

Details



Completion Time: Less than a week

Permission: Download and Share

What's My Footprint?

Overview

Students will investigate what a carbon footprint is and calculate their own personal carbon footprint. Finally, students will develop ways to reduce their carbon footprint.

Objectives

- Students will know that the principles of chemistry underlie the functioning of biological systems.
- Students will know that carbon, because of its ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms.
- Students will know the idea of atoms explains the conservation of matter: in chemical reactions the number of atoms stay the same no matter how they are arranged, so their total mass stays the same.

Lesson Preparation

1. This lesson requires computers with internet connection. Teachers should sign up for computer lab time, a school library appointment, or check out laptop carts for this lesson.
2. Print out one worksheet per group.
3. Log into www.brainpop.com and click on the "Carbon Cycle" video.
4. Obtain 10 key calculators (optional).

Procedure

1. Ask students, what is carbon? Possible answers: it's an element from the periodic table, etc.
2. Ask students what is a footprint? Possible answers: it's the dent your foot makes into the dirt when you're walking.
3. Ask students, what is a carbon footprint?
4. Show the Brainpop video "Carbon Cycle."
5. Have a class discussion.
6. Divide students into groups of 4.
7. Provide one worksheet and one computer with inter-

Materials

- Computers with Internet access
- Carbon Footprint Worksheet (attached)

net connection per group.

8. Students log onto the Nature Conservancy's website

<http://www.nature.org/greenliving/carboncalculator/>

9. Each student in the group will take a turn using the computer to calculate their carbon footprint. Make sure to click on each tab, Get Started, Home Energy, Driving and Flying, Food and Diet, Recycling and Waste, and Results. Students may be reluctant to fill in annual mileage since they are not drivers yet or just don't know what their mileage is, but as passengers in a car instead of using mass transit, they do contribute to carbon emissions. Therefore, students may need help with calculating their annual mileage. They can use a standard mileage rate of 8,206 miles per year for male teens 16-19 (source: US Department of Transportation Federal Highway Administration, Average Annual Miles per Driver by Age Group). Or students may want to calculate their daily mileage to school and multiply by the number of school days. The optional 10 key calculators may be used here. On the Results tab, students can observe their behavior break down and compare their behavior to US average and a world average.

10. Ask students to share what they think about their results.

11. Now have students try to reduce their carbon footprint by 20%. Ask students, what would you do to change your consumption or behaviors? Which question can you answer differently to reduce your footprint?

12. Ask students to enter on Table 2 a few sentences about the changes they decided to make, and why they made that choice. Have them think about the values embedded in their choice. Have students think about what ideas from the news, other classes or from their prior experience are informing their choice? Finally, ask what further information could help you to make this choice?

13. After completing Table 2, have students recalculate each of their footprints. Enter the new numbers onto Table 3.

14. Each group will make a 3-5 minute presentation about their calculations and their behavior changes.

15. Class discussion. What is useful to you about calculating your carbon footprint?

Extension

1. Students can log in at home and do this activity at home with their family.
2. Students can graph their results on graph paper or using Excel's graphing feature.
3. Students can test and compare several different websites' carbon calculators.

Assessment

The teacher will use the group presentation and worksheet as an assessment.

Credits

Cristina Solis

National Science Education Standards (NSES):

Content Standards, Grades 5-8

Content Standard A: Science As Inquiry

- a. Abilities necessary to do scientific inquiry

Content Standard B: Physical Science

- a. Properties and changes of properties in matter
- c. Transfer of energy

Content Standard F: Science In Personal and Social Perspectives

- a. Personal health
- b. Populations, resources, and environments
- e. Science and technology in society

Content Standards, Grades 9-12

Content Standard A: Science As Inquiry

- a. Abilities necessary to do scientific inquiry

Content Standard B: Physical Science

- b. Structure and properties of matter
- e. Conservation of energy and increase in disorder
- f. Interactions of energy and matter

Content Standard C: Life Science

- e. Matter, energy, and organization in living systems

Content Standard D: Earth and Space Science

- a. Energy in the earth system
- b. Geochemical cycles

Content Standard F: Science In Personal and Social Perspectives

- a. Personal and community health
- d. Environmental quality
- e. Natural and human-induced hazards

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**TABLE 1
CARBON CALCULATOR**

<i>Name 1</i>	<i>Name 2</i>	<i>Name 3</i>	<i>Name 4</i>
<i>tons of CO₂</i>	<i>tons of CO₂</i>	<i>tons of CO₂</i>	<i>tons of CO₂</i>

**TABLE 2
BEHAVIORIAL CHANGES**

<i>Name</i>	<i>Behavior Change</i>	<i>Justification for Change</i>

**TABLE 3
RECALCULATION OF CARBON**

<i>Name 1</i>	<i>Name 2</i>	<i>Name 3</i>	<i>Name 4</i>
<i>tons of CO₂</i>	<i>tons of CO₂</i>	<i>tons of CO₂</i>	<i>tons of CO₂</i>

REFLECTION

1. *Why should we find out our personal carbon footprint?*

2. *Is it realistic for people to decrease their carbon output?*