

Watch Your Step



Introduction:

When we hike in the forest, walk on the beach, and play in the snow, we leave behind our mark - our footprint. But, the outline of our shoe is not the true size of the impact we make on the Earth. Less often seen, yet more important, is our ecological footprint.

This activity is designed to show students how ecological footprints vary by country and standard of living. Students will discover their own ecological footprints and compare them to those of other students in various regions of the world by answering the questions on the Personal Footprint Quiz developed by the Global Footprint Network.

An ecological footprint is a measure of the amount of natural resources that are required to sustain the material standard of living of a given human population or individual. Everybody has an impact on the Earth because they consume products and services derived from nature. The ecological footprint measures how much land and water area is required to produce the resources we consume and to absorb our wastes.

Every action impacts the planet's ecosystems. This is of little concern as long as human use of resources does not exceed what the Earth can renew. Today, humanity uses the equivalent of 1.5 planets to provide the resources we use and absorb our waste. In other words, it now takes one year and six months for the Earth to regenerate what we use in a single year. Our world footprint has doubled since 1966. Even using modest U.N. projections on population growth, consumption, and climate change, we will need two Earths to satisfy our global needs by 2030.

By measuring the ecological footprint of a population (an individual, a city, a nation, or all of humanity) students can assess the impact we have upon the Earth and explore ways to manage ecological assets more carefully. It helps the students to see the "big picture" of the current ecological reality with easily understandable measurements.

Materials:

Student worksheets
Computer with Internet access
Any utility bills such as water and electricity (optional)

Concept:

Human impact and resource consumption: Countries with large per capita footprints, like the U.S., have a smaller share of the global population, while regions with low per capita footprints, like China, generally account for a larger share of the global population.

Objectives:

Students will be able to:

- Calculate their own ecological footprint as a measure of the impact they have on the Earth.
- Gain insight into the ways their lifestyle affects the Earth.
- Become aware of the carrying capacity of the Earth.
- Compare and contrast their calculated ecological footprint with the average person in various regions of the world.
- Explore ways to reduce our individual and global ecological footprints.

Subjects:

Economics, Environmental Science, Family and Consumer Sciences, Geography, Health, History, Language Arts, Social Studies

Skills:

Critical thinking, analysis, reading comprehension

Method:

In this activity, students will learn about the concept of the ecological footprint, compare their own to students of other nations, and explore why it is an important measurement of their impact on the Earth's resources.



Procedure:

1. Have students complete the on-line Personal Footprint Quiz at www.footprintnetwork.org to estimate how much land it takes to support their lifestyle. Click on “Footprint for You” at the bottom of the homepage. This quiz was developed by the Global Footprint Network. Their footprint will be given in “global acres.” (1 global hectare = 2.47 global acres).
2. Have students then complete the quiz based on the lifestyles of students in other parts of the world using the biographical profiles provided. This enables students to compare their footprint to other young people and to the amount of resources available on Earth.
3. Go over the discussion questions listed below as a class assignment or assign them as a home work assignment.

Instructions for taking the quiz:

Students will find information about the main character in the biological profiles that should be used to complete the quiz.

- Assume that if an item on the quiz, such as time spent on a plane or train, is not mentioned in the profile, then the character does not participate in that activity.
- If there is not information in a profile to answer a certain question, the student may be able to answer, “I don’t know.”
- Student answers may be slightly different than the answers printed on the answer key depending on how they interpret the information in the profile.

Questions on the quiz may be as follows:

1. Country where the person lives
2. Number of times the person eats meat and/or poultry each week
3. Number of times the person eats fish each week
4. Number of times the person eats dairy (eggs, milk, cheese) each day
5. Amount of his/her food that is processed, packaged, and imported
6. Number of people in the home
7. Size and type of home
8. Type of fuel used in their home
9. Use of electricity in the home
10. Use of energy-efficient lights in the home
11. Percentage of home’s energy from renewable sources
12. Distance traveled on public transportation per week
13. Distance traveled by car per week
14. Gas mileage for their car (if they have one)
15. Amount of time the person flies on a plane each year
16. Amount of money spent on clothing and household goods
17. Amount of money spent on household upgrades
18. Amount of money spent on entertainment
19. Amount of waste materials that are recycled



Answer Key:

