Investigate carbon

Lesson 6
Teacher notes
Tracking carbon's footprints

Years 3 to 4

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INQuIRY

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Tracking carbon's footprints

Lesson 6: Teacher notes

This document provides the teacher with the details of the lesson.

At a glance

To support students to:

> calculate their own carbon footprints using information about their own and their family's activities
> understand the consequences of the size of their footprints for themselves and their Asia-Pacific neighbours
> think of ways to reduce their footprints and how this affects their lives and the lives of others.

InQuIRY focus: **Investigate**

The *Investigate* phase is designed to provide students with hands-on experiences of the science phenomenon. Students explore ideas, collect evidence, discuss their observations and keep records, such as science journal entries. The *Investigate* phase ensures all students have a shared experience that can be discussed and explained.

In the *Investigate* phase students develop a literacy product to represent their developing understanding. They discuss and identify patterns and relationships within their observations. Students consider the current views of scientists and deepen their own understanding.

Assessment guide

This assessment guide supports teachers in identifying the types of assessment that are appropriate for this lesson.

Formative assessment is an important aspect of the *Investigate* phase. It involves monitoring students' developing understanding and giving feedback that extends their learning. It involves monitoring students' developing understanding of:

> how to calculate a carbon footprint, what it means, how it can be reduced and the consequences for themselves and others.

You will also monitor their developing science inquiry skills.

Summative assessment of the science inquiry skills is another important focus of the *Investigate* phase. Rubrics can be used to gauge the level of student achievement on performance tasks.

Key lesson objectives

Science

Students will be able to:

> calculate their own carbon footprints using information about their own and their family's activities
> understand the consequences of the size of their footprints for themselves and their Asia-Pacific neighbours
> think of ways to reduce their footprints and how this affects their lives and the lives of others.

Literacy

Students will be able to:

> calculate their carbon footprints using their own data

> contribute to discussions about their carbon footprints, how to reduce them and the consequences for themselves and others

> record their observations, ideas and descriptions in drawings and words.

This lesson also provides opportunities to monitor the development of students' general capabilities.

Teacher background information

Carbon dioxide emissions from a variety of human and non-human induced activities and events are the cause of ever-increasing atmospheric CO_2 concentrations. Students can determine their role in the release of carbon emissions through online greenhouse gas calculators, such as the EPA Greenhouse Calculator. By answering a series of relatively straightforward questions about the lives and lifestyles of themselves and their family, students can gain a snapshot of their own carbon dioxide contributions, also known as their carbon footprint. Comparisons can be made between their own footprint and the amount of useable land that is required to sustain that footprint. The information can also be extrapolated to show the number of plant Earths that would be required if everyone on the planet lived with the same carbon-intensive lifestyle. Students can compare their own carbon footprint with their fellow students, other schools and communities and against averages for their state and country. They can also develop an awareness of the carbon footprints of their Asia-Pacific neighbours and compare the livelihoods and lifestyles of such peoples to their own.

Students can use these comparisons as a springboard for action on a personal, school, community and national level. With support and guidance, students can act to minimise their impact on the planet and make connections with others locally and in the Asia-Pacific region to make a positive difference to the lives and livelihoods of both people and the environment.

Equipment

For the Class

> A large-scale graphic organiser, similar to that on page 7 of the T*racking carbon's footprints – Student worksheet*.

> Textas for students to write on the graphic organiser.

For each Student

> Students will each require a copy of the *Tracking carbon's footprints - Student worksheet* and access to a computer and the internet.

Preparation

> For the *Tracking carbon's footprints - Student worksheet*, check that the web carbon calculator and all other online videos and websites are working.
<http://www.epa.vic.gov.au/agc/animations.html>
<http://www.wwf.org.au/our_work/people_and_the_environment/human_footprint/footprint_calculator/>

> Prepare the large-scale graphic organiser for the class.

Lesson steps

1. Explain to students that one of the best clues to finding carbon is to search for its footprints. Read through the introduction to the *Tracking carbon's footprints – Student worksheet*.
2. Students to watch the Carbon Footprint Animation from the Australian Greenhouse Calculator website (<http://www.epa.vic.gov.au/agc/animations.html>) and answer the questions on the *Tracking carbon's footprints – Student worksheet.*
3. Students to calculate their own carbon footprints using the basic version of the WWF footprint calculator <http://www.wwf.org.au/our_work/people_and_the_environment/human_footprint/footprint_calculator/> Students to fill in their global hectares and number of Earths on the *Tracking carbon's footprints – Student worksheets*. Use the information on the worksheet to explain what global hectares and number of Earths mean.
4. Using the graphic organiser on page 7 of the *Tracking carbon's footprints – Student worksheet*, ask students to brainstorm some of the actions that they can take to reduce their own carbon footprints.
5. Set up a similar graphic organiser as that on page 7 of the *Tracking carbon's footprints – Student worksheet* but on a larger scale around the classroom for students to add their best ideas. Use their responses to facilitate a discussion about the many different ways that people can reduce their carbon footprints.
6. Students to compare their own carbon footprint to that of others around the world using the graphic on page 8 of the *Tracking carbon's footprints – Student worksheet*. Students to draw themselves and their own trolley of Earths into the graphic.
7. Students to think about the differences between their own lifestyles and the lifestyles of people in Asia-Pacific countries like Timor Leste by completing the table on page 9 of the *Tracking carbon's footprints – Student worksheet.*
8. Take action against climate change in developing countries by sending a Postcard from the Frontlines – see pages 10 and 11 of the *Tracking carbon's footprints – Student worksheet* for details.

Please note: If actually sending the postcards is something that your class or school is not able to accommodate, this activity can be modified. For example, students can complete their postcards and these can be sent to the consulates here in Australia that each represent the affected countries, or the postcards can simply be arranged around the classroom or school.

Sources:

Australian Greenhouse Calculator 2011, *Carbon Footprint Animation*, viewed 3 January 2014, <http://www.epa.vic.gov.au/agc/animations.html>.
WWF 2014, *Ecological Footprint Calculator*, viewed 30 December 2014, <http://www.wwf.org.au/our_work/people_and_the_environment/human_footprint/footprint_calculator/>.