

Curriculum Map

Subject: Combined Science



Year: 11

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|--------------------------|--|--|---|---|---|-----------------------|
| Content Knowledge | <p>C10 - Chemical Analysis C10 Knowledge: How chromatography can identify between pure and impure substances How chromatography works Tests for common gases</p> <p>C11 - The Earth's Atmosphere Understand how the atmosphere formed Changes to the atmosphere over time How greenhouse effect works The importance of peer review How to reduce carbon emissions Problems caused by pollutants</p> <p>Required Practical Identifying pure and impure substances by chromatography</p> <p>P11 Force and Pressure: Pressure and surfaces Pressure in a liquid at rest Atmospheric pressure Upthrust and flotation</p> <p>P12 Electromagnetic Waves: The electromagnetic spectrum Infra-red, Microwaves, Radio Waves Ultraviolet, X-rays, gamma rays X-rays in medicine</p> <p>P13 Electromagnetism: Magnetic fields Magnetic fields and electric currents Electromagnets in devices The motor effect The generator effect</p> | <p>B12 Genetics and Evolution: Reproduction Types of reproduction Cell division in sexual reproduction The human genome DNA structure and function Inheritance Mutations Inherited disorders</p> <p>Chapter B12 Knowledge: State the two types of reproduction and distinguish between the two. Go through step by step the process of meiosis and its importance. Explain how fungi reproduce. Learn how proteins are made. Describe what is meant by inheritance. List characteristics caused by genetics. Compare characteristics/traits caused by genetics vs. The environment. Describe what a mutation means in terms of the DNA. Explore different inherited disorders and how they are passed on from one generation to the next. Describe how doctors can screen for genetic disorders.</p> <p>C12 - The Earth's resources Finite and Renewable energy sources Safe Water Treating water Extracting metals Life Cycle Assessments Reduce, Reuse and Recycle</p> <p>C12 Knowledge:</p> | <p>B13 Genetics and Evolution: Variation and Evolution Variation Evolution by Natural Selection Selective Breeding Genetic Engineering</p> <p>Chapter B13 Knowledge: Knowing what is meant by variation. Explaining Darwin's theory of Natural Selection. Explain what is meant by genetic engineering.</p> <p>B14 Genetics and evolution: Accepting Darwin's ideas Evolution and speciation Fossils and extinction Antibiotic resistant bacteria Classification</p> | <p>B16 Adaptations, interdependence, and competition: Competition in animals and plants Adaptations in animals and plants</p> <p>Chapter B16 Knowledge: Know what animals and plants compete for. List different adaptations plants and animals have and describe how these adaptations aid in their survival.</p> <p>b) Organising an ecosystem Food chains and webs The decay cycle The water cycle The carbon cycle Rate of decomposition</p> <p>Chapter B17 Knowledge: Identify producers and consumers in food chains and webs. Show how energy travels through a food chain. Describe the decay, water, and carbon cycle and explain their importance. Describe optimal conditions for decay.</p> | <p>Revision To focus on recapping key knowledge and re-address common misconceptions Embed additional exam practice for each chapter Focus on key aspects of required practicals</p> | <p>External exams</p> |

