2040 - Reducing Our Carbon Footprint

Name

Class

Teacher Preparation

Learning intentions:

Students will...

- … understand about densities and masses of solids, liquids and gases
- … learn how CO_2 output by humans can be measured in kilograms produced ‘per annum’
- … learn that human CO_2 outputs can be reduced either through consuming less CO_2 or by absorbing or ‘drawing down’ CO_2 from the atmosphere
- … develop teamwork skills as they calculate household CO_2 footprints using addition, subtraction and multiplication of large numbers
- … realise that they can make a difference to global carbon dioxide levels by acting locally and encouraging others to do the same

Success criteria:

Students can...

- ... explain in simple terms why liquids, solids and gases have different densities
- ... convert kilograms of CO_2 into a given approximate volume at room temperature, using multiplication
- ... use provided data and successfully use addition, subtraction and multiplication to calculate and solve aggregate amounts of CO_2 for individuals, neighbourhoods and societies
- ... express examples of local and household actions that can be taken to reduce their own individual carbon footprint and those of their families

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Make the learning intentions and success criteria visible to students throughout this lesson.

Teacher content information: A 2018 study by The University of Melbourne on the thoughts and concerns of young people from Generations X and Y found the number one concern across both groups was lack of action around climate change. In particular, "Generation X worries what climate change will mean for their own children, while Generation Y is concerned about the impact on future generations" (**The Educator**). The report indicates that young people have a serious mistrust in the Government's ability or willingness to tackle climate change.

Tackling climate change requires large-scale, systemic changes across all aspects of society. Simply aiming to reduce our $C0_2$ emissions is not enough: we need to rapidly decarbonise our planet. While this might sound challenging, the good news is we already have the knowledge and tools to do it.

2040 is an innovative feature documentary that looks to the future while focusing on what is happening now. Award-winning director Damon Gameau (director of **That Sugar Film**) embarks on a journey to explore what the future could look like by the year 2040 if we simply embraced the best solutions already available to us to improve our planet.

The film will demonstrate to your students that we already have the solutions to climate change; we just need to take action to bring them rapidly into the mainstream. The 2040 documentary and curriculum package will support your students in turning this knowledge into positive action for a better future.

Find out how to see the film **here**. These lessons have been designed with a media library to support teachers. The film is available on video-on-demand and DVD.

The film is the entry point to a global impact campaign that seeks to mobilise audiences to learn about, contribute to, advocate for and invest in regenerative solutions that improve the wellbeing of the planet, all people and all living systems.

To join the Regeneration and share your vision for 2040, see the **website**.

Watch the 2040 trailer:

2040 - Official Trailer **Password: 2040_EDU**

Cool.org, GoodThing Productions and Regen Pictures would like to acknowledge the generous contributions of **Good Pitch Australia**, **Shark Island Institute**, **Documentary Australia Foundation**, **The Caledonia Foundation** and our philanthropic partners in the development of these teaching resources.

Addressing misconceptions: Students often hear about the issue of global warming in the media, at home and at school. However, there are two striking observations we can make about the way in which young people hear about, and process, messages about this pressing global environmental issue.

- What is happening to our planet is almost always couched in terms of ‘doom and gloom’. Accompanying the discourse surrounding this issue is the sense that a rapidly warming climate is both inevitable and irreversible, therefore there is nothing we can do about it other than lie back and accept a cataclysmic fate.
- There seems to be a fundamental misunderstanding about what has actually caused global warming – in particular, the role of carbon dioxide and its human-induced increase in the atmosphere. Young people often perceive CO_2 as a nasty, unstoppable pollutant choking up the atmosphere, quite unaware that CO_2 is actually a small but highly sensitive and naturally occurring component of Earth’s atmosphere. They are also generally unaware that if humans were to take immediate action, it is possible to draw down much of the human contribution to atmospheric CO_2 and so ameliorate its detrimental impact on our climate, oceans and surface temperatures on Earth.

The overall message for students in this lesson (and its precursor lesson, **2040 - The Maths of Carbon - 5 & 6**, is that mathematics, combined with technological application and determined environmental action, can change our planet’s fortune and turn around the outlook for current and future generations. As much as anything, success with our strategies for effective environmental solutions are an exercise in mathematical problem-solving. After all, it is hard to argue with the maths!

This lesson requires basic knowledge of the principle of sustainability. If students are unfamiliar with this term or need clarity, consider sharing the following definition:

> Sustainability is about making sure there is enough for our environment and for everyone on earth, both now and in the future.

This factsheet can also help to provide background information about the principles of sustainability: **Sustainability Factsheet**.

The IPCC

The **Intergovernmental Panel on Climate Change (IPCC)** is the United Nations body for assessing the science related to climate change. It was created to:

- provide policymakers (governments) with regular scientific updates about climate change;
- highlight the impact climate change will have on the planet in the future; and,
- offer some ideas about how to tackle the challenges of climate change's potential effects on the planet.

In 2021-22, the IPCC released their **sixth assessment report**. This is the most up-to-date physical understanding of the climate system and climate change.
The report makes a number of important points:

- It is unequivocal that human influence has warmed the atmosphere, ocean and land.
- Global surface temperature will continue to increase until at least mid-century under all emissions scenarios considered. Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO2 and other greenhouse gas emissions occur in the coming decades (B1). The report describes five possible climate futures, where #1 is not great and #5 is extremely bad. If we want to keep global warming at less than two degrees, which the IPCC says is the best-case scenario, we need to reduce our CO2 and greenhouse gas emissions significantly and start right away.

'Net zero' or 'carbon neutral' are terms that refer to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere. Getting to net zero means we can still produce some emissions, so long as we're doing something else to reduce the greenhouse gases already in the atmosphere at the same time, kind of like balancing a set of scales (**more info**).
Psychological safety. The IPCC Report sets a hard challenge. While this real-world issue is essential for students to understand, there is no doubt it can make them feel sad or anxious about the future is becoming darker and scarier by the day.
So, reassure students that we can have a hopeful and optimistic outlook on this report, rather than one of doom and gloom. Explain that optimism involves looking objectively at a situation and making a conscious decision to focus on the good (**more info**), and that hope is the belief that you **can** make an impact (**more info**). Explain to students that you are going to look ahead, identify what needs to be improved, and then work on the skills and confidence so that they can go out and do it.
If you're interested in learning more about how to approach challenging topics around climate change and sustainability in your classroom through a Hope and Optimism lens, consider **our PD course.**

These lessons have been created in partnership with

2040, Good Thing Productions