1. Overview

This module aims to provide an overview of the carbon cycle and greenhouse gas emissions as a cause of climate change. It is aimed at meeting the KS3 requirements relating to ‘the production of carbon dioxide by human activity and the impact on climate’.

The first lesson focusses on climate as a function of the interactions between the three earth systems: land, sea and the atmosphere. Each system is identified to contain stores of energy, with flows of energy occurring between systems. The extent of the flows of energy between these systems impacts the climate.

The second lesson introduces the carbon cycle. The cycle is a natural phenomenon in which carbon is transferred between the land, oceans and atmosphere, existing in different forms, with such transfers typically existing in equilibrium. However, the cycle can be altered by disturbances, which may be natural or man-made. Examples of the carbon cycle in the context of limestone and coal are provided.

The third lesson starts with providing the context of increasing atmospheric CO2 concentrations. It goes on to provide a summary of the human production of carbon dioxide, across energy generation, land use change and waste management. Students are asked to prepare a greenhouse gas diary, describing their daily activities that contribute to greenhouse gas emissions.

The final lesson focusses on the link between greenhouse gases and warming. The start of the lesson describes the anthropogenic greenhouse effect. It goes on to identify temperature increases as a primary effect, with multiple potential secondary effects. Some of these secondary effects may cause an increase or decrease in the initial forcing factor as part of feedback loops. Students are asked to consider how primary and secondary effects might impact people in different situations. Given the complexity of the earth system, it is highlighted that a risk based approach is adopted to predicting the impact of climate change. Mitigation and adaptation are introduced as means to address the potential effects of climate change.

1. Content areas

* Climate change;
* Carbon cycle;
* Anthropogenic greenhouse effect;
* System flows, stores and feedback loops;

1. Skills

* Risk based analysis;
* Awareness of the impact of a student’s activity on the environment;