

# Watch Where You Step

## OVERVIEW

Students identify the components of an Ecological Footprint by creating a web diagram of all the resources they use in their everyday lives and the mark or “footprint” this consumption leaves on the environment. The activity emphasizes the interconnectedness of lifestyle, population, and environmental impacts, and focuses on solutions to reduce Ecological Footprints.

## INQUIRY/CRITICAL THINKING QUESTIONS

- What are the environmental, economic, and social impacts of a typical U.S. diet and lifestyle?
- What would be the consequences if the rest of the world adopted a U.S. lifestyle?
- What can we do to reduce impacts associated with resource consumption?

## OBJECTIVES

Students will:

- Identify the resources, processes, and impacts embodied in everyday activities
- Describe the interconnectedness of population, lifestyle, economics, and environmental issues
- Discuss, create, and implement ways to reduce Ecological Footprints

**TIME REQUIRED:** 1 hour

## KEY ISSUES/CONCEPTS

- Ecological Footprint
- Carrying Capacity

## SUBJECT AREAS

- **Social Studies**  
(Geography, Economics, Global Studies)
- **Science** (Life, Environmental)
- **Math**

## NATIONAL STANDARDS CONSISTENCY

- **NCSS: 2, 3, 7, 9**
- **NSES: C, F**

## GRADE LEVEL: 5–11



## FTF Related Reading

- Intermediate: Chapter 4 from *Global Issues and Sustainable Solutions*
- Advanced: Unit 2, Chapters 3 and 4 from *It's All Connected*

## Materials/Preparation

- Butcher paper, 1 sheet per group of 3–4 students
- Marking pens, colored, 2–3 pens per group of 3–4 students

- Overhead: *Definition and Components of an Ecological Footprint*
- (Optional) Handout: *Hamburger, Fries, and a Cola*

## Activity

### Introduction

1. (Optional) Do a Sides Debate using the statements below (see Sides Debate lesson on page 28):
  - “There are enough resources to meet the

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needs of everyone on the planet.”

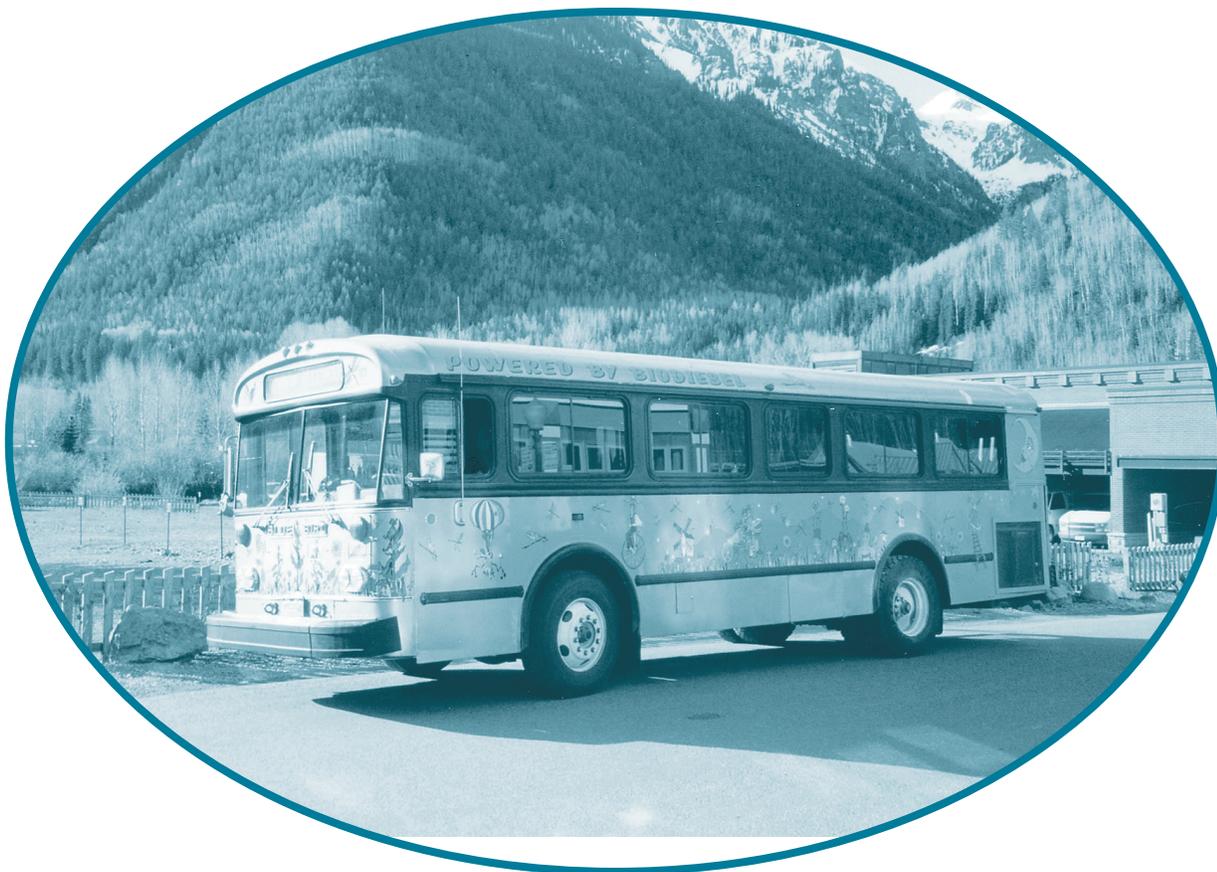
- “The U.S. gives more to the world, and therefore can take more from the world.”

