Science Key Stage 5 Learning Journey

Year 13

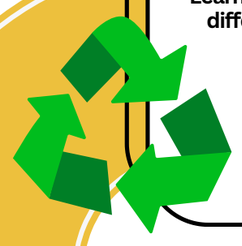
Unit 6 Contemporary Issues in Science.

Learning Aim A: Investigate contemporary scientific issues that impact the global population and environment



Unit 6 Contemporary Issues in Science.

Learning Aim B: Examine the effect different organisations have on contemporary science





Unit 6 Contemporary Issues in Science.

Learning Aim C: Understand how to evaluate and report scientific information



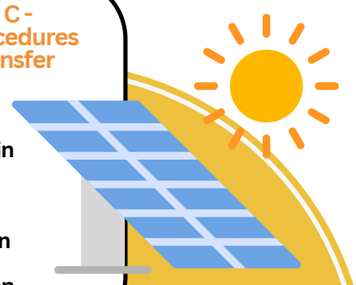
Unit 4 Learning Aim D - Review personal development of scientific skills for laboratory work

- Describe the practical skills and personal competencies that you have used in this unit.
- M8 Assess what practical skills and personal competencies that have developed and suggest improvements in each area.
- D6 Evaluate the practical skills and personal competencies that have been developed and propose an action plan for future progression.



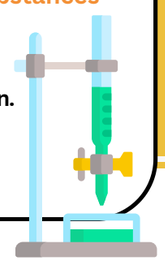
Unit 4 Learning Aim C - Undertake physical procedures to examine energy transfer

- Cooling Curve investigation for Paraffin and Stearic Acid
- Length of a Wire Affect Resistance Investigation
- Solar Panel Investigation



Unit 4 Learning Aim A - Undertake Techniques to Determine Chemical Concentration and Composition of Substances

Using titration technique to find an unknown concentration.



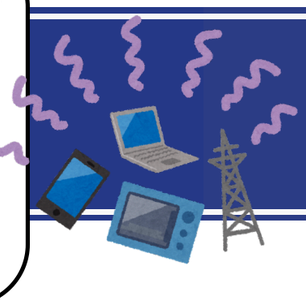
Unit 4 Learning Aim B - Undertake biological procedures to investigate concentration and distribution of biological components

Using a Colour Meter (Colorimeter) to find an Unknown Concentration



Unit 3 Principles and Applications of Physics - Use of Electromagnetic Waves in a Vacuum

- Recall from GCSE the electromagnetic wave spectrum and uses of specific wave.
- Recall the inverse square law for intensity of a wave.
- Know how EM waves are applied and used in satellite communications, mobile phones, Bluetooth, Wi-Fi and infrared.



Unit 3 Principles and Applications of Physics - The Principles of Fibre Optics

- Explain the laws of refraction and calculate refractive index (n) of a medium using n= c/v = sin i/sin r.
- Explain how critical angles is achieved experimentally and the effect of total internal reflection.
- Apply total internal reflection to fibre optics in medicine.
- How do fibre optic broadband work and what is multimode fibre?

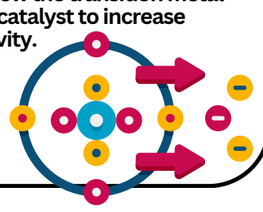


Unit 3 Principles and Applications of Physics - Stationary Waves Resonance

- Know that when two coherent waves pass through each other, the resultant wave is stationary wave pattern with nodes and antinodes.
- Know that in a stretch string the wave speed can be calculated from the length (L), tension (T) and string mass (m).

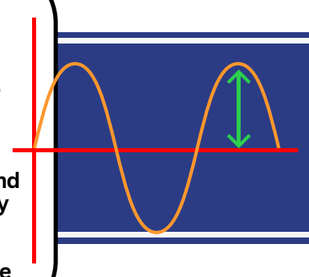
Unit 2 Principles and Applications of Chemistry - Physical Properties of Metals

- Explain oxidation and reduction and write half equations.
- Explain how the transition metal acts as a catalyst to increase productivity.



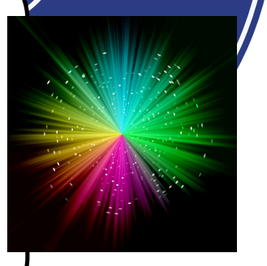
Unit 3 Principles and Applications of Physics - Waves in Communication

- Recall from GCSE oscillations, period and amplitude of a wave pattern. Types of waves transverse and longitudinal.
- Explain the wave-front propagation principle to light and how they behave (Developed by mathematician Christian Huygens).
- Analyse graphs to find the phase difference between 2 waves.



