

# Binogi in Your Science Classroom

Grade 7(ON) - Heat in the Environment  
Lesson: Greenhouse Gases



## Supported by



Resource Guide for Teachers

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Please visit:

<https://escapeprojects.ca/> for additional resources and information

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# Gr. 7 ON Greenhouse Gases Learning Objectives and Big Ideas

## Overall Expectation

Assess the costs and benefits of technologies that reduce heat loss or heat-related impacts on the environment;

## Specific Expectation

3.8 identify common sources of greenhouse gases (e.g., carbon dioxide comes from plant and animal respiration and the burning of fossil fuels; methane comes from wetlands, grazing livestock, termites, fossil fuel extraction, and landfills; nitrous oxide comes from soils and nitrogen fertilizers), and describe ways of reducing emissions of these gases.

## Learning Objectives

Understanding the effects of heat on the Earth. For example, the greenhouse effect and global warming.

## Big Ideas

Understand how I can be aware of, and reduce, greenhouse gases and my carbon footprint.

## Assessment

1. Assessment FOR

Diagnostic questions, Minds On, Action, Consolidation

2. Assessment AS: Consolidation

# Scientific Terms and Resources/Materials

## Vocabulary

Greenhouse effect, greenhouse gasses, carbon dioxide, methane, chlorofluorocarbons, acid rain, particle theory, fossil fuels, carbon footprint.

## Pair/Group Activities

Please follow your school's **Covid-19 safety protocols** for any pair/group activities.

## Language Friendly Pedagogy

At the beginning of the lesson, students will be invited to add key terms in their **Concept Detective** and add any new words that they come across throughout the lesson.

## Binogi Related Resources

**[Greenhouse Gases](#)**

## Other Resources


Nasa Greenhouse Cards -  
**<https://climatekids.nasa.gov/greenhouse-cards/>**

Carbon Footprint Calculator -  
**<http://www.footprintcalculator.org>**


# At the beginning of class... (5 ~ 10 min)

1. Share learning objectives - *Understanding the effects of heat on the Earth. For example, the greenhouse gas effect and global warming.*
2. Co-create success criteria
  - Sample :
    - *I can name some of the causes of the greenhouse gas effect and global warming;*
    - *I understand my role of reducing the greenhouse gas effect and global warming.*
3. Ask the students to add the following words in their [Concept Detective](#) which they will fill in throughout the lesson:  
**ie:** Greenhouse effect, greenhouse gasses, Carbon dioxide, methane, chlorofluorocarbons, acid rain, particle theory, fossil fuels, carbon footprint.
4. Diagnostic Questions: Teachers should systematically start with 2 or 3 diagnostic questions. Examples of diagnostic questions can be found:
  - a) using previous years' specific expectations;
  - b) students taking part in [Binogi quizzes](#).

# Minds On

Task Component	Instruction	Assessment Focus Look Fors	Notes
<p><b>Before (Activation/ Review) ~5-10 mins</b></p> <p><b>Resources:</b></p>	<p>** Use information on greenhouse gases from <a href="#">NASA</a> and create Kahoot questions before the class.</p> <p>1. Play Kahoot with students. </p>	<p>How do students represent their understandings and linkages between concepts?</p> <p>How does the activity connect to, and help prepare students for problem solving?</p> <p>How are you interacting with your students?</p>	<p>Teacher records answer / wonderings / understandings. Asks students to elaborate/explain their responses with the class.</p>

# Action

Task Component	Instruction	Assessment Focus Look Fors	Notes
<p><b>During (Working on it) ~15-20 mins</b></p> <p><b>Materials:</b></p> <p><b>paper, markers, blocks, ruler, graph paper</b></p>	<ol style="list-style-type: none"><li data-bbox="363 380 1309 464">1. Have students guess what “carbon footprint” means, then explain.</li><li data-bbox="363 601 1271 726">2. Each student calculates their own <a href="#">carbon footprint</a> (<i>available in different languages</i>). Have students make notes of their results.</li></ol> 	<p>What role do I and my students play during the problem solving process?</p> <p>What strategies do we predict students will use to do the math?</p> <p>What strategies are students using to do the math?</p>	<p>Have your students watch the videos in the language of their choice.</p> <p>Record students' thoughts.</p> <p>Think-pair-share: student thinks on their own first, then they share with their partner, then with the class.</p>

# Consolidation/Reflection

## Instruction

### Discussion

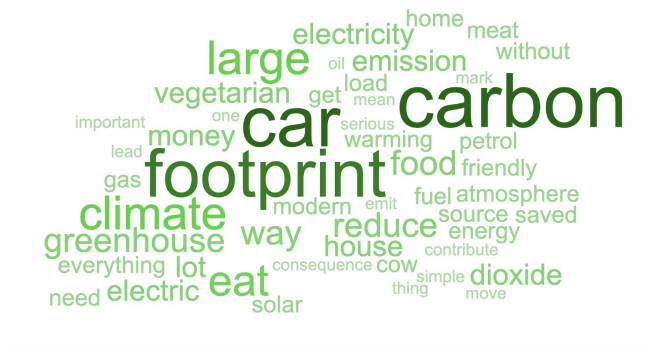
Have a class discussion around everyone's results. Possible questions to ask:

1. Why do you think your results lead you to have more than one Earth?
2. What is your worst "habit"?
3. What is your best "habit"?

What do you think you can do (immediately and long-term) to change your results?

### Language Friendly Pedagogy

Students complete their [Concept Detective](#).



## Assessment Focus Look Fors

How are you consolidating student learning? Which strategy was used (Congress, Gallery Walk, Bansho, etc.) and why?

How do you determine what should be highlighted? How is it connected to the learning goal/expectations? How is student thinking annotated?

What roles do you and your students take on during the consolidation?



# Extensions & Differentiation/Modifications

What the following Binogi video: [Greenhouse Gases](#)

How does this tie into the carbon footprint exercise that you did? How would you explain this to your baby brother, sister or family member?

# Parent and Community Connection

## Home Assignment

[Concept Detective](#) - students can complete any terms they wish to include in their glossary with their parents.

EXAMPLE of parent/community activity:

Students do the [carbon footprint](#) quiz with their family members. The aim is to consolidate the student's learning further by engaging in talks, as well as increasing parental involvement and raising awareness of what they are learning in school.

Some of the questions parents can ask once they have watched the video:

1. What are some short- and long-term changes that we can make to reduce our carbon footprint?

Students can share their answers the next day with the class if they wish to.