2. Introduce the concept of Ecological Footprint using the overhead, *Definition and Components of an Ecological Footprint*. Tell students that in order to understand this concept, they will create a diagram illustrating everything that is associated with 1 component of their Ecological Footprint.

## Steps

1. Give the following directions before grouping students and assigning their Footprint component: In groups, brainstorm and map all of the resources, processes, and impacts associated with 1 component of your Ecological Footprint, such as a meal, mode of transport, favorite object, or item of clothing. For example, for ‘My Favorite Meal,’ you would first agree on a meal you like, write and/or draw it in the center of the paper, and then write and/or draw the resources and processes it took to produce it.
2. Do a short verbal example together with the class. Ask them what it takes to create a hamburger (cow, bun, lettuce, etc.). There are a few steps between the cow and the burger itself. What are they? (e.g. grass, butcher, meat grinder). Between the cow and the burger, we have the slaughterhouse, the transportation of the beef to the restaurant, the energy to heat the stove to cook the burger, and so on. Now, think about all the steps required to make your item, including the resources needed to produce, process, deliver, serve, and dispose of it (e.g. farmland, water, farm machinery, fertilizer, pesticides, petroleum fuels, electrical energy, transportation, refrigeration, markets, and restaurants). What impacts result from each of those processes and technologies (e.g. soil erosion, pesticide runoff, air pollution, freeway crowding, and urban sprawl)? Use the optional handout Hamburger, Fries, and a Cola as an example of what goes into producing this common U.S. meal.
3. Arrange students in groups of 3-4.
4. Assign each group 1 of the following scenarios that illustrate 1 component of an Ecological Footprint, and have them begin their web diagrams (if you have a large class, you can assign items to more than one group):
  - My Favorite Food
  - How I Traveled Here Today (a mode of transportation)
  - My Favorite Object (a toy, sports equipment, etc.)
  - My Favorite Piece of Clothing
5. Allow about 20 minutes for this portion of the activity. Encourage students to be creative and think of everything that is related to the object. Remind them to include items such as transportation of a product, the marketing of popular brand items, health issues, and waste disposal.
6. After completing their diagrams, have students brainstorm and list, on the back of their butcher paper, 10 things that they can do personally to reduce their Ecological Footprint (in relation to the item they mapped).
7. Have each group present their diagrams and report their findings and solutions to the class. As students present their footprint

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reduction solutions, be sure to emphasize that they do not need to give up everything they like, but rather should focus on ways to reduce their impacts. For example, they do not need to say that people should never drive cars; rather, they could say that people could ride a bike to school when possible, or once a week.

8. Bring the class back together for reflection questions.

## Assessment Reflection Questions

### *For Intermediate and Advanced Students*

- Discuss the average size of an Ecological Footprint of a person living in the United States (about 24 acres) as compared to someone living in India (about 2 acres).
- What impacts might result if twice as many people lived in our community and enjoyed the

same meals, transportation, clothing, etc.?

- What impacts might result if everyone in the world were to enjoy the same lifestyle? How would that impact you economically, environmentally, socially, and politically? How might that impact your access to education, employment, and recreation?
- What would be the consequences of 12 billion people having the same lifestyle? Would that be sustainable? How might your life change in response?

### *For Advanced Students*

- If only a small percentage of the world's people were able to enjoy such a meal, mode of transportation, or clothing while the rest of the world did without, what might the environmental, social, and security consequences be?
- Why would stabilizing the U.S. population have a major impact on trends in global

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resource consumption and environmental damage (despite the fact that the United States constitutes less than 5 percent of global population)?