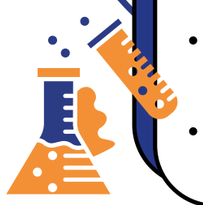
Unit 3 Principles and Applications of Physics - Emission Spectra

- Know that the quantum theory of light and other electromagnetic radiations is based on the relationship between Frequency, energy and planks constant (h).
- Analyse data on electron de-excitation in a hydrogen atom - a photon of a specific frequency is emitted.



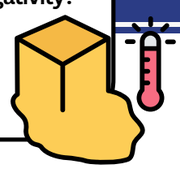
Unit 2 Principles and Applications of Chemistry - Physical Properties of Metals

- How do Period 2 and 3 elements react with oxygen? Write an equation.
- Recall from GCSE the products of reactivity of metals with oxygen, water, dilute hydrochloric acid and sulfuric acid.
- Explain the position of metals in the reactivity series in relation to position in the periodic table.



Unit 2 Principles and Applications of Chemistry - Physical Properties of Elements

- What are the trends in ionic radius down a group, why do they follow a pattern?
- Why do beryllium and aluminium have identical electronegativity?
- Define electron affinity and explain what the negative signs mean.
- Know trends in melting and boiling points.



Unit 2 Principles and Applications of Chemistry - Calculations

- Know how to calculate moles, Relative atomic mass and molar mass.
- How to calculate the empirical formular of a compound
- Using a chemical equation to calculate the quantities of reactants and products.
- Calculate percentage yield from actual mass and theoretical mass.

Unit 2 Principles and Applications of Chemistry - Periodicity and properties of elements

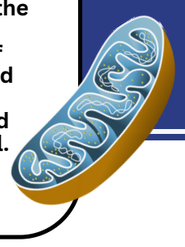
- Use the periodic table and electron configuration to make predictions of behaviour of reactions.
- How to arrange atoms in sub-shells and orbits for an atom
- Show ionic bonding and covalent bonding using a dot and cross diagram.
- Describe the differences between metal, ionic and covalent bonding.
- Explain intermolecular forces and know what dipole and Van der Waal forces.



Year 12

Unit 1 Prinicples and Application of Biology - Cell Structure and Function

- Calculate magnification with an expectation to rearrange the equation.
- Describe the structures of organelles in an animal and plant cell.
- Describe the structure and function of a bacterial cell.
- Describe the various cell specialism and know the structures and functions.

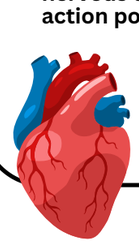


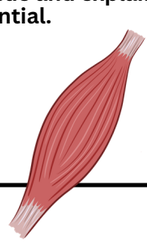
Unit 1 Principles and Application of Biology - Tissue Structure and Function

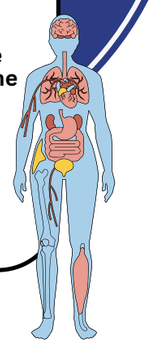
- Know the structure and functions of the 4 main types of tissues in animals.
- Explain that epithelial cells are found lining organs and surfaces and are divided into 3 types.
- Know the structure and functions of squamous, ciliated columnar and endothelial tissue and where they are found.

Unit 1 Principles and Application of Biology - Tissue Structure and Function

- Describe the structure and functions of muscle cells.
- Describe the structure of the nervous tissue and explain the action potential.







Year 13 Overview

In Year 13 students build on their knowledge and skills to develop better practice to prepare them for Tertiary education or employment in a science related field. The work that they have learnt in Year 12 is a firm backbone to develop further investigation skill thinking and independence needed to research and make critical evaluations in their coursework. Unit 2 focussed on the use laboratory techniques correctly and accurately, students will learn how century old techniques are still used in modern analytical chemistry and are the basis for analysis in a range of occupations related to the chemistry industry, medicine and pharmaceuticals, education, forensic investigations and many more.

Year 12 Overview

In Year 12 students build on their knowledge and skills to develop better practice to prepare them for Tertiary education or employment in a science related field. Advances in science have produced great benefits for society. These advances depend on research and carrying out scientific investigations. In Unit 3 students will acquire the skills needed to plan a scientific investigation and record results appropriately. Students will learn how to process and analyse results, draw scientific conclusions, and evaluate their work. In unit 1 students will cover core science concepts, students will study electronic structure to predict a range of chemical substance reactions. Students will build on cells from GCSE and will delve into other organelles and adaptations. In Physics the focus is on Waves and their properties used in the Medical Physics Industry.

"Science is magic that works." Kurt Vonnegut