teacher guide

Carbon cycle 3: Carbon neutral

Components

	NAME	DESCRIPTION	AUDIENCE
	*Carbon neutral* teacher guide	This guide outlines how to use a video and carbon audit worksheet to reduce a school's carbon footprint.	teachers
	*The 1, 2, 3 of going carbon neutral* video	A video outlines steps South Fremantle Senior High School took to become Australia's first carbon neutral school.	students
	*Carbon audit* worksheet	Statement cards set a context for students to identify a feedback loop. Students select three feedback cards that create a positive feedback loop.	students

Purpose

Students **Elaborate** on their understanding of the carbon cycle, and how human activities affect the cycle, by looking at ways for their school to reduce its carbon impact.

Outcomes

Students:

- appreciate how electricity, water use and waste all affect greenhouse gas production;
- realise there are ways they can personally, and collectively as a school, reduce greenhouse gas emissions; and
- are encouraged to undertake steps towards reducing greenhouse gas emissions.

Activity summary

ACTIVITY	POSSIBLE STRATEGY
Students view video, *The 1, 2, 3 of going carbon neutral*.	whole class
Students conduct an audit around the school.	small groups
Students collate results of their audit and discuss ideas for reducing carbon emission.	whole class

Technical requirements

The teacher guide and worksheet require Adobe Reader (version 5 or later), which is a free download from www.adobe.com. The worksheet is also available in Microsoft Word format.

A modern browser (e g Internet Explorer 9 or later, Google Chrome, Safari 5.0+, Opera or Firefox) is required to view the video.

Teacher notes

South Fremantle Senior High School was the first school in Australia to become carbon neutral. This video outlines how they did it. It draws attention to how schools contribute to carbon dioxide in the atmosphere through: electricity and other energy use; water use (because it takes energy to get it to the school); and waste production (because it requires energy both to create resources in the first place and to get rid of waste).

South Fremantle Senior High School do three things to be carbon neutral:

- they reduce use of electricity, water, and production of waste;
- they generate their own electricity and purchase the rest from renewable sources (wind etc); and
- they replace stored carbon by planting trees and seagrass.

The audit document is an exercise in which students identify where electricity use, water use and waste production could possibly be reduced. It may be used in a single classroom, or groups of students may be sent around the school to audit several classrooms, bathrooms or other areas such as: library, staff room, canteen, and gym. To complete the water use form students may need to find out about types of reticulation used and amount of water required to top up a swimming pool. Advise grounds staff about students asking questions beforehand.

If making water, electricity or gas meter readings, locate meters prior to sending students out as meters may be inaccessible to students. To fit meter readings into one session you could make initial readings yourself, a day or week earlier. Students may design their own form or questionnaire to audit how much greenhouse gas is produced by staff and students travelling to school, or how food and drink consumed in the school gets to the school. These are other areas where the amount of greenhouse gases created by school communities may be reduced.

You may use the video and activity to promote discussion with students about the need for personal and collective action to reduce carbon production and combat climate change. You may also use it to initiate actual carbon reduction action, however big or small.

Acknowledgements

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The 1, 2, 3 of going carbon neutral

- images courtesy of South Fremantle Senior High School
- wind turbines, courtesy of Channel 9
- underwater seagrass planting courtesy of John Statton from the Oceans Institute at The University of Western Australia
- 'Mysterioso march' by Kevin MacLeod, courtesy of Incompetech
- 'Achilles' by VJ memes, ccmixter.org
- 'Dance of the Sugar Plum Fairy' composed by Pyotr Ilyich Tchaikovsky by Kevin MacLeod courtesy of Incompetech.

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SPICE resources and copyright

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Associated SPICE resources

Carbon cycle 3: Carbon neutral may be used in conjunction with related SPICE resources to address the broader topic of the carbon cycle.

DESCRIPTION	LEARNING PURPOSE
Carbon ocean (overview) This learning pathway shows how a number of SPICE resources can be used in teaching students about the carbon cycle and the significance of the oceans in the carbon cycle.	
Carbon cycle 1: Carbon ocean Students do a variety of hands-on and media watching activities that focus on phytoplankton, seagrass and ocean chemistry.	**Explore**
Carbon cycle 2: Feedback loops Students undertake an activity, with board and cards, involving small group discussion. Students identify positive feedback cycles that link human-induced climate change to the carbon cycle in oceans.	**Explain**
Carbon cycle 3: Carbon neutral Students watch a short video, then undertake a classroom or school audit to consider how a school can move towards carbon neutrality.	**Elaborate**