- Does lessening our impacts necessarily mean reducing our quality of life? Are there ways of enhancing your quality of life while reducing your impacts (e.g. driving a higher mileage car, generating less waste, saving money by using more efficient appliances)?
- How else could you maintain a comfortable and fulfilling lifestyle, but lower the associated environmental impacts?

## Lesson Extensions

- For younger students, you may want to have the class focus on 1 component of an Ecological Footprint rather than those listed above. For example, you could have the whole class choose a meal and then assign 1 part of the meal to each group.
- Bring in an everyday item in its original packaging (such as a juice box, CD, cookies, drink cup, small appliance, toy, etc.) and have the class analyze the Ecological Footprint created by producing, distributing, and disposing of the item. Discuss alternatives to using the item and/or how the item could be produced in a more sustainable manner. Then assign students to do the same (individually or in small groups) with an item of their choice. Have them propose their sustainable solution to other users and/or the manufacturer of the item.
- Have students do a “trash carry” activity. Give each student a large, empty trash bag and have them carry it with them, putting into it all of the trash they generate in 1, 2, or 3 days. Have them weigh their bag of trash at the end of the day(s). Brainstorm ways they could reduce the amount of trash they generate. Repeat the exercise on another day, implementing their trash-reduction ideas. Have them then weigh their second bag of trash. Did they succeed in

reducing the amount of their trash? Discuss other ways trash can be reduced.

## Writing/Art Connection

- Use the book *Material World* by Peter Menzel to analyze the Ecological Footprints of people around the world. Have the students create their own “material world” picture of their bedroom at home, either as a photo or a drawing, and write a short paper describing the project.
- Have students write a letter to someone about the Ecological Footprint concept. By writing a letter, students demonstrate that they understand what an Ecological Footprint is, why the concept is an important one, and how one’s footprint might be reduced. Alternatively, if a student feels it is not important to reduce one’s footprint, they may explain why they feel that way. Give students the following instructions: Write a letter to a friend, cousin, parent, or someone else that you know. In your letter, you must:
  - Briefly explain what an Ecological Footprint is. What have you learned about it?
  - Suggest ways that you and the recipient of your letter might reduce your Ecological Footprints. Be realistic. What are some things you might really try?
  - Try to convince the other person that it is worth trying these suggestions. Explain why you think it is important to reduce the size of your Ecological Footprint. Alternatively, if you believe that it is not important to do so, then explain why not. Try calculating your own Ecological Footprint, as described below, before writing your letter.

## Math/Technology Connection

- Students can calculate the size of their own Ecological Footprint and compare it with people around the world by visiting [www.myfootprint.org](http://www.myfootprint.org).

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## Action Projects

- Do an Ecological Footprint Awareness Campaign. Have the students post their Footprint diagrams around the school with titles such as, “This Is What It Takes to Bring You Your Lunch” or “Have You Ever Wondered What Resources It Takes to Get You to School Every Day?”
- Have the students evaluate the food prepared in the school cafeteria and present a proposal to the school administration and their peers with alternatives to high resource consumption and wasteful practices.
- Have your students take the Facing the Future Pledge to help create a just and sustainable world. Reprint the pledge form on page 22 or download it from [www.facingthefuture.org](http://www.facingthefuture.org). Post the pledges in the classroom and revisit them throughout the year. Have students write in their journals about the activity and how their pledge is going.
- Do a “trash audit” and develop (or improve) a recycling program for the school. Include how much and what kind of trash is produced, where and how it is disposed of, and the associated impacts. Determine the school’s financial cost of the wasted materials and the handling and disposal of the trash. Set up or improve the existing structure for recycling (who can take it, provide bins, etc.), educate the school on how and what to recycle, and track results.
- Visit [www.facingthefuture.org](http://www.facingthefuture.org), click on **Take Action**, then **Fast Facts and Quick Actions** for more information and action opportunities on reducing consumption and Ecological Footprints.

Mathis Wackernagel introduces the Ecological Footprint and paints a picture of our current global situation. Wackernagel explores the implications of ecological deficits and provides examples of how governments, communities, and businesses are using the Ecological Footprint to help improve their ecological performance.

### Books

- *Stuff: The Secret Lives of Everyday Things*, John C. Ryan and Alan Thein Durning, Northwest Environmental Watch, 1997. *Stuff* follows a typical day in the life of a fictional, middle-class North American, and tracks her consumption. [www.northwestwatch.org](http://www.northwestwatch.org).
- *Material World: A Global Family Portrait*, Peter Menzel, Sierra Club Books, 1994. Award-winning photojournalist Peter Menzel brought together 16 of the world’s leading photographers to create a visual portrait of life in 30 nations.

### Websites

- [www.rprogress.org](http://www.rprogress.org) - Redefining Progress works with a broad array of partners to shift the economy and public policy towards sustainability.
- [www.footprintnetwork.org](http://www.footprintnetwork.org) – Global Footprint Network supports a sustainable economy by advancing the Ecological Footprint, a measurement and management tool that makes the reality of planetary limits relevant to decision-makers around the world.

## Additional Resources

### Films

- *The Ecological Footprint: Accounting for a Small Planet*, Global Footprint Network, Bullfrog Films, [www.bullfrogfilms.com](http://www.bullfrogfilms.com), 2005, 30 minutes. In this documentary film,

## Lesson 12 Overhead:

# Definition and Components of an Ecological Footprint

## Ecological Footprint:

The area of the Earth's productive surface (land and sea) that it takes to produce the goods and services necessary to support a person's lifestyle

## Components of an Ecological Footprint:

- **Oxygen** (e.g. trees for absorbing carbon dioxide)
- **Food** (e.g. meat, dairy, fish, fruits and veggies)
- **Water** (e.g. drinking, cooking, washing)
- **Fiber** (e.g. clothes, wood, upholstery)
- **Energy** (e.g. fuel for cars, heat for cooking)
- **Infrastructure** (e.g. highways, hospitals, water facilities)
- **Waste Disposal** (e.g. garbage dumps, landfills)
- **Recreation** (e.g. soccer fields, golf courses)

# Hamburger, Fries, and a Cola

## What Did it Take To Produce This American Meal?



- The meat came from cattle grazed initially on public or private land, and later fed grain. About 10 percent of all public lands in the western United States have been turned to desert by overgrazing, and about two-thirds of those public lands are significantly degraded. Streamside lands, where cattle graze, have been especially damaged.
- It took approximately 2 pounds of grain to produce that quarter pound of meat, and that grain production caused five times its weight in topsoil loss due to erosion from unsustainable farming methods. Producing that grain also took substantial amounts of pesticides and fertilizers (half of all fertilizer in the United States is applied to feed corn for animals), some of which ran off into surface water or seeped into groundwater supplies. By the time the steer was finished in the feedlot, it took 600 gallons of water to build that hamburger patty. Once slaughtered and processed, the meat was frozen, shipped by truck, kept cold, and then cooked on a grill using natural gas.
- The 5-ounce order of fries came from one 10-ounce potato grown in Idaho on half a square foot of soil. It took 7.5 gallons of water to raise that potato, plus quantities of fertilizer and pesticides, some of which ran off into the Columbia or Snake Rivers. Because of that, and dams that generate power and divert water for irrigation, the Snake River sockeye salmon is virtually extinct. A number of other species are also in decline because of these production practices.
- The potato was dug with a diesel-powered harvester and then trucked to a processing plant where it was dehydrated, sliced, and frozen. The freezing was done by a cooling unit containing hydrofluorocarbons, some of which escaped into the atmosphere and likely contributed to global climate change. The frozen fries were then trucked to a distribution center, then on to a fast-food restaurant where they were stored in a freezer and then fried in corn oil heated by electricity generated by hydropower.
- The meal was served in a fast-food restaurant built on what once was originally forest, then farmland, then converted to commercial/industrial uses as the city expanded. The ketchup in aluminum-foil packets came from Pittsburgh and was made from Florida tomatoes. The salt came from Louisiana.
- The cola came from a Seattle processing plant. It is made of 90 percent water from the Cedar River. The high-fructose corn syrup came from Iowa, as did the carbon dioxide used to produce the fizz, which is produced by fermenting corn. The caffeine came from a processing plant that makes decaffeinated coffee. The cola can was made from one-third recycled aluminum and two-thirds bauxite ore strip-mined in Australia. It came to Washington State on a Korean freighter, and was processed into aluminum using an amount of energy equivalent to a quart of gasoline. The energy came from some of the same dams mentioned earlier that have contributed to a 97 percent decrease in the salmon runs of the Columbia Basin.
- The typical mouthful of food consumed in the United States traveled 1,200 miles for us to eat it. Along the way, it required packaging, energy, roads, bridges, and warehouses, and contributed to atmospheric pollution, adverse health effects, and traffic congestion.