



# in the Classroom

Curriculum-linked activities that bring students' love of animals to life!



**A big lunch can mean a big footprint – carbon footprint, that is! Introduce students to the ways our everyday food choices contribute to climate change and challenge them to shrink their carbon footprints by making sustainable choices at lunch.**

## Food for Thought: Classroom Activity

Climate change is a pervasive issue that affects animals everywhere. Increases in global temperatures over the past 150 years have been significant, with a nearly 1° C rise in the past century alone<sup>1</sup>. This rising temperature is thought to be the result of the surge in greenhouse gas emissions that came alongside the Industrial Revolution, a period of increased manufacturing technology that began in the late 1700s. With this boost in manufacturing came an increased use of fossil fuels, and their use continues to contribute significantly to a growing carbon footprint.

**Carbon footprint: the amount of greenhouse gases created by the products we use and the actions we take<sup>2</sup>.**

In this activity, students will audit their lunches by completing the Food for Thought quiz to determine how each component of their meal contributes to their carbon footprint. They will look at the “life cycle” of their lunch by investigating:

- What their lunch is made up of
- What their food is stored in
- Where their food came from, or where it was made
- How much waste their lunch generates

After taking the quiz, students will record their individual scores and the overall score as a class. A take-home guide will provide quick and easy tips that can help students as they're challenged to beat their scores by creating more carbon footprint-friendly lunches. The quiz and lunchbox audit should take between 30-45 minutes, and students' improved lunches can be re-evaluated in a follow-up activity at a later date.

### Materials

- Food for Thought Quiz – one copy per student (provided)
- Food for Thought Take-home Guide - one copy per student (provided)
- Teacher's Guide (provided)

### Instructions

1. Before beginning the classroom activity, lead a classroom discussion on the key concepts outlined in the Teacher's Guide (climate change, carbon footprint). Students should understand these basic ideas because they provide the context for the activity below.  
*Note: this activity requires students to bring a lunch to school and shouldn't be completed on a lunch order day*
2. Divide students into pairs and distribute a copy of the Food for Thought Quiz to each student.
3. Ask students to take out their lunches and give them 20 minutes to complete the quiz to determine how carbon footprint-friendly their meals are. Students will examine the various components of their lunches and tally their scores for each question, with scoring as follows:
  - 1 point for every “A” answer selected
  - 2 points for every “B”
  - 3 points for every “C”

*Hint: the lower the score the more footprint-friendly the lunch is – but don't share this information with students just yet!*

## Activity at a Glance

Grade level: 6

Overall objectives: Assess the impact of food consumption on climate change and learn how to make smarter food choices to help shrink your carbon footprint

Key concepts: climate change, carbon footprint – see Teacher's Guide for more information

By participating in the Food for Thought Classroom Activity, students will meet the following curriculum expectations:

1. Assess human impacts on biodiversity, and identify ways of preserving biodiversity



4. Once all students have completed the quiz, ask for a show of hands to determine who scored in the top three – these students are carbon footprint champions!
  - Lowest possible score: 9 (this is great!)
  - Highest possible score: 27 (this needs some work!)
5. As students put their lunches away, collect the quizzes and tally the total score for the classroom. Write this number on the board – this is the goal for your class to beat when the activity is repeated!
6. Use the wrap-up section below to facilitate a classroom discussion about the key concepts covered in the lesson and quiz. Following discussion, return the quizzes, distribute a copy of the take-home guide to each student, and choose a date to repeat the activity. For this follow-up lesson, students will use the take-home guide to create a more carbon footprint-friendly lunch, which will be re-evaluated as students are challenged to beat their score – and the class’ score!

## **Wrap-up and Discussion**

Now that students have seen that even the food they eat can contribute to their carbon footprint, facilitate a discussion about the activity that emphasizes how small changes can have a big impact on climate change.

1. The first part of this discussion should provide students with a broad understanding of the features of their meals that increased their carbon footprint.
2. The second part of the discussion should encourage students to reflect upon their scores, interpret their results, and offer suggestions as to how to improve their lunches for the next round of the activity.

