

| Yr10 (KS4) | Topic Area | Key knowledge/skills (what <u>has</u> to be learnt) | Examples of key compulsory practicals for students | Knowledge/Skills revisited and to be revisited | What does good look like? | Resources/support at home |
|---------------|-------------------------------|---|--|--|---|--|
| B4 | Organising animals and plants | <p>The structure and function of the human circulatory system. The role and components of blood. The structure and function of the different blood vessels and the heart. The way of solving problems with heart and blood supply to the heart.</p> <p>The structure and function of the human gas exchange system. The adaptations of the alveoli of the lungs for effective gas exchange. The mechanisms of breathing. The importance of ventilating the lungs to maintain steep concentration gradients.</p> <p>The tissues and organs in plants. The role of the leaf stomata in gas exchange in a plant. How evaporation and transpiration are controlled in plants.</p> | | | Please see the published checklists on the website. | <p>Kerboodle Google classroom BBC Bitesize</p> <p>Savemyexams Cognito science videos Physics and Maths Tutor, for notes and past paper questions</p> |
| B5 | Communicable disease | <p>The role of bacteria, viruses, protists and bacteria in diseases.</p> <p>How the human defense responses work. How your white blood cells protect you from disease.</p> | Required practical: Light intensity and the rate of photosynthesis | | | |

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| B6 | Preventing and treating disease | <p>How the immune system works and how vaccination protects people against disease. How antibiotics and painkillers work.</p> <p>How some drugs were discovered and how scientists look for new drugs. The stages involved in testing and trialling new drugs.</p> | | | | |
| B7 | Non-communicable diseases | <p>What is meant by a non-communicable disease. How cancer spreads. The difference between malignant and benign tumours. Smoking and the risk of disease. The effect of diet and exercise on the risk of developing different diseases. How alcohol affects the body.</p> | | | | |
| B8 | Photosynthesis | <p>The process of photosynthesis in plants and the factors that limit the rate. How plants use the glucose they make.</p> | <p>Practical: Light intensity and rate of photosynthesis</p> <p>Practical: testing for starch</p> | | | |
| B9 | Respiration | <p>The importance of aerobic and anaerobic respiration. How the body responds to exercise. The metabolic reactions that take place in the body and the role of the liver.</p> | | | | |
| C4 | Chemical calculations | <p>Relative atomic mass, relative formula mass and the mole.</p> <p>Equations and reacting masses.</p> | | | | |

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| | | Expressing concentration. | | | |
| C5 | Chemical Changes | <p>Metals and the reactivity series.</p> <p>Extracting metals, oxidation and reduction.</p> <p>Making salts and neutralisation.</p> | <p>Displacement reactions with a variety of metals and soluble metal compounds.</p> <p>RP1 - Prepare a Pure Dry sample of a Soluble Salt from the reaction of either an Insoluble Metal Carbonate or Metal Oxide and an Acid, using appropriate apparatus and technique.</p> | Simple Oxidation states. | |
| C6 | Electrolysis | <p>Electrolysis of a molten ionic substance. Equations for the reactions at the anode and cathode.</p> <p>The manufacture of aluminium.</p> <p>Electrolysis of aqueous solutions; predicting the product at the cathode.</p> | <p>Electrolysis of Copper Sulphate solution using a Copper Anode and Aluminium foil Cathode (or coin)</p> <p>RP3 - Electrolysis of Aqueous solutions using Inert electrodes.</p> | Bonding Oxidation states | |
| C7 | Energy Changes | <p>Exothermic and endothermic reactions and their uses.</p> <p>Energy profile diagrams and activation energy.</p> <p>Using bond energies to calculate energy changes.</p> | <p>Experience a variety of Endo & Exothermic reactions.</p> <p>RP4 - Investigating temperature changes. Using appropriate equipment and methods, investigate the variables that affect the energy</p> | Validity of data and analysis | |

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| | | | changes in chemical reactions involving one aqueous solution. Simple Chemical Cell and Fruit batteries. | | | |
| C8 | Rates of Reaction | <p>Measuring the rate of a reaction - different methods.</p> <p>Collision theory - factors that affect the rate of a reaction; surface area, concentration, temperature and catalysts.</p> <p>Reversible reactions and equilibrium.</p> <p>Le Chatelier's principle and the effect of changing conditions.</p> | <p>Carry out a variety of experiments to observe and determine the rate of reaction when Concentration, Surface area of a solid reagent and Temperature are varied. Also when a Catalyst is introduced.</p> <p>RP5 - Investigate how changes in Concentration affect the rate of reactions using one method involving the measuring of a gas produced and another involving a change of colour or turbidity.</p> | <p>Key practical skills, variables, validity, errors, manipulation, graphs and analysis.</p> <p>Topic 7</p> | | |
| C9 | Crude Oil | <p>Crude oil and alkanes.</p> <p>Hydrocarbons and combustion.</p> <p>Fractional distillation of oil - making useful products.</p> <p>Cracking - breaking long molecules into shorter ones.</p> | | <p>Bonding</p> <p>Separating mixtures</p> | | |
| C10 | Chemical analysis | Pure substances and mixtures and | | | | |

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| | | <p>formulations.</p> <p>Paper chromatography.</p> <p>Testing for gases (H₂, O₂, CO₂, Cl₂)</p> | | | | |
| C11 | The Earth's atmosphere | <p>How the atmosphere developed.</p> <p>The current composition of the atmosphere.</p> <p>The greenhouse effect.</p> <p>Global warming and its consequences.</p> <p>Atmospheric pollutants.</p> | | | | |
| C12 | The Earth's resources | <p>Finite and renewable resources.</p> <p>Treating water to make it potable.</p> <p>Dealing with wastewater.</p> <p>Extracting metals from their ores.</p> <p>Purification of copper using electrolysis.</p> <p>Bioleaching and phytomining.</p> <p>Life cycle assessments (LCA) and reusing / recycling.</p> | <p>Research tasks.</p> <p>RP6 - Purify and test water. Analyse and purify water from different sources, including pH, dissolved solids and distillation.</p> <p>Greenhouse Effect Demo using Carbon dioxide , Large beaker, black paper disc and a powerful lamp.</p> | <p>REDOX</p> <p>Electrolysis</p> | | |
| P4 | Electric circuits | <p>How to calculate the flow of charge</p> | <p>Investigating resistance</p> <p>Investigating different electrical components</p> | <p>Note: Year 7 Electric Circuits knowledge to be reviewed and</p> | | |

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| | | How to work out the resistance and potential difference in an electric circuit | | consolidated due to COVID lockdown disruption in Spring/Summer 2020. | | |
| P5 | Electricity in the home | <p>Applying the knowledge and understanding of current and pd behaviour in electric circuits to the context of mains electricity supplies in the home.</p> <p>Explaining alternative current and how earth wires and fuses wires protect users and appliances.</p> <p>Calculating the rates of energy transfer and these are necessary to understand: how resistance heating is both useful and wasteful; compare the efficiency of different appliances and discuss the most appropriate appliance for a given situation in the home.</p> | | Note: Year 7 Energy in the home (electrical aspects such as electrical costs and power) must be reviewed and consolidated due to COVID lockdown Spring/Summer 2020). | | |
| P7 | Radioactivity | <p>How an unstable nucleus changes when it becomes stable and why the radiation it gives out is harmful</p> <p>What nuclear fission and fusion are</p> | | | | |
| P8 | Forces in balance | <p>The difference between a vector and a scalar and how to represent a vector</p> <p>How to find the resultant of two forces and to resolve a force into perpendicular components</p> | | | | |
| P9 | Motion | The difference between speed and velocity and what is meant by acceleration | | | | |

| Yr11 (KS4) | Topic Area | Key knowledge/skills (what <u>has</u> to be learnt) | Examples of key compulsory practicals for students | Knowledge/Skills revisited and to be revisited | What does good look like? | Resources/support at home |
|------------|---------------------------|---|--|--|---|---|
| B10 | The human nervous system | <p>The principles of homeostasis and why it is important for internal body conditions to be controlled.</p> <p>The differences between sensory and motor neurones and their role in coordination and control.</p> | | | Please see the published checklists on the website. | <p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>Savemyexams</p> <p>Cognito science videos</p> <p>Physics and Maths Tutor, for notes and past paper questions</p> |
| B10 | B11 Hormonal coordination | <p>The principle of hormonal control. The role of the pancreas in monitoring and controlling blood glucose concentration. How diabetes is treated.</p> <p>How reproduction is controlled by hormones and how hormones can be used in the artificial control of fertility.</p> | | | | |
| B13 | Reproduction | <p>How the DNA of an organism can be analysed. Know about the variants of genes known as alleles.</p> <p>How meiosis in cell division forms gametes.</p> <p>How information is passed from one generation to another. How to use genetic diagrams, direct proportion, simple ratios and probability to predict outcomes of a genetic cross.</p> | | | | |
| B14 | Variation and evolution | <p>The importance of selective breeding in the development of plants and animals</p> | | | | |

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| | | and the increasing use of genetic engineering to introduce desirable characteristics. | | | | |
| B15 | Genetics and evolution | <p>The history of genetics and the work of Gregor Mendel.</p> <p>How fossils are formed and how they can reveal how organisms have changed over time.</p> <p>How the DNA based systems for classifying organisms work.</p> | | | | |
| B16 | Adaptations, interdependence and competition | How to investigate and measure the distribution and abundance of species in a system. Know about the competition between organisms for resources and about the adaptations of organisms that result from natural selection and enable them to compete successfully in specific environments. | Practical: Investigate the population size of a common species in a habitat. | | | |
| B17 | Organising an ecosystem | The importance of material cycles in nature that return chemicals from the bodies of organisms to the soil, water and air. | | | | |
| B18 | Biodiversity and ecosystems | The reasons for the growth in the human population and its impact in terms of pollution of the land, water and air. | | | | |

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| C9 | Crude Oil | <p>How fractional distillation can be used to separate crude oil into useful fractions.</p> <p>How the properties and usefulness of these fractions relate to their molecular structure.</p> <p>Understanding the process and importance of cracking.</p> <p>Describing complete and incomplete combustion of hydrocarbons with balanced symbol equations.</p> | <p>Burning a Hydrocarbon and determining the products using chemical reactions. Lime water, Cobalt chloride</p> <p>Demo Fractional distillation</p> <p>Crack a long chain hydrocarbon and test for the products using Bromine water or KMnO_4</p> | | | |
| C12 | Chemical analysis | Identifying unknown gases and ions using a wide range of tests | <p>RP5 - Using Paper Chromatography to determine the R_f values for a variety of colours in Food Dyes.</p> | | | |
| C13 | Earth's Atmosphere | How the composition of the Earth's atmosphere developed over its history, how climate change is caused by greenhouse gases and this needs to be addressed. | <p>Research tasks.</p> <p>Greenhouse Effect Demo using Carbon dioxide , Large beaker, black paper disc and a powerful lamp.</p> | | | |
| C14 | Earth's resources | How to analyse data on diminishing finite resources and carrying out Life Cycle Assessments to judge the impact of making new materials. | RP Purifying water | | | |
| P8 | Forces in balance | The difference between a vector and a scalar and how to represent a vector | | | | |

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| | | How to find the resultant of two forces and to resolve a force into perpendicular components | | | | |
| P9 | Motion | The difference between speed and velocity and what is meant by acceleration | | | | |
| P10 | Forces and motion | <p>What is meant by terminal velocity and why objects fall through water at a constant velocity</p> <p>What is meant by the conservation of momentum and when we can use the rule.</p> <p>How to measure the stiffness of a spring and what is meant by elasticity.</p> <p>How to calculate the weight on an object from its mass and the gravitational field strength of where it is.</p> | <p>Investigate the relationship between force and extension of a spring (Stretch tests)</p> <p>Investigating forces and acceleration</p> | | | |
| P12 | Wave properties | Consider the different types of waves and their interactions. | | KS3 Content revisited: Wave effects, wave properties, sound, light | | |
| P13 | Electromagnetic waves | How are the different sections of the electromagnetic spectrum utilised in today's world | | | | |
| P15 | Electromagnetism | How the strength of a magnetic field is measured and what a solenoid is. The motor effect. | | KS3 Content revisited: Electromagnets Note: Magnetism and electromagnetism content from Year 8 must be reviewed and consolidated due to COVID lockdown disruption Spring/Summer 2020 | | |

