Lesson 2 | What is causing the climate to change?

Prior Requirements:

Completing Lesson 1 is greatly encouraged to ensure that students understand what climate change is and some of the main ways it is impacting our planet e.g., temperature rise, changing precipitation patterns, melting ice caps, and rising sea levels.

Learning Objectives:

To understand the main causes of climate change.

To learn about the basics of the greenhouse effect and the carbon cycle.

To understand human's role in the greenhouse effect and the carbon cycle.

National Curriculum Links:

<u>Chemistry Objectives</u>

Earth and atmosphere

- the carbon cycle.
- the composition of the atmosphere
- the production of carbon dioxide by human activity and the impact on climate

<u>Geography Objectives</u>

- understand how human and physical processes interact to influence, and change landscapes, environments and the climate; and how human activity relies on effective functioning of natural systems.

Success Criteria (in 'child friendly' language):

I understand what climate change is.
I can explain what the greenhouse effect is.
I understand and can explain the carbon cycle.
I understand how human activities are contributing to climate change.

Key Language:

Greenhouse gases, anthropogenic activities, fossil fuels, atmosphere, climate change, carbon cycle, photosynthesis, respiration, decomposition, combustion, greenhouse effect.

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Introduction (10 minutes)

Using the PowerPoint presentation, display a model of the carbon cycle - use this to explain the carbon cycle in its most basic form - using diagrams and arrows to show carbon in and carbon out. Also briefly highlight how we have natural carbon sinks within nature.

Main Activities (35 minutes)

Pt 1 Carbon Cycle

1. Distribute a large sheet of paper to each group of students.
2. Hand out a set of printed images and statements related to the natural carbon cycle.
    a. Each of these images or statements should be directly related to steps in the cycle.
3. Instruct students to place images and statements on their paper to illustrate the carbon cycle. They should use markers to draw arrows or add any additional elements they think are necessary.
4. Once groups have completed their diagrams, stop to discuss.
5. Ask a student to review the cycle they created - Check for understanding.

Pt 2 Greenhouse Effect

1. Introduce the greenhouse effect by providing images of the sun, Earth, and greenhouse gases. Ask students to depict how the sun's rays enter the Earth's atmosphere, get absorbed by the Earth, and are then re-emitted, with some being trapped by greenhouse gases. Elicit from students the idea that more carbon will lead to more reflected heat being trapped within the Earth's atmosphere.
2. Ask students:
    a. What is one way to disrupt this cycle?
    b. What natural occurrences could happen that would cause disruption (you give examples such as a volcanic eruption or forest fire)
    c. What human activities will add or take away carbon from the system?

Materials:

- Printed images (plants, animals, oceans, factories, cars, etc.),
- printed statements (photosynthesis, respiration, decomposition, combustion, etc.)
- large sheets of paper
- markers
- glue

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3. Distribute additional images and statements that depict human activities and their impact on the carbon cycle. a. E.g. - factories, cars, construction, transport, farming 4. Students should integrate these new elements into their existing diagrams, showing how human activities add more carbon dioxide to the cycle (e.g. burning of fossil fuels, etc.) These might include new arrows, annotations and bits of text / information being added to the diagram. 5. Discuss how this would change what is on their diagram. What impact would this have other than more carbon? 6. Allow groups to share their diagrams with the class, explaining their understanding of the carbon cycle, the greenhouse effect, and human impact. a. Optional Observation Break - This could be usefully done as a 'gallery walk' before all groups have finished - so that they can see what other groups are doing and incorporate their ideas into their own models, they can also leave post-it notes with feedback on other groups' work.	

Discussion (10 minutes)

These questions could be usefully discussed first as a class.
*The lesson might finish with the students answering these questions in writing AFTER the class discussion as an **exit ticket** (assessment opportunity).*

- How do human activities disrupt the natural balance of the carbon cycle?
- Why is it important to understand the relationship between the carbon cycle and the greenhouse effect?
- What are some ways we can reduce our carbon footprint and lessen our impact on the carbon cycle?

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