

# CARBON CYCLE PACKAGE

## Welcome!



### The project

*Drive it down! Measuring and mitigating school-gate transport emissions.*

“*Drive it down! Measuring and mitigating school-gate transport emissions*” is a project aimed at ākonga, kaiako, and the wider public to highlight that every individual’s behaviour measurably impacts CO<sub>2</sub> emissions.

This box contains teaching resources to support carbon cycle learning for children in primary school (years 5-6), which can be adapted to suit your local curriculum and curriculum levels, and ākonga's learning needs.

### Goals

- Provide educational resources for kaiako to teach the carbon cycle, aimed at school years 5-6 (but adaptable to other curriculum levels).
- Increase scientific literacy levels on the carbon cycle to support the development of initiatives for fossil fuel emissions’ reduction.

### Content

- Booklet
- Teacher's guidelines for each activity
- Discussion cards (card game)
- Memory cards (card game)
- Quiz (Kahoot!)
- Auckland GHG Invaders (online desktop game)
- Additional resources sheet
- Whiteboard pens

### How to use the material

- We suggest that teachers use the **booklet** and the **additional resources** to provide children with a background in the topic.
- The **discussion cards** and **memory cards** can be used either before or after children have a background in the topic. If used before, it is a way to introduce vocabulary and raise discussion about the topics and gather some formative assessment data before explicit learning. If used after, discussions can be connected to the lessons learned through the **booklet**. You will hopefully find enriched discussions following on from content present through the **booklet**.
- The **quiz** can be used to assess children's understanding about the topic. We do not recommend the **quiz** to be used as a 'pre-test'.
- The **Auckland GHG Invaders** online game can be used to stimulate children on how to drive emissions down. Can be played before or after children have a background in the topic.
- Use **all the materials combined** to help children develop the initiatives to drive emissions down!

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## Acknowledgements

**Leigh Fleming** developed the booklet and PowerPoint resources, installed the sensors at the school-gate and analysed the resulting datasets and is the leading scientist of the project.

**Vanessa Monteiro** developed the teacher's guidelines, the discussion cards, the memory cards, the quiz, and the Auckland GHG Invaders.

**Donna Hiraina Calis** developed most of the illustrations.

**Erin Edmonds** developed the list of additional teacher resources and provided feedback on the educational resources.

**Rachel Lawson, Jack Drummond** and **Vanessa Monteiro** developed and analysed the surveys to assess behavioural changes and the quality of the educational resources.

**GNS Communication/Design team** provided illustrations and design for the Carbon Cycle booklet.

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- Wellington Doctoral Scholarship from Victoria University of Wellington (Vanessa Monteiro)
- University of California Berkeley (provided the low-cost sensors)

## The team

**Leigh Fleming** is an early career Carbon Cycle Scientist at GNS Science. She is an expert on greenhouse gas measurement instrumentation.

**Vanessa Monteiro** is a PhD candidate at Victoria University of Wellington and GNS Science, where she is conducting a research on greenhouse gas emissions from cities and the use of serious games to inform emissions.

**Donna Hiraina Calis** is a BSc Global Sustainability Science Student at Utrecht University. She developed the illustrations during an internship at GNS Science.

**Rachel Lawson** is an early career Social Science Technician in the Hazard and Risk Social Science Team at GNS Science.

**Jack Drummond** is an early career Socio-economic Policy Specialist in the Climate and Energy Team at GNS Science.

**Erin Edmonds** is a primary school specialist science teacher from Silverstream School in Upper Hutt. She supported this project during her sabbatical at GNS Science as a participant teacher on the Royal Society Te Apārangi 'Science Teaching Leadership Programme'; funded by Ministry of Business, Innovation and Employment (MBIE).

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