li>- Conservation of mass</li> <li>- Moles</li> </ul>	19-25	
<b>Chemistry content in paper 1 only</b>		
<b>States of matter and methods of separating and purifying substances</b> <ul style="list-style-type: none"> <li>- States of matter</li> <li>- Mixtures</li> <li>- Filtration and crystallisation</li> <li>- Paper chromatography</li> <li>- Distillation (Core practical: investigating inks)</li> <li>- Drinking water</li> </ul>	26-33	
<b>Acids and alkalis</b> <ul style="list-style-type: none"> <li>- Acids, alkalis and indicators</li> <li>- Looking at acids</li> <li>- Bases and salts (core practical: Preparing copper sulfate)</li> <li>- Alkalis and balancing equations (Core practical – investigating neutralisation)</li> <li>- Alkalis and neutralisation</li> <li>- Reactions of acids with metals and metal carbonates</li> <li>- Solubility</li> </ul>	34-41	
<b>Electrolytic processes</b> <ul style="list-style-type: none"> <li>- Electrolysis (core practical: Electrolysis of copper sulfate solution)</li> <li>- Products from electrolysis</li> </ul>	42-45	

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<b>Obtaining and using metals.</b> <ul style="list-style-type: none"><li>- Reactivity</li><li>- Ores</li><li>- Oxidation and reduction</li><li>- Life cycle assessment and recycling</li></ul>	<b>46-54</b>	
<b>Transition metals, alloys and corrosion</b> <ul style="list-style-type: none"><li>- Transition metals</li><li>- Corrosion</li><li>- Electroplating</li><li>- Alloying</li><li>- Uses of metals and alloys</li></ul>	<b>55-58</b>	
<b>Quantitative analysis</b> <ul style="list-style-type: none"><li>- Yields</li><li>- Atom economy</li><li>- Concentrations</li><li>- Titration and calculations (core practical: acid-alkali titration)</li><li>- Molar volume of gases</li></ul>	<b>59-66</b>	
<b>Dynamic equilibria, calculation involving volumes of gases</b> <ul style="list-style-type: none"><li>- Dynamic equilibrium</li><li>- Fertilisers and the Haber process</li><li>- Factors affecting equilibrium</li></ul>	<b>67-69</b>	
<b>Chemical cells and fuel cells</b> <ul style="list-style-type: none"><li>- Chemical and fuel cells</li></ul>	<b>70-71</b>	
<b>Chemistry content in paper 2 only</b>		
<b>Groups in the periodic table</b> <ul style="list-style-type: none"><li>- Group 1</li><li>- Group 7</li><li>- Halogen reactivity</li><li>- Group 0</li></ul>	<b>72-77</b>	
<b>Rates of reaction</b> <ul style="list-style-type: none"><li>- Rates of reaction</li><li>- Factors affecting reaction rates (core practical: investigating reaction rates)</li><li>- Catalysts and activation energy</li></ul>	<b>78-80</b>	

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<b>Heat energy changes in chemical reactions</b> <ul style="list-style-type: none"> <li>- Exothermic and endothermic reactions</li> <li>- Energy changes in reactions</li> </ul>	<b>81-83</b>	
<b>Fuels</b> <ul style="list-style-type: none"> <li>- Hydrocarbons in crude oil and natural gas</li> <li>- Fractional distillation of crude oil</li> <li>- The alkane homologous series</li> <li>- Complete and incomplete combustion</li> <li>- Combustible fuels and pollution</li> <li>- Breaking down hydrocarbons</li> </ul>	<b>84-91</b>	
<b>Earth and atmospheric science</b> <ul style="list-style-type: none"> <li>- The early atmosphere</li> <li>- The changing atmosphere</li> <li>- The atmosphere today</li> <li>- Climate change</li> </ul>	<b>92-94</b>	
<b>Hydrocarbons</b> <ul style="list-style-type: none"> <li>- Alkanes and alkenes</li> <li>- Reactions of alkanes and alkenes</li> </ul>	<b>99-11</b>	
<b>Alcohols and carboxylic acids</b> <ul style="list-style-type: none"> <li>- Ethanol production</li> <li>- Alcohols (core practical: The combustion of alcohols)</li> <li>- Carboxylic acids</li> </ul>	<b>106-109</b>	
<b>Polymers</b> <ul style="list-style-type: none"> <li>- Addition polymerisation</li> <li>- Polymer properties and uses</li> <li>- Condensation polymerisation</li> <li>- Problems with polymers</li> </ul>	<b>101-105</b>	
<b>Quantitative analysis: Tests for ions</b> <ul style="list-style-type: none"> <li>- Flame tests and photometry</li> <li>- Tests for positive ions</li> <li>- Tests for negative ions (core practical: Identifying ions)</li> </ul>	<b>95-98</b>	
<b>Bulk surface properties of matter including nanoparticles</b> <ul style="list-style-type: none"> <li>- Choosing materials</li> <li>- Composite materials</li> <li>- Nanoparticles</li> </ul>	<b>110-112</b>	

