

# Climate Change & Ecological Footprint Workshop

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## Exploring Climate Change Through Math

- Human activity continues to modify landscapes and alter the Earth's atmospheric composition of greenhouse gases. As global temperatures rise, the Earth's climate changes. These changes include precipitation patterns, severe and extreme weather events, etc. (Shepardson, et al. 2012).
- As climate change exacerbates over time, we risk extreme havoc to our environmental system. Students therefore require instruction to take informed action as we aim to preserve our planet. Understanding how much of the Earth's resources we consume everyday informs us of these issues in sustainability (Grant, Littlejohn, 2004).
- In an effort to inform educators about integrating climate change in the classroom, this workshop demonstrates how an ecological footprint can empower Grade 5/6 students to lead more sustainable lives. The activity provides a valuable mathematical vantage point for comprehending how climate change is subject to the choices we make over time.

## Successful Climate Change Pedagogy

- Student teachers at Lakehead University found experiential learning groups translatable into climate change practice. This instruction had a positive effect on their preparedness to teach climate change pedagogy in the classroom (Berger et al., 2014).
- Grade 6 students were asked to calculate their carbon footprint and its impact on climate change, which empowered them to identify more sustainable ways of living (Belislem, 2017).
- Grade 2/3 students engaged in "5E" science inquiry: Engagement, Exploration, Explanation, Elaboration, and Evaluation. By the end of the unit, students had increased knowledge of global warming and more favourable attitudes towards the environment (Karpudewan et al., 2015).
- In a grade 5 classroom, students were successful in math, science, and geography when they made cross curricular connections with climate change studies (Oldakowski & Johnson, 2018).



## Cross Curricular Connections

**Number Sense and Operational Sense:** Grade 5 (pg. 78), Grade 6 (pg. 88).  
**Data Management and Probability:** Grade 5 (pg. 84), Grade 6 (pg. 95).  
**Relating Science and Technology to Society and the Environment:** Grade Five 1.1 (pg. 99).  
**Understanding Matter and Energy:** 1.2 Grade 6 (pg. 119).  
**Government and Citizens Working Together:** B1.3 Grade 5 (pg. 112); Grade 6 (pg. 125).



*How would knowing their ecological footprint aid student understanding of climate change?  
Once students find their data, how might you extend their mathematical learning?  
How might programs integrate this learning to provide for cross-curricular connections?*

## Suggested Unit Layout

### KWL Chart, Think Pair Share & Class Discussion:

Students complete **K** (know) as a class, answering:

- *What do we know about climate change?*
- *What do we know about ecological footprints?*

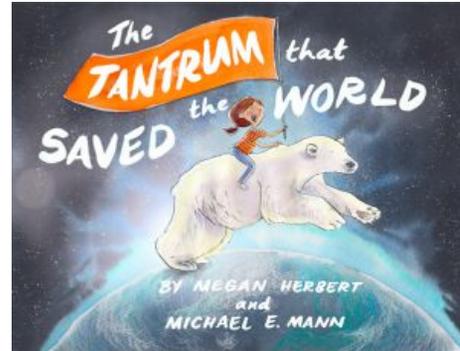
### Read Aloud:

- *The Tantrum that Saved the World* by Megan Herbert & Michael E. Mann (2017)

### Think Pair Share and W of Chart:

Students pair up to discuss, and complete **W** (want to know), answering:

- *After reading this book, what do we want to know or learn about climate change and ecological footprints?*



### Define and Calculate Personal Eco-Footprint:

- Define eco-footprint for students: break down complex words (e.g. “biologically productive land”)
- Students complete self-report survey in small groups to calculate eco-footprints

[http://www.earthrangers.org/wp-content/uploads/2016/08/how\\_big\\_is\\_my\\_ecological\\_footprint.pdf](http://www.earthrangers.org/wp-content/uploads/2016/08/how_big_is_my_ecological_footprint.pdf)

### Class Discussion:

- *What can we now do with this data?* (Graph it, make connections to climate change).
- *What kind of predictions or estimates can we make about our classroom’s eco-footprint? Our school’s? Our community’s?* (Make estimates through multiplication, Graph it).

### Making More Connections and L (learned) of Chart:

- Exploring other resources demonstrating human impacts on climate change:
  - Videos, Photos, Books, Websites
  - Interpreting data from other sources
  - Students fill out **L** of chart, answering: *What have these resources taught us?*

### Extending the Learning - Taking Action:

- Students can set personal goals to reduce their footprint
- Re-calculate Ecological Footprint: *What does this data tell us now? What has changed?*

### Additional Classroom Resources

Kelsey, E., Hanmer, C. (2010). *Not your typical book about the environment*. Toronto: Owl Kids Inc.

O’Sullivan, J. (2009). *101 ways you can help save the planet before you’re 12*. Toronto: Sterling Publishing.

