Year 10
Subject: Chemistry
Topic/Unit: C10 Using Resources
When: Half Term 6

Huntington School
Learn and succeed

Overview: Why this? Why now?
This unit teaches students how humans use the Earth's limited resources to meet our needs for food, warmth, and shelter. As natural resources run low, chemistry provides essential ways to create synthetic alternatives and develop sustainable methods to protect the planet for future generations.

Building on...building to:
The unit builds on prior knowledge of **metallic bonding**, **covalent structures**, and **chemical analysis**. It prepares students for advanced environmental science by teaching them how to evaluate the impact of products from "cradle to grave".

Sequence summary:
- **Earth's Resources:** Students distinguish between **finite resources**, which cannot be replaced quickly (fossil fuels, metals), and **renewable resources**, which reform faster than they are used (timber).
- **Water Treatment:** The curriculum defines **potable water** as safe for drinking, contrasting it with **pure water**. Students explore how fresh water is filtered and sterilised, and how dry countries use **desalination** (distillation or reverse osmosis) for sea water.
- **Waste Water:** Lessons cover the four stages of treating sewage: screening, sedimentation, and both aerobic and anaerobic digestion.
- **Sustainable Extraction:** New methods like **phytomining** (using plants) and **bioleaching** (using bacteria) are studied for extracting copper from low-grade ores.
- **Life Cycle Assessment (LCA):** Students learn to measure the environmental impact of a product's raw materials, manufacture, use, and disposal.

Separate Science
- **Materials and Properties:** Students investigate **ceramics** (clay and glass), **composites** (like concrete or carbon fibre), and **polymers**. They compare how reaction conditions create different materials, such as flexible LDPE versus rigid HDPE.
- **Metals and Corrosion:** Analysis of why **alloys** are harder than pure metals due to disrupted layers. Students explore **corrosion** (rusting) and prevention methods like **galvanising** or **sacrificial protection**.

Key Vocabulary:
Sustainable, Finite, Potable, Desalination, Bioleaching, Phytomining, Corrosion, Alloy, Composite, Polymer.

Assessments:
- **Formative:** Required practical on the **purification of water samples**.
- **Summative:** Evaluating a statement on the environmental impact of plastic versus paper bags using LCA data.

Able and interested:
Learners will evaluate many different materials for their use for different functions.

Inclusion, Personal Development and Wider Skills:
Practical work develops lab safety and mathematical skills through **R_f value** and **carat** calculations. Students use **dual-coding** to create effective flashcards for revision.

Homework and Independent Learning:
Students will complete a task set on the SPARX online platform. The task is based on the current topic but also includes consolidation on previous topics. It will automatically adjust the level of challenge as the student complete the activities.