## Physics content in paper 1 only

<b>Motion</b> <ul style="list-style-type: none"> <li>- Vectors and scalars</li> <li>- Distance/time graphs</li> <li>- Acceleration</li> <li>- Velocity/time graphs</li> </ul>	2-6	
<b>Forces and motion</b> <ul style="list-style-type: none"> <li>- Resultant forces</li> <li>- Newton's first law</li> <li>- Mass and weight</li> <li>- Newton's second law (core practical: investigating acceleration)</li> <li>- Newton's third law</li> <li>- Momentum</li> <li>- Stopping distances</li> <li>- Breaking distance and energy</li> <li>- Crash hazards</li> </ul>	7-16	
<b>Conservation of energy</b> <ul style="list-style-type: none"> <li>- Energy stores and transfers</li> <li>- Energy efficiency</li> <li>- Keeping warm</li> <li>- Stored energies</li> <li>- Non-renewable resources</li> <li>- Renewable resources</li> </ul>	17-22	
<b>Waves</b> <ul style="list-style-type: none"> <li>- Describing waves</li> <li>- Wave speeds (core practical: Investigating waves)</li> <li>- Refraction</li> <li>- <i>Waves crossing boundaries</i></li> <li>- <i>Ears and hearing</i></li> <li>- <i>Ultrasound</i></li> <li>- <i>Infrasound</i></li> </ul>	23-31	
<b>Light and the electromagnetic spectrum</b> <ul style="list-style-type: none"> <li>- <i>Ray diagrams (Core practical: Investigating refraction)</i></li> <li>- <i>Colour</i></li> <li>- <i>Lenses</i></li> <li>- Electromagnetic waves (core practical: Investigating refraction)</li> <li>- The electromagnetic spectrum</li> <li>- Using the long wavelengths</li> </ul>	32-44	

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<ul style="list-style-type: none"> <li>- <i>Radiation and temperature (core practical: investigating radiation)</i></li> <li>- Using the short wavelengths</li> <li>- EM radiation dangers</li> </ul>		
<b>Radioactivity</b> <ul style="list-style-type: none"> <li>- Atomic models</li> <li>- Inside atoms</li> <li>- Electrons and orbits</li> <li>- Background radiation</li> <li>- Types of radiation</li> <li>- Radioactive decay</li> <li>- Half life</li> <li>- Using radioactivity</li> <li>- Dangers of reactivity</li> <li>- <i>Radioactivity in medicine</i></li> <li>- <i>Nuclear energy</i></li> <li>- <i>Nuclear fission</i></li> <li>- <i>Nuclear fusion</i></li> </ul>	45-63	
<b>Astronomy</b> <ul style="list-style-type: none"> <li>- <i>The solar system</i></li> <li>- <i>Gravity and orbits</i></li> <li>- <i>Life cycle of stars</i></li> <li>- <i>Red-Shift</i></li> <li>- <i>Origins of the universe</i></li> </ul>	64-70	
<b>Physics content in paper 2 only</b>		
<b>Energy – forces doing work and forces and their effects</b> <ul style="list-style-type: none"> <li>- Work and power</li> <li>- Vector diagrams</li> <li>- Objects affecting each other</li> <li>- <i>Rotational forces</i></li> </ul>	71-78	
<b>Electricity and circuits</b> <ul style="list-style-type: none"> <li>- Electric circuits</li> <li>- Current and potential difference</li> <li>- Current, charge and energy</li> <li>- Resistance</li> <li>- More about resistance (core practical: investigating resistance)</li> <li>- Transferring energy</li> <li>- Power</li> <li>- Transferring energy by electricity</li> <li>- Electrical safety</li> </ul>	79-92	



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<b><i>Static electricity</i></b> <ul style="list-style-type: none"><li>- <i>Charges and static electricity</i></li><li>- <i>Dangers and uses of static electricity</i></li><li>- <i>Electric fields</i></li></ul>	<b>93-97</b>	
<b>Magnetism, the motor effect and electromagnetic induction</b> <ul style="list-style-type: none"><li>- Magnets and magnetic fields</li><li>- Electromagnetism</li><li>- Magnetic forces</li><li>- <i>Electromagnetic induction</i></li><li>- Transformers</li><li>- Transformers and energy</li></ul>	<b>98-106</b>	
<b>Particle model</b> <ul style="list-style-type: none"><li>- Particles and density (Core practical: investigating densities)</li><li>- Energy and changes in state</li><li>- Energy calculations (Core practical: Investigating water)</li><li>- Gas temperature and pressure</li><li>- <i>Gas pressure and volume</i></li></ul>	<b>107-114</b>	
<b>Forces and matter</b> <ul style="list-style-type: none"><li>- Bending and stretching (Core practical: investigating springs)</li><li>- Extension and energy transfers</li><li>- <i>Pressure in fluids</i></li><li>- <i>Pressure and upthrust</i></li></ul>	<b>115-120</b>	