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| | | <p>Know the difference between potable and pure water How to purify water How to make water safe for the environment How to obtain potable water Interpreting life cycle assessments How reducing, reusing and recycling of materials decrease their environmental impacts</p> <p>Required Practical: Analysis and purification of water samples</p> | | <p>Required Practical: Investigating the effect of temperature on the rate of decay of fresh milk by measuring pH change Required practical skills</p> <p>Revision To focus on recapping key knowledge and re-address common misconceptions</p> | | |
| Skills | <p>Evaluate modern instrumental methods with traditional analysis methods. Evaluate the quality of evidence in a report about global climate change</p> <p>To be able to use and manipulate the pressure equations correctly To recall and identify correct scientific knowledge To be able to compare and contrast differences in uses for various sections of the the EM spectrum To be able to describe both the generator and motor effect clearly and concisely</p> | <p>Distinguishing between finite and renewable sources Extracting and interpreting information from charts and graphs Determining the purity of water Evaluating the alternative biological methods of metal extraction Evaluating ways of reducing and uses of limited metal ores</p> | <p>To recall and identify correct scientific knowledge</p> <p>Evaluate the use of genetic engineering</p> <p>To recall and identify correct scientific knowledge</p> | <p>Justify a point of view on global warming and its contributing factors (deforestation, pollution etc.) and how we as a society can maintain our biodiversity Construct pyramids of biomass and number to scale based on data provided or calculated</p> | <p>Recalling important information Exam Technique Spacing Interleaving Elaboration</p> | |
| Key Questions | <p>How can we use chemical tests to identify unknown substances? What are the advantages and disadvantages of using industrial methods of analysis? What is global warming and why does it matter? Why does pressure change the further up you go in the atmosphere? How do mobile phones send signals to one another? How does your TV remote connect to your TV? How does an electric motor work? How can we send electricity across the entire country safely and efficiently?</p> | <p>How is human activity affecting the Earth's atmosphere?</p> | <p>What is DNA, what is a genome, and why is it so important to be able to analyse the genome of an organism? How are characteristics passed from parents to their offspring? Who was Charles Darwin? Is cloning widely used in industry?</p> | <p>What is adaptation and why is it so important? Why is the cycling of materials in nature so vital to life on Earth?</p> | | |

| Assessment | Diagnostics Test End of Chapter Test ReAct Task | Diagnostics Test End of Chapter Test ReAct Task Mock exams | Diagnostics Test End of Chapter Test ReAct Task | Diagnostics Test End of Chapter Test ReAct Tasks Mock exams | Diagnostics Test End of Chapter Test ReAct Task | |
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| Literacy/numeracy/SMSC/Character | <p>Numeracy: Measuring the height of a chromatogram Calculating the Rf Value of a chromatogram Reading pie charts Analysing graphs.</p> <p>Chemistry Keywords: Formulations, mixtures, chromatogram, retention factor, precipitates, atmosphere, carbon footprint, carbon storage, particulates, global dimming</p> <p>Physics Key words: Pressure, Upthrust, Density infrared, ultraviolet, radio waves, gamma, white light, Magnetic field, induction, electromagnet, Fleming's Left Hand Rule, motor effect, generator effect, transformer</p> <p>SMSC: Working together to investigate chromatography Evaluating evidence that demonstrates the rise of carbon dioxide leading to climate change</p> | <p>Numeracy: Calculating pressure and order of magnitude</p> <p>Numeracy: Extracting and interpreting data from charts, graphs and tables Using order of magnitudes</p> <p>Chemistry Keywords: Bioleaching, life cycle assessment, blast furnace, non-renewable</p> <p>SMSC: Working together to investigate the purity of water Are there more sustainable ways of extracting metals?</p> | <p>Numeracy: Calculating current and voltage in a transformer and order of magnitude</p> <p>Biology Key words: natural selection, evolution, cloning, genetic engineering, selective breeding</p> <p>Biology Key words: speciation, antibiotic resistance, evolution</p> <p>Biology Key words: inheritance, screening, genome, nucleotide, polydactyl, cystic fibrosis, DNA, nucleus.</p> <p>Numeracy: working out fractions, calculating percentages, working out probability</p> | <p>Key words: biofuel, deforestation, peat, sustainability, mycoprotein, bioaccumulation, biomass</p> <p>Numeracy: % change, % increase or decrease, calculating mean, interpreting data in a table or graph, drawing a graph, drawing pyramids of biomass and number using a scale</p> | | |
| Enrichment opportunities and futures | <p>STEM Club Summer Fayre at Royal Institution of Chemistry The Wellcome Collection The Faraday Museum or the Science Museum Visit Watson and Crick's original DNA model at the Science Museum in South Kensington- See their model up close Francis Crick Institute at King's Cross- Look into some current research taking place at the Francis Crick Institute in London https://www.crick.ac.uk/ Learn more about Dolly the Sheep and if you ever find yourself in Edinburgh visit her at the National Museum of Scotland- https://www.nms.ac.uk/explore-our-collections/stories/natural-world/dolly-the-sheep/ WHO AM I? Exhibition at the Science Museum in South Kensington, London. See Darwin's original copy of <i>On the Origin of Species</i> at The Natural History Museum in South Kensington, London. See the archaeopteryx and learn about its importance in terms of evolution at The Natural History Museum in South Kensington, London.</p> | | | | | |