Year 8
Subject: Science (Chemistry)
Topic/Unit: Metals, Reactivity, and Extraction
When: Half Term 4

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Overview: Why this? Why now?
This unit explores the chemical nature of metals and how their varying levels of reactivity influence their use and extraction. Understanding how metals lose electrons to form new compounds is vital for explaining physical changes, such as the tarnishing of silver or the oxidation of the Statue of Liberty. This knowledge is also essential for industries such as cosmetic science, where chemists design safe and effective formulas for daily products.

Building on...building to:
This work builds on previous knowledge of elements, compounds, and the arrangement of the periodic table. It leads to an advanced understanding of chemical energetics and prepares students for Key Stage 4 topics, including electrolysis and complex reduction reactions.

Sequence summary:
1. **Defining Reactivity:** Exploring the concept that reactivity in chemistry describes how easily a metal atom loses its outer electrons.
2. **Metal Reactions:** Investigating how different metals react with oxygen to form metal oxides, with water to produce hydroxides and hydrogen gas, and with dilute acids to create salts.
3. **The Reactivity Series:** Constructing a hierarchical list of metals from the most reactive (potassium) to the least reactive (platinum).
4. **Displacement Reactions:** Defining these as reactions where a more reactive metal replaces a less reactive metal within a compound. Students conduct practical experiments using spotting tiles to observe these changes in action.
5. **Ores and Extraction:** Learning that metals are mined as ores—compounds found in the Earth's crust.
6. **Methods of Extraction:** Identifying that unreactive metals are found naturally, while others require chemical separation. Students perform reductions using carbon to extract iron and copper.

Key Vocabulary:
Reactivity, **Displacement**, Ore, **Extraction**, Reduction, Metal Oxide, Hydroxide, Salt, and Electron.

Assessments:
Students will be working towards an assessment taken in the second half of this term.

Able and interested:
Higher-attaining students will explain how some metals, like aluminium, form an "oxide barrier" that protects them from further reaction. They will also investigate the use of carbon as a reducing agent for specific metals in the reactivity series.

Inclusion, Personal Development and Wider Skills:
Mathematical proficiency is enhanced by calculating the number of atoms in chemical formulas. Laboratory safety is prioritised, particularly regarding the use of Bunsen burners and protecting the eyes from intense magnesium flames.

Homework and Independent Learning:
Students will be set weekly homework activities using the Sparx online learning platform.