### **Key points to discuss include:**

- **Meals that contain animal protein tend to have a higher carbon footprint than meals that do not**
  - The food and water required to raise livestock takes a lot of energy to produce, and more energy means more emissions<sup>iii</sup>. It takes nearly 10 times the amount of fossil fuels to produce animal protein than it does to produce plant protein<sup>iv</sup>!
  - Land used for grazing is often degraded and difficult to restore, and sometimes creating pasture requires the clearcutting of forested areas<sup>v</sup>.
    - The mass production of corn and other crops can also cause land degradation, which is why it’s important to buy organic foods when we can
  - The methane produced by livestock is over 20 times more potent than carbon dioxide in terms of its contributions to global warming<sup>vi</sup>, with ruminants (animals like cows and sheep that digest their food through fermentation<sup>vii</sup>) producing over 40% of the greenhouse gases linked to agriculture globally<sup>viii</sup>.
- **Prepackaged snacks/individually wrapped items and leftover/spoiled foods are a significant contributor to waste in many school lunches**
  - The waste created by food packaging and its production accounts for nearly 20% of the waste generated by the food industry across the country<sup>ix</sup>
  - Over \$30 billion of food is wasted in Canada each year<sup>x</sup>!
  - Foods that end up in landfills release greenhouse gases as they decompose. With an estimated 30% of the food purchased by the average household ending up in the garbage, the greenhouse gases produced by discarded foods is considerable<sup>xi</sup>.
  - Only a small percentage of plastics, including those found in water bottles and plastic grocery bags, are recycled each year. Many plastic items are non-recyclable, and those that are often end up treated as waste because they are contaminated with non-recyclable materials (like food waste, glue from labels, etc.). Plastics that end up in landfills do not biodegrade and can take thousands of years to decompose, leaking pollutants into the soil and water<sup>xii</sup>.
- **Transportation accounts for about 10% of food’s carbon footprint<sup>xiii</sup>, and in Canada a meal travels an average of 1,200 km from where it’s produced to where it’s consumed. Most means of mass transportation rely on fossil fuels like gas and oil, which produce greenhouse gas emissions.**



### **Did you know?**

Painted turtles, like Earth Rangers Animal Ambassador Shelly, face a unique problem in response to climate change. Because air temperature determines the gender of turtle hatchlings, warmer weather will produce more females, making it harder for turtles to find mates.



Building on their understanding of the carbon footprint concept, ask students to share and interpret their quiz results. Recognizing their contribution to climate change is critical as students learn the simple steps they can take to help keep their carbon footprints small. Questions to ask include:

- **What were your best and worst scores, and why?**

- Possible answers: "I scored 3 on the "what's it stored in" question because I brought my sandwich in a Ziploc bag, but I scored a 1 for "what's it made of?" because my lunch has no meat in it!"

- **What surprised you the most about the carbon footprint of your lunch?**

- Possible answers: unaware that even a "litterless lunch" can still have a big carbon footprint; didn't know there was such a big difference in the carbon footprint of the actual food included (eg. red meat vs. chicken/turkey)

- **What do you think will be the easiest change to make when it comes to planning more footprint-friendly meals? The hardest?**

- Possible answers: using less red meat; replacing plastic sandwich bags with reusable containers; only buying local/in-season fruits and veggies; buying snacks that come in less packaging

- **Beyond your school lunch, what do you think are some other ways you can help shrink your carbon footprint?**

- Possible answers: choosing products made of natural materials (like wood) vs synthetic materials (like plastic); using products that have less packaging; buying more local goods; buying used toys or clothes; reducing waste by using an item completely before disposing of it; only buying products that are "needs" instead of "wants"



### Take it to the Next Level (optional)

Choosing locally made, organic foods is a great way to shrink the carbon footprint of your meals. Organize a small fieldtrip to a local farmer's market or community garden to introduce your students to some of these amazing initiatives. Encourage students to speak with local farmers or even get involved with a community garden to learn more about how they can help!

You can find your local farmer's market here:

<http://www.farmersmarketsincanada.com/Markets.cfm>, and can check out some of the community gardens in your area here: <http://sustainontario.com/initiatives/community-garden-network>.

