Year 8
Subject: Science (Chemistry)
Topic/Unit: Particles, Purity, and Separating Mixtures
When: Half Term 2

Huntington School
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Overview: Why this? Why now?
This unit establishes the foundational language of chemistry by defining the building blocks of matter. Understanding how to identify pure substances and separate complex mixtures is a vital skill for numerous careers, including forensic science and industrial brewing.

Building on...building to:
This unit builds upon primary school knowledge of solids, liquids, and gases. It leads to an advanced understanding of chemical bonding and quantitative analysis required for higher-level study.

Sequence summary:
1. **Foundations:** Defining atoms as the basic units of matter and distinguishing between elements, compounds, and mixtures.
2. **Purity:** Identifying pure substances as containing only one type of element or compound and using melting points to distinguish them from impure mixtures.
3. **Dissolving:** Mastering definitions for solute, solvent, and solution while exploring how temperature affects solubility.
4. **Basic Separation:** Using filtration to remove insoluble solids and evaporation to recover soluble solutes.
5. **Advanced Separation:** Employing a separating funnel to divide liquids of different densities and distillation to separate substances with different boiling points.
6. **Chromatography:** Analysing the solubility of different dyes within a mixture using paper chromatography.

Key Vocabulary:
Element, compound, mixture, solute, solvent, saturated, filtrate, residue, distillate, and chromatography.

Assessments:
Students will be assessed on their ability to define key terms and identify particle diagrams. Practical competency is measured through the safe use of Bunsen burners. A formal six-mark exam question will require students to outline a multi-step procedure for separating a complex mixture of salt, water, and wood chips. Students will be working towards the first assessment in this term.

Able and interested:
Higher-attaining students will investigate the use of specialised apparatus, such as the Thiele tube, for high-precision melting point analysis. They may also explore the "Technical Brewer" and "Scene of Crime Officer" career pathways to see how chemical analysis is applied in professional contexts.

Inclusion, Personal Development and Wider Skills:
This unit promotes laboratory safety through the rigorous application of "standard lab rules," including the use of safety goggles and heat-proof mats. Mathematical skills are enhanced through the calculation of mole fractions and the interpretation of solubility curves.

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