Offsetting Carbon Emissions

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**Description**

A collection of activities and resources regarding offsetting carbon emissions that meet state education standards and national sustainability standards for the 7th grade level.

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### Revision History

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Offsetting Carbon Emissions

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Excellence in Curricula and Experiential Learning

Introduction

Grade Level

These activities are intended for a seventh grade classroom.

Discipline

These activities have a science and social studies focus.

TEKS

Content:

Throughout social studies in Kindergarten-Grade 12, students build a foundation in history; geography; economics; government; citizenship; culture; science, technology, and society; and social studies skills. The content, as appropriate for the grade level or course, enables students to understand the importance of patriotism, function in a free enterprise society, and appreciate the basic democratic values of our state and nation as referenced in the Texas Education Code (TEC), §28.002(h). TEKS §113.19. Social Studies, Grade 7. (a)(5)

Skills:

The student knows that matter has physical and chemical properties and can undergo physical and chemical changes. TEKS §112.19. Science, Grade 7. (b)(6)(A)(B)(C)

The student understands the rights and responsibilities of Texas citizens in a democratic society. TEKS §113.19. Social Studies, Grade 7. (b)(16)(A)(B)

The student communicates in written, oral, and visual forms. TEKS §113.19. Social Studies, Grade 7. (b)(22)(A)(B)(C)(D)

The student uses problem-solving and decision-making skills, working independently and with others, in a variety of settings. TEKS §113.19. Social Studies, Grade 7. (b)(23)(A)(B)

National Education for Sustainability K-12 Student Learning Standards

1.1 ~ Personal Action ~ Personal Responsibility ~ Personal Footprint Calculation ~ Problem Solving
1.2 ~ Collective Actions ~ Designing a Sustainable System ~ Societal Footprint Calculation
2.2 ~ Ecological Systems ~ Natural Resources ~ Ecological Footprint
2.3 ~ Economic Systems ~ Food Systems
2.4 ~ Social and Cultural Systems ~ Citizenship ~ Resource Distribution

TheOffsetting Carbon Emissions
Objective

In this lesson, students learn about the exchange of carbon credits to offset corporate emissions. They then investigate their own “carbon footprints” and reflect on how they can reduce their impact on the environment.

Key Words

Carbon footprint
Natural resources
Carbon offsetting
Emission

Description of Activities

The following activities have been compiled to address the topic of “Offsetting Carbon Emissions” in seventh grade classrooms. The activities meet the state and national education standards for seventh grade, and are intended to supplement pre-existing curricula, with a focus on integrating sustainability topics. The activities can be used in conjunction or alone.
Activities

Activity 1: Carbon Footprint in Numbers

Introduction

In this activity, students will reflect on some of the ways they use carbon-based fuel in their own lives, and how they might contribute to their “carbon footprints.” They will also look at the carbon footprint of the United States and brainstorm possible solutions.

Materials

Board (chalk/dry erase)
Computer(s)
Handout- “How I Create Carbon Emissions”
Online article
  - “Sale of Carbon Credits Helping Land-Rich, but Cash-Poor, Tribes”

Products

List
Journal/handout
Timeline

Process

1. Students respond to the following prompt in their journals/on paper, written on the board prior to class: “Think about some of the ways you use carbon-based natural resources, such as coal, oil and gas. Make a list of examples under the following categories: home, transportation, school and recreation” on the “How I Create Carbon Emissions” Handout. Allow students several minutes to write, and then have them share their responses as you list them on the board.

2. Next, introduce the term “carbon footprint” as a measure of the amount of carbon dioxide emitted through the combustion of fossil fuels. The footprint reflects the amount of carbon-based natural resources consumed by a person, company, community or country over a given period of time. On a large scale, it is usually expressed in tons. On an individual or household basis, carbon footprints are calculated in pounds. According to the Environmental Protection Agency, the emissions average for a two-person household is 41,500 pounds per year. How large do students think their households’ footprints are?

3. Before continuing, you may wish to contextualize the concept of carbon footprint by explaining to students that the United States produces approximately one-fourth of the world’s carbon emissions.

4. As a class, read and discuss “Sale of Carbon Credits Helping Land-Rich, but Cash-Poor, Tribes” focusing on the following questions:
• Why, according to the article, are the Nez Perce converting some of their land back to forest?
• What is the “carbon market”?
• How does the United States differ from other countries in its approach to carbon emissions credits, according to the article?
• How can tribal reservations profit from newly planted forests?
• What is a “carbon portfolio”?
• To what does Brian Kummett compare a mutual fund?
• What do you think Ted Dodge means when he says that sequestration credits are a “bridge”?
• What conclusions can you draw about the future success of carbon emissions credit trading in the United States based on this article?