Many municipalities even offer community garden programs that can help your group get started if your class is interested in creating their own! *Note: these lists are not exhaustive – if you're unable to find a farmer's market or community garden in your area, be sure to check with your municipality for complete details.*



#### Did you know?

The woodland caribou is at risk of habitat loss due to climate change, but Earth Rangers worked to protect almost 4 million hectares of caribou habitat in Manitoba to help ensure a brighter future for these iconic animals!



# Food for Thought

## Teacher's Activity Guide

Use this guide to facilitate a discussion on the Key Concepts below prior to leading the classroom activity.

Key Concept One: Climate change | Key Concept Two: Carbon footprint  
Food for Thought Quiz | Food for Thought Take-home Guide

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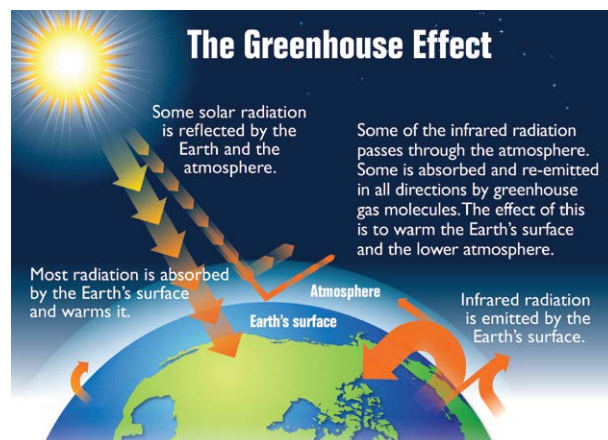
TD Friends of the Environment Foundation

### Key Concept One: Climate change

Climate change refers to a long-term change in the weather in a particular region<sup>xv</sup>. Some climate change happens naturally, with fluctuations in temperature, wind patterns, and precipitation occurring across various time scales throughout history, but the current rate of change is unprecedented<sup>xvi</sup>. Since the end of the Industrial Revolution in the late 1800s the global average temperature began to rise, and to date it has increased nearly 1 °C<sup>xvii</sup> – a sizeable increase considering it was only a 5 °C change in temperature that resulted after the last ice age<sup>xviii</sup>!

This widespread warming is thought to be caused by the increase in greenhouse gas emissions that occurs as a result of the increased use of fossil fuels. These fuels, which include oil, coal, and natural gas, produce greenhouse gases like carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) when they're burned, and once released into the atmosphere can trap heat and cause the Earth's surface to warm.

This trapping of heat by the atmosphere also occurs naturally in a process called the greenhouse effect. Some of the sun's energy is absorbed by the earth or is reflected back into space, but about 20% remains trapped in the atmosphere, where it helps to hold heat at the earth's surface<sup>xix</sup>. If this process didn't occur the Earth would be too cold to sustain human life (like on Mars, where the thin atmosphere holds very little heat and the average temperature is -60 °C<sup>xx</sup>), but the increased amount of greenhouse gases in our atmosphere has caused warming well beyond this natural range<sup>xxi</sup>.



The effects of climate change and an increasing global temperature are numerous. Extreme weather events like droughts and floods are becoming more common and these trends are expected to continue if the rate of temperature increase persists<sup>xxii</sup>. For species that have spent thousands of years adapting to one set of environmental conditions, the shift towards a different climate can mean the difference between survival and extinction<sup>xxiii</sup>. It is predicted that within the next 40 years 25% of all species on Earth could go extinct as a result of climate change. Some of the species affected by climate change include:

- Polar bears: melting sea ice means less hunting grounds for these massive carnivores, who rely on the thick Arctic ice to reach their main food source, seals<sup>xxiv</sup>
- Sea turtles: rising sea levels can wash away beaches, reducing the available habitat for nesting sea turtles<sup>xxv</sup>
- Woodland caribou: caribou are well adapted to snow and use it as an advantage over their predators, but increased warming means less snow, which makes them more vulnerable to predation<sup>xxvi</sup>

### Key Concept Two: Carbon footprint

One measure of an individual's impact on, or contribution to, climate change, is their carbon footprint. A carbon footprint is defined as the amount of greenhouse gases that are generated by the actions a person takes, the foods they eat, and the products they buy<sup>xxvii</sup>. Everything that we do and all of the products we use contribute to our carbon footprint, which is why the choices we make are so important!



