



Learning intention or WALT

Identify what climate change is and why the climate is changing.



Success criteria

- I can explain what climate change is
- I can describe the greenhouse effect
- I can identify the role of fossil fuels in climate change



Estimated time – 55 minutes



Key words

Climate • Phenomenon • Global warming • Atmosphere • Fossil fuels • Greenhouse gases
Livestock • Solar energy • Carbon dioxide (CO₂) • Greenhouse effect • Synthetic fertiliser

Learning experience



Class discussion and video **15 minutes**

Introduction and what is climate change?

- 1 Today we start **On the Go!** We will learn about environmentally friendly ways that we can travel around Tāmaki Makaurau, Auckland and how this can have a wider impact on our world. In this lesson we will learn about climate change: What it is and what is causing it.
- 2 Read and discuss the learning intention or WALT and the success criteria for this lesson (page 1). Ask students to share what they already know about the topic:
 - **What do you think climate change is?**
 - **How is climate change harming our Earth?**
 - **What things can we do to help our Earth?**

- 3  As a class watch this ignite video to spark further discussion:
[What is climate change?](#) (6:03 minutes, YouTube)

Address any student climate anxiety and mention: *The good news is that countries around the world have agreed we need to work together to slow down global warming and climate change, and we need to do it now!* (Students will read this statement again shortly in their online reading.)

- 4 Ask students to start Lesson 1.



Independent online learning 15 minutes

How climate change happens

- 5 Students start Lesson 1 and read about climate change (page 2).
- 6 Students click icons to reveal the steps leading to climate change and its impacts as follows (page 3):
Burning more fossil fuels, more livestock farming and cutting down more forests → More heat-trapping (greenhouse gases) are released → More heat is trapped in Earth's atmosphere → Earth gets warmer (global warming) → More heatwaves and droughts • More wild storms • More floods • More polar ice melting • More sea level rise

The importance of carbon

- 7  Page 4: Students read about carbon and how carbon dioxide is formed and they watch this video about the importance of carbon: [The carbon cycle](#) (2:46 minutes, Inspire Education)

Activities causing climate change

- 8 Students read about greenhouse gases and then select the human activities they think contribute to climate change (pages 5-6).
Answer: Burning coal, using synthetic fertilisers, burning wood, cows farting and burping, burning fossil fuels, leaving the lights on.

Identify greenhouse gases

- 9 Students select which gases they think are greenhouse gases (page 7).
Answer: Water vapour, carbon dioxide, methane and nitrous oxide.



Class discussion and video 10 minutes

Carbon dioxide and water vapour

- 10 Ask students:

What is the chemical symbol for carbon dioxide and how is it formed?

Answer: The carbon (C) we emit or release joins with oxygen (O) in the atmosphere and expands into carbon dioxide (CO₂) - ensure students understand that CO₂ is not bad, the problem is that we are releasing too much of it into our atmosphere.

Did you know that water vapour is the gaseous form of water? What is the solid form of water called?

Answer: Ice

Ice is formed in freezing temperatures; how do you think water vapour is formed?

Answer: When temperatures get warmer, water from the oceans, lakes and rivers evaporates and turns into gas or vapour which rises into the air, this is 'water vapour'.

The greenhouse effect

- 11  As a class watch this video: [What is the greenhouse effect?](#) (2:30 minutes, NASA)

Ask the class what they learned from the video:

What is Earth's atmosphere and what is the purpose of it?

Answer: Our atmosphere is a mixture of gases that surround Earth like a jacket – it keeps us warm, gives us oxygen to breathe and is where our weather happens. We call it air because we humans can breathe it.

What traps heat in the atmosphere creating the greenhouse effect?

Answer: Greenhouse gases such as carbon dioxide (CO₂).

Why is the greenhouse effect a good thing and when does it become a bad thing?

Answer: It is good because it keeps Earth warm enough for us to live on. It is bad when too many greenhouse gases trap too much heat and Earth's temperature increases, causing climate change.



Independent online learning 5 minutes

Fossil fuels and climate change

- 12  Students read and then watch a video about fossil fuels and climate change (pages 8-9): [NASA's Earth Minute: Gas Problem](#) (1:42 minutes, NASA)



Class quiz and self-assessment 10 minutes

- 13 Ask students what they learned today and discuss any questions they may have.
- 14 [Run the 6-question Kahoot! quiz](#) (you will need to log in to Kahoot!).

Quiz answers

1. What do we mean by 'climate'?

- a) **The weather patterns over a large area or period of time**
- b) The weather on a specific day
- c) A part of the world which is always hot
- d) Something unchangeable

2. Which of these is not a greenhouse gas?

- a) Carbon dioxide
- b) **Oxygen**
- c) Methane
- d) Nitrous oxide

3. Why is it called the 'greenhouse effect'?

- a) Because all the plants are dying
- b) Because sunlight is being reflected out of the atmosphere
- c) Because the gases cause the heat to be expelled from the atmosphere
- d) **Because greenhouse gases trap heat from the sun which warms the Earth**

- 14** **4. What is carbon?**
- a) A dangerous chemical that is polluting Earth
 - b) An element found in many living things that we can burn for energy**
 - c) A metal found in the ground that is heating up the ocean
 - d) A compound in the air which is contributing to climate change

5. Which greenhouse gas is most commonly produced by human activities?

- a) Carbon dioxide**
- b) Oxygen
- c) Methane
- d) Nitrous oxide

6. What are examples of fossil fuels?

- a) Soil, wood and water
- b) Yellow fats found under the ocean floor
- c) Water vapour found inside plants
- d) Coal, oil and natural gas**

- 15** Students use the tick boxes to indicate if they think they have achieved the success criteria or not (page 11).
- 16** Mention the next lesson (Lesson 2): *Today we have learned about climate change and what is causing it. In our next lesson we will learn about the impact it has on the world.*



Extra activities

Teacher-guided class experiment

Conduct a practical demonstration of the greenhouse effect: [Global warming in a jar](#).

Independent online learning

If students finish early, they have the option to complete one of the following activities:

E1. Play [My Coastal Futures](#) (by NIWA – National Institute of Water and Atmospheric Research, New Zealand) a game where students select an avatar, and make decisions with financial implications to protect their coastal home from rising sea levels.

E2. Explore the [NASA Climate Kids](#) website.