5. Have students revisit the notion of “carbon footprints.” As they read in the article, carbon offsetting (i.e., balancing out emissions by purchasing shares of carbon sequestering forests) in the United States is not mandatory, but voluntary. When companies choose to offset their emissions, they in effect reduce their carbon footprints. Explain to students that they will be working in pairs to investigate and reflect on their own carbon footprints as well as brainstorm ways in which they can reduce or even offset their emissions.
Activity 2: Footprint Calculations

Introduction

Students will calculate their own carbon or ecological footprints and reflect on how they might reduce their impact on the environment. They will also investigate a method of carbon offsetting to research for homework and present in a future class period.

Materials

Computers
Online calculator

Products

Carbon calculations
Presentation

Process

1. Divide students into pairs and direct them to visit an online carbon footprint calculator. Work with whichever website you prefer but some options were provided:
   • The Earth Day Footprint Quiz (http://www.myfootprint.org/) allows individuals to calculate their “ecological footprints” in terms of acres and number of planets needed to sustain their impact
   • The Environmental Protection Agency offers a Personal Emissions Calculator (http://www.epa.gov/climatechange/emissions/ind_calculator.html) in pounds to help households reduce carbon emissions;
   • British Petroleum’s Carbon Footprint Calculator (http://www.bp.com/carboncalculator.do?categoryId=9008641&contentId=7025802) enables individual footprint calculation based on data gathered from around the world.

2. Students should spend approximately ten minutes calculating their footprints (students who do not know specific information about household energy consumption and transportation should use the average estimates provided by calculators), before answering and discussing the following questions (copied onto a handout for easier student access):
   • Were you surprised by your footprint rating? Why or why not?
   • What does your current footprint rating say about your household? Why?
   • How does your footprint compare to the average for your country? If it is higher or lower than the national average, why do you think this might be?
   • Using your household’s footprint as an average, calculate the rating for your town or city.
   • Based on what you know about environmental protection, what steps do you think you could take on a daily basis to reduce your household’s footprint?
   • Based on what you have learned about carbon sequestering and carbon emissions trading, what could you do to offset your household’s carbon emissions?
3. Toward the end of class, have students reconvene to share and discuss their findings.
   • Were most students surprised?
   • What ideas do they have for reducing and offsetting their household emissions?
   • Which do they think they will be able to realistically implement?
   • How could they compare their footprints to those of the carbon emissions traders they read about in today’s article?
   • Do they think the changes in their individual or household carbon emissions might wider implications? Why or why not?
Additional Activities

Introduction

The following activities were set apart from the rest so that they may be where the instructor feels they fit best. They can be added in to compliment the previous activities or set as separate projects. They could also be possible homework assignments. Materials and products were not provided due to the straightforwardness of the tasks.

Activities

- Create a “How It Works” poster or PowerPoint presentation to explain the carbon cycle.

- What is the Kyoto Protocol? How were the standards for this historic agreement set? Which countries have signed the Protocol, and how have their emissions statistics changed in recent years? Why did some countries, such as the United States, choose to sign, but not ratify, the Protocol? Write a research paper on your findings.

- Return to the forms of carbon offsetting they read about in “Sale of Carbon Credits Helping Land-Rich, but Cash-Poor, Tribes.” The Chicago carbon exchange lists a number of ways that carbon emissions can be offset, including methane destruction (ex. landfill methane collection), agricultural practices, forestry practices, renewable energy, and clean development mechanism projects. Have each student choose a carbon offset method to research and present in a following class period.

- Investigate legislation passed on state and national levels to control car emissions. Create a timeline illustrating changes in such laws and parallel changes in the automotive industry, such as the creation of new technologies.
Additional Resources

Online Resources

Primary Source

Reference Resources
http://www.epa.gov/climatechange/emissions/ind_calculator.html
http://www.wri.org/blog/2006/10/how-us-state-ghg-emissions-compare-internationally
http://www.myfootprint.org/
http://www.bp.com/carboncalculator.do?categoryId=9008641&contentId=7025802
http://cait2.wri.org/wri

Educational Videos
http://www.youtube.com/watch?v=DvNeBDnKlIE
http://www.youtube.com/watch?v=XUGVcc02BUM
http://www.youtube.com/watch?v=3L6MWHJMRml
# How I Create Carbon Emissions

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