Year 10
Subject: Chemistry
Topic/Unit: Chemistry of the Atmosphere
When: Half Term 1 A

Huntington School
Learn and succeed

Overview: Why this? Why now?
This unit explores the **evolution of the Earth's atmosphere** over 4.6 billion years, from a volatile volcanic environment to the life-sustaining air we breathe today. Understanding the balance of gases is essential for students to evaluate the modern challenges of **global climate change** and **atmospheric pollution**.

Building on...building to:
This unit builds on prior knowledge of **chemical reactions**, specifically **photosynthesis** and **combustion**. It provides a foundation for future studies in **sustainability** and the industrial management of the Earth's resources.

Sequence summary:
- **The Early Atmosphere:** Students investigate theories on how volcanic activity released gases like **carbon dioxide, nitrogen, and water vapour**, which condensed to form the oceans.
- **Oxygen and Carbon Dioxide Changes:** The curriculum covers how **algae and plants** increased oxygen levels through photosynthesis and how carbon dioxide decreased by being "locked away" in **sedimentary rocks** and fossil fuels.
- **The Greenhouse Effect:** Students learn the mechanism of the greenhouse effect, distinguishing between **short-wave radiation** from the sun and **long-wave (thermal) radiation** absorbed by gases like methane and carbon dioxide.
- **Climate Change and Carbon Footprints:** Lessons analyse the human activities—such as **deforestation and burning fossil fuels**—that increase greenhouse gases. Students define a **carbon footprint** and discuss the environmental implications of global warming, including melting ice caps and extreme weather.
- **Atmospheric Pollutants:** The unit concludes by identifying pollutants produced by fuel combustion, such as **carbon monoxide, sulfur dioxide, and nitrogen oxides**, and their effects like acid rain and global dimming.

Key Vocabulary:
Atmosphere, Photosynthesis, Greenhouse Effect, Carbon Footprint, Climate Change, Combustion, Peer Review, Pollutant, Global Dimming.

Assessments:
- **Formative:** Retrieval "Do Now" tasks on gas percentages and graph analysis using the **RACE method** (Relationship, Anomalies, Change, Explanation).
- **Summative:** Formal exam-style questions on the greenhouse effect mechanism and identifying the products of incomplete combustion.

Able and interested:
Learners will evaluate the quality of evidence in scientific reports and the importance of **peer review** in establishing scientific consensus. They will also investigate **carbon capture** technologies.

Inclusion, Personal Development and Wider Skills: Students develop **mathematical skills** by interpreting complex climate data and sea-level graphs. Discussion of the **ethical and economic barriers** to reducing carbon footprints encourages global citizenship.

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.