Greenhouse gases like carbon dioxide and methane are released at many points during food's journey from farm to table.



**Did you know?** Melting sea ice in the Canadian arctic is a big problem for the beluga whale, but Earth Rangers helped protect this amazing mammal by supporting research into its habitat and its response to environmental changes.





# Food for Thought Quiz

Name: \_\_\_\_\_

They say you are what you eat, but did you know that your food choices can also add to your carbon footprint? Complete this quiz to find out how footprint-friendly your lunch is and see if you have what it takes to be a carbon footprint champions! Score 1 point for every "A" you select, 2 points for every "B", and 3 points for every "C". When you're finished, add up your score and write it in the box at the bottom of the page.

## What's your lunch made of?

- 1) What's your favourite part of today's lunch?
  - a. Last night's leftovers
  - b. Fresh fruits and veggies
  - c. Prepackaged snacks like granola bars
- 2) On a scale of 1 to carnivore, how meaty is your lunch?
  - a. Call it a zero - there's no meat in today's meal!
  - b. You'll find chicken or turkey in my lunchbox but no redmeat (like beef)
  - c. Whether it's beef or bacon I loove red meat and can't wait to dig in at lunchtime today!

## What's it stored in?

- 3) You brought your lunch to school in...
  - a. Old Faithful: the lunch bag or backpack you'll use all year
  - b. A reusable canvas or vinyl bag that you replace every couple of weeks
  - c. A plastic grocery bag - it's all we use at the store, so we've got tons at home!
- 4) What do you use to quench your lunchtime thirst?
  - a. A reusable water bottle
  - b. A can or plastic bottle
  - c. Juice box or pouch

## Where did your lunch come from?

- 5) Where was the food in your lunch bought?
  - a. From a farmer's market
  - b. From my local grocery store
  - c. From a store that's pretty far from my house (but the store is really cool, so it's worth it!)
- 6) How much of the food in your lunch comes from local sources?

Hint: We don't mean the grocery store - check any packaging or stickers to see where these items were made

  - a. Most of it. We love eating local
  - b. Some of it I think, but I'm not sure - the packaging is probably in the garbage at home!
  - c. None of it. We only eat exotic foods

## What will be left when you're finished?

- 7) What will you do with the leftovers from your lunch?
  - a. There will be no leftovers - I only packed what I know I'm going to eat!
  - b. They'll go in the fridge for later
  - c. I'll throw them out
- 8) Think back to how your food came before it went into your lunch. How were most of your snacks packaged?
  - a. We made most of the snacks ourselves out of stuff we already had at home, so there wasn't any extra packaging
  - b. They came in one big bag or box (we love buying in bulk!) and we portioned them out ourselves
  - c. They came individually wrapped and packaged
- 9) How many pieces of garbage will your lunch produce?
  - a. None - we love litterless lunches!
  - b. Only one
  - c. Two or more

My lunch scored \_\_\_\_\_ points

Our class scored \_\_\_\_\_ points

YOU CAN CONTINUE YOUR MISSION TO SHRINK YOUR CARBON FOOTPRINT AT HOME BY JOINING THE EARTH RANGERS CARBON FOOTPRINT INVESTIGATION TEAM! ARE YOU UP FOR THE CHALLENGE? FIND OUT HERE:

<http://www.earthrangers.com/Carbon-Footprint-Investigation/>





# Food for Thought

## Take-home Guide

Name: \_\_\_\_\_

Your score to beat is... \_\_\_\_\_

What items in your lunch do you think had the highest carbon footprint? The lowest?