Argentina - Nahual:

| | |
|-----------------------------------|-----|
| Total Footprint (global hectares) | 2.5 |
| Total Footprint (acres) | 6.2 |
| Number of Earths Needed | 1.4 |

China – Wu Dong:

| | |
|-----------------------------------|-----|
| Total Footprint (global hectares) | 1.4 |
| Total Footprint (acres) | 3.5 |
| Number of Earths Needed | 0.8 |

Italy - Constanza:

| | |
|-----------------------------------|-----|
| Total Footprint (global hectares) | 3.6 |
| Total Footprint (acres) | 8.9 |
| Number of Earths Needed | 2.0 |

South Africa - Wisani:

| | |
|-----------------------------------|-----|
| Total Footprint (global hectares) | 3.0 |
| Total Footprint (acres) | 7.4 |
| Number of Earths Needed | 1.7 |

Discussion Questions:

1. How does your footprint compare to the U.S. national average? How close is your use of resources to the world average?

Answers will vary. U.S. average is 7 global hectares (17 acres) per person. World average is 2.7 global hectares (6.7 acres) per person.

2. How do the students from the other countries compare to you and to each other?

Although the number of acres for each student in the class will be different, there is a good chance that even the lowest resource use in the class will be more than the students in the profiles.

3. What are the environmental, economic, and social impacts of a typical American diet and lifestyle? What would happen if the rest of the world adopted our actions and lifestyles?

The American average is 17 acres/person and the world average is 7 acres/person. This means Americans are (on average) 'overstepping' their bounds, and using resources in an unsustainable fashion. This unsustainable use of resources might be a contributor to negative impressions of Americans on the part of citizens of other countries. If the rest of the world adopted the U.S. lifestyle, the demand for resources would be much, much greater than the amount of resources available to the world.

4. In what ways would your grandparents' (or other members of earlier generations) lifestyles have been different from your lifestyle?

Resource use has risen over time, so grandparents (when they were young) most likely had a smaller footprint than current students. Several of the ways in which grandparents likely had a smaller footprint can be seen by looking at the questions in the quiz: our grandparents probably did not use cars as much, nor have access to as much processed food, to give just two examples



5. Why do processed foods impact the Earth more than locally produced, non-processed foods?

Processed foods use much more energy to produce the final product, and the machines that do the processing typically run on non-renewable fuels. The packaging also increases the food's footprint over unprocessed food, which probably does not have packaging. Locally produced food has lower transportation costs than food produced elsewhere.

6. No one wants to give up all the things that make our lives comfortable, but what are some important changes we can make that would reduce the size of our footprints?

There are ways to be more efficient in the things we do and use today: in particular, there have been many advances in energy efficiency in the last several years. Upgrading to more efficient appliances can make a big difference in a house's footprint. Another alternative is to use energy from renewable resources, such as wind and solar power. Reducing car use can also reduce footprints significantly: carpooling, grouping car trips together, biking or walking to nearby places, using public transportation, and switching to a car with better fuel economy can all make a difference.

7. What is changing in your community in an unsustainable direction? What is changing to make life more sustainable?

Answers will vary.

Web Sites:

Global Footprint Network

www.footprintnetwork.org

Explains the major threats to our environment, including water pollution, deforestation, and global warming, and offers opportunities for taking action.

Ecological Footprint Quiz - Center for Sustainable Economy

www.myfootprint.org

Estimates how much land and water you need to support your lifestyle. Enables you to compare your footprint to other people's and to the amount of resources available on Earth.

Sources:

D'Aluisio, Faith and Menzel, Peter. *Hungry Planet: What the World Eats*. Material World Books and Ten Speed Press, 2005.

Living Planet Report 2012 - World Wildlife Fund and Global Footprint Network

Menzel, Peter. *Material World: A Global Family Portrait*. San Francisco: Sierra Club Books, 1994 .



Name: _____

Date: _____

Watch Your Step

Student Worksheet

Take the Personal Footprint Quiz at www.footprintnetwork.org. The quiz is located on the main page, called "Footprint for You". Then use the following profiles to take the quiz four more times, using the footprints of students from other countries. Fill in the questions in the space below each of the profiles.

My Footprint:

You'll need to know or estimate the following information to fill out the quiz:

1. Number of times you eat animal-based products each week (meat, fish and eggs)
2. Amount of your food that is processed, packaged, and imported
3. Amount of trash you generate
4. