

KS4 Long Term Curriculum Plan: Combined Science/Year 10 2023-2024

Curriculum Aim: In Science we aim to prepare students for their GCSE exams whilst also allowing students to be able to understand and interpret the world that they live in. GCSE combined science prepares students to leave school with a strong understanding of how science works as well as preparing them for future careers, courses and employment in science.

Link to prior learning: This course will build on the knowledge and skills developed during study in Year 9 and KS3, they will also develop their practical, problem solving and investigative skills.

Rationale of sequencing: The topics have been ordered in a way that allows them to build on the following topics skills.

| | Focus / Topic | Knowledge & Skills (from NC/Programmes of Study) | Assessment |
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| Autumn 1 | P1 Conservation and dissipation of energy C3 Structure and bonding | P1 Students should be able to recall and apply equations linked to energy. To be able to investigate the transfer of energy from a gravitational potential energy store to a kinetic energy store. C3 Students should be able to visualise and represent 2D and 3D forms including two dimensional representations of 3D objects. Students will learn to recognise substances as small molecules, polymers, metallic giant structures or giant structures from diagrams showing their bonding. | P1, C3 End of topic test |
| Autumn 2 | P2 Energy transfer by heating P3 Energy resources P4 Electric circuits C4 Chemical calculations C5 Chemical changes | P2 To be able to investigate thermal conductivity using rods of different materials and be able to calculate the specific heat capacity of different materials. P3 To know that electrical power is transferred from power stations to consumers using the National Grid and to be able to evaluate a range of renewable and non-renewable energy sources. P4 To be able to investigate the relationship between the resistance of a thermistor and temperature. Investigate the relationship between the resistance of an LDR and light intensity. To be able to interpret a range of data and graphs that show relationships between current, resistance, voltage and components. C4 To be able to recognise and use expressions in decimal form and standard form and balance chemical equations and calculate the relative formula masses of different compounds. C5 To explore mixing of reagents to explore chemical changes and/or products and describe how metals are extracted from their ore and to be able to recognise oxidation and reduction. | P2, P3, P4, C4, C5 End of topic test Assessment week |
| Spring 1 | P5 Electricity in the home P6 Molecules and matter C6 Electrolysis C7 Energy changes | P5 To know that electrical power is transferred from power stations to consumers using the National Grid and that everyday electrical appliances are designed to bring about energy transfers. To be able to identify the function of each wire in a plug. P6 To be able to freely recall and use the equation that calculates density. To be able to describe how, when substances change state (melt, freeze, boil, evaporate, condense or sublimate), mass is conserved. To be able to explain the differences in density between the different states of matter in terms of the arrangement of atoms or molecules. C6 To investigate that soluble salts can be made from acids by reacting them with solid insoluble substances, such as metals, metal oxides, hydroxides or carbonates. Demonstrate how salt solutions can be crystallised to produce solid salts. C7 To investigate exothermic and endothermic reactions using the correct equipment and to know that in a chemical reaction bonds must be broken and remade. | P5, P6, C6 ,C7 End of topic test Required Practicals: P6: Density C6: Electrolysis C7: Temperature change |

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| Spring 2 | P7 Radioactivity B4 Organising animals and plants B8 Photosynthesis B5 Communicable diseases | <p>P7 To know that the molecules of a gas are in constant random motion. The temperature of the gas is related to the average kinetic energy of the molecules. To know that some atomic nuclei are unstable. and that the nucleus gives out radiation as it changes to become more stable. . This is a random process called radioactive decay.</p> <p>B4 To evaluate methods of treatment for heart conditions bearing in mind the benefits and risks associated with the treatment. To know that blood is a tissue consisting of plasma, in which the red blood cells, white blood cells and platelets are suspended. To complete an observation and drawing of a transverse section of leaf and to measure the rate of transpiration by the uptake of water.</p> <p>B8 To know the photosynthesis equation. To use data to relate limiting factors to the cost effectiveness of adding heat, light or carbon dioxide to greenhouses. To investigate what impacts the rate of photosynthesis.</p> <p>B5 To be able to interpret data about risk factors for specified diseases and to evaluate the global use of vaccination in the prevention of disease. To be able to describe the process of discovery and development of potential new medicines, including preclinical and clinical trials.</p> | <p>P7, B8,B4, B5, End of topic test</p> <p>Required Practicals: B8: Photosynthesis</p> |
| Summer 1 | B6 Preventing and treating diseases B7 Non-communicable diseases B9 Respiration C8 Rates and equilibrium | <p>B6 To be able to describe the process of discovery and development of potential new medicines, including preclinical and clinical testing. To know that traditionally drugs were extracted from plants and microorganisms.</p> <p>B7 To know that antibiotics cannot kill viral pathogens and painkillers and other medicines are used to treat the symptoms of disease but do not kill pathogens. To understand that It is difficult to develop drugs that kill viruses without also damaging the body's tissues.</p> <p>B9 To be able to describe cellular respiration as an exothermic reaction which is continuously occurring in living cells and to conduct Investigations into the effect of exercise on the body. To know and apply the respiration equation.</p> <p>C8 To translate information between graphical and numeric form. To use collision theory to explain how various factors affect rates of reactions.</p> | <p>B6, B7, B9, C8 End of topic test</p> <p>Required Practicals: C8: Rate of reaction</p> |
| Summer 2 | P8 Forces in balance P9 Motion C9 Crude oil and fuels C10 Chemical analysis | <p>P8 Resultant force, resolving forces and using a parallelogram of forces.</p> <p>P9 and P10 Distance time graphs and velocity time graphs, gain understanding of what displacement and other vector quantities. Terminal velocity and what can affect stopping distance. To be able to use ratios and proportional reasoning to convert units and complete rates. To be able to calculate acceleration, velocity and the resultant force.</p> <p>C9 To know that crude oil is a finite resource found in rocks. Crude oil is the remains of an ancient biomass consisting mainly of plankton that was buried in mud. To participate in experiments that investigate the properties of different hydrocarbons. To know that hydrocarbons can be broken down (cracked) to produce smaller, more useful molecules and that cracking can be done by various methods including catalytic cracking and steam cracking.</p> <p>C10 To be able to identify formulations, distinguish pure from impure substances and explain the methods behind identifying a number of gasses. To be able to interpret chromatograms and determine R_f values.</p> | <p>P8, P9, C9, C10 End of topic test</p> <p>Required Practicals: P8: Acceleration P10: Force and extension C10: Chromatography and water purification.</p> <p>PPEs</p> |

Further Information

AQA Specification: <https://www.aqa.org.uk/subjects/science/gcse/combined-science-trilogy-8464>

Chace GCSE Science website: <https://sites.google.com/chace.enfield.sch.uk/year11revision>

Seneca: <https://senecalearning.com/en-GB/>

Kerboodle: <https://www.kerboodle.com/users/login>