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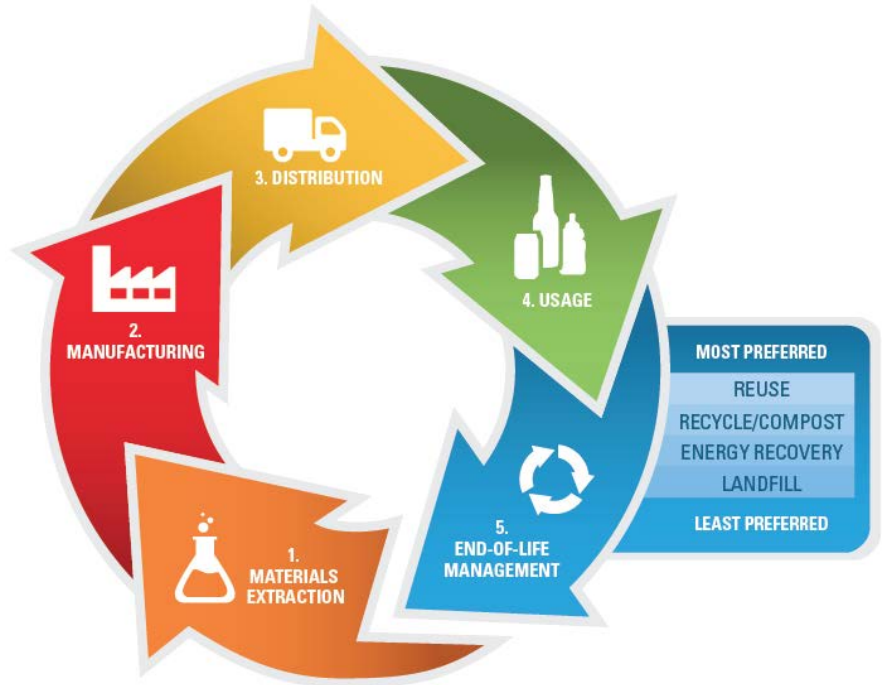
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**Greenhouse gases are released at many points as food grows and travels from farm to table, and it's important to always consider these when you're out shopping.**

The best way to shrink your carbon footprint is to use less and buy less, but we can't always eat less (and sometimes we don't want to!). Instead, keep these questions in mind the next time you're planning your lunch or buying groceries with your family:



### What's in my food?

- ☹ Red meat is one of the biggest contributors to your lunch's carbon footprint
- ☺ Try a meatless option once or twice a week, or opt for chicken or turkey instead

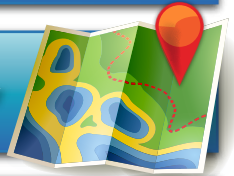


### What's my food stored in?

- ☹ The less packaging that ends up in the garbage, the better!
- ☺ Try to buy in bulk and avoid individually wrapped snacks - make your own individual servings by portioning items into reusable containers

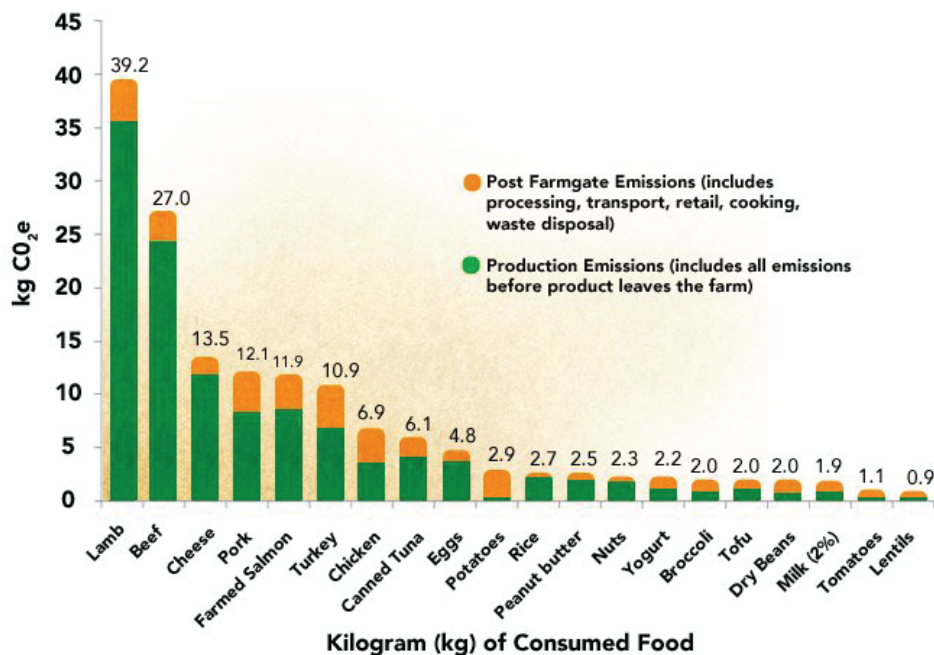
### Where was my food made?

