YEAR: 11 Science (Double Award) Chemistry & Biology

Knowledge Focus: 5.3 Metals and Their Extraction & 5.4 Chemical Reactions and Energy & 4.1 Classification and biodiversity, 4.2 Cell division and stem cells

Skills, knowledge and understanding to be developed in this Learning Plan:

How metals are extracted from their ores using a variety of methods. Ordering metals by reactivity based on displacement reactions. Describe chemical reactions as exothermic or endothermic. Classify organisms based on featured and scientific names, understand adaptations for survival, investigate population size and factors affecting it, measuring biodiversity and explore conservation methods, use of quadrats and processing data, capture-recapture techniques, evaluate impacts of biological control methods, mitosis, meiosis, stem cells and uses, ethics of stem cells, links between cell division and cancer

Key terms to be learned in this LP: , Combustion, extraction, carbonate, sulfate, displacement reaction, binomial, classify, DNA, complementary bases

Weeks 1-2 Learning Objectives: **5.3 Metals and their extraction.** Which ores are metals extracted from. Relative reactivity of metals as demonstrated in displacement reactions. Unreactive metals being found in their native form. Reduction and oxidation in terms of gaining or losing oxygen. The industrial extraction of iron in the blast furnace including equations at each step. Reactants and products involved in the extraction of iron in the blast furnace. The electrolysis of lead bromide and aluminium oxide. Oxidation and reduction in terms of losing and gaining electrons. Identify the reactions at the anode and cathode during electrolysis. The factors that need to be considered when building and electrolysis plant including; transport, workforce, materials and electricity available.	***Objective assessments:*** Be able to: Describe why some metals are found as ores and some are found native. Identify the relative reactivity of metals based on displacement reactions. Identify oxidation and reduction reactions in terms of gaining or losing oxygen. Explain how the blast furnace uses metal reactivity to extract iron from its ore. Describe the process of electrolysis. Identifying the factors affecting the sustainability of extracting metals. Write ionic equations to explain the reactions happening at the anode and cathode.	**Homework:** Set: Due:
Week 3 Learning Objectives: **5.4 Chemical Reactions and Energy** Exothermic and endothermic reactions in terms of temperature change and energy transfer to or from the surroundings. Energy profiles for exothermic and endothermic reactions.	***Objective assessments:*** Be able to: Explain what is meant by exothermic and endothermic reactions. Draw energy profiles to demonstrate exothermic and endothermic reactions. Label energy profiles.	**Homework:** Set: Due:
Week 4 Learning Objectives: **5.4 Chemical Reactions and Energy** Activation energy as the energy needed for a reaction to occur. Use of bond energy data to calculate overall energy change for a reaction and to identify if it is exothermic or endothermic. Assessment 5.3 End of Topic	***Objective assessments:*** Be able to: Describe what is meant by activation energy. Calculate bon enthalpies of reactions.	**Homework:** Set: Due:

Weeks 5-6 Learning Objectives: **4.1 Classification and biodiversity** • Classify organisms based on features and scientific names. • Understand adaptations for survival. • Investigate population size and factors affecting it. • Measure biodiversity and explore conservation methods. • Use quadrats and sampling techniques in fieldwork. • Apply capture-recapture methods for estimating populations. Evaluate impacts of biological control and invasive species.	***Objective assessments:*** Be able to classify organisms based off their morphological characteristics Be able to explain the need for classification Be able to sample biodiversity and explain why we need biodiversity Be able to explain how we are protecting biodiversity.	**Homework:** Set: Due: **Homework:** Set: Due:
Week 7 Learning Objectives: **4.1 Classification and biodiversity, 4.2 cell division and stem cells** • Summarise the need for the preservation of biodiversity. • Understand what genetic material is, where it is found and why it replicates. • Understand what mitosis and meiosis are • Compare and contrast mitosis and meiosis. • Explore the uses of stem cells in medicine State and explain the ethical arguments surrounding stem cells Assessment 4.1 End of Topic	***Objective assessments:*** Be able to explain how cells divide to create cells with different functions (e.g. growth and repair) Be able to analyse the ethical arguments surrounding stem cell usage and sourcing	