- ☹ Foods made far away release more greenhouse gases during their transportation than local foods that don't have to travel as far
- ☺ Stick to local fruits and veggies (hint: buy only what's in season)



### How much will I actually use?

- ☹ Wasted food that ends up in a landfill will release greenhouse gases as it breaks down over time - less food waste means less greenhouse gas emissions!
- ☺ Get creative with your leftovers - roasted chicken one day can make an awesome chicken soup the next!



All diagrams courtesy of the United States Environmental Protection Agency (US EPA) and Environmental Working Group .

Additional diagram and information below for your reference and to be used as desired. You'll find more information on the seasonal availability of fruits and vegetables in your area here:  
<http://localfoods.about.com/od/CanadianProduceGuides/>

## References and additional resources

- i <http://earthobservatory.nasa.gov/Features/WorldOfChange/decadaltemp.php>
- ii <http://www.nature.org/greenliving/carboncalculator/>
- iii <http://www.davidsuzuki.org/what-you-can-do/food-and-our-planet/food-and-climate-change/>
- iv <http://www.news.cornell.edu/stories/1997/08/us-could-feed-800-million-people-grain-livestock-eat>
- v <ftp://ftp.fao.org/docrep/fao/010/a0701e/a0701e00.pdf>
- vi <http://www.fao.org/agriculture/lead/themes0/climate/en/>
- vii <http://aitc.ca/bc/uploads/ruminants.pdf>
- viii <http://www.fao.org/news/story/en/item/197623/icode/>
- ix <http://vcm-international.com/wp-content/uploads/2013/04/Food-Waste-in-Canada-112410.pdf>
- x <http://vcm-international.com/wp-content/uploads/2014/12/Food-Waste-in-Canada-27-Billion-Revisited-Dec-10-2014.pdf>
- xi <http://www.davidsuzuki.org/what-you-can-do/food-and-our-planet/help-end-food-waste/>
- xii <http://blogs.ei.columbia.edu/2012/01/31/what-happens-to-all-that-plastic/>
- xiii <https://www.sciencedaily.com/releases/2008/04/080421161338.htm>
- xiv <http://www.davidsuzuki.org/what-you-can-do/food-and-our-planet/food-and-climate-change/>
- xv <http://climatechange.gc.ca/default.asp?lang=En&n=F2DB1FBE-1>
- xvi <http://climate.nasa.gov/vital-signs/global-temperature/>
- xvii [http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1ARS\\_SPM\\_FINAL.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1ARS_SPM_FINAL.pdf)
- xviii [http://earthguide.ucsd.edu/virtualmuseum/climatechange2/01\\_1.shtml](http://earthguide.ucsd.edu/virtualmuseum/climatechange2/01_1.shtml)
- xix <http://climatechange.gc.ca/default.asp?lang=En&n=1A0305D5-1>
- xx <http://quest.nasa.gov/aero/planetary/mars.html>
- xxi <http://climatechange.gc.ca/default.asp?lang=En&n=1A0305D5-1>
- xxii <http://climate.nasa.gov/effects/>
- xxiii <http://www.nature.org/ourinitiatives/urgentissues/global-warming-climate-change/threats-impacts/wildlife-at-risk.xml>
- xxiv <http://www.polarbearsinternational.org/about-polar-bears/essentials/hunting-and-eating>
- xxv [https://cmsdata.iucn.org/downloads/fact\\_sheet\\_red\\_list\\_turtle.pdf](https://cmsdata.iucn.org/downloads/fact_sheet_red_list_turtle.pdf)
- xxvi <http://www.pc.gc.ca/eng/nature/eeep-sar/itm3/eeep-sar3caribou.aspx>
- xxvii <http://www.nature.org/greenliving/carboncalculator/>
- xxviii <http://www.ewg.org/meateatersguide/a-meat-eaters-guide-to-climate-change-health-what-you-eat-matters/climate-and-environmental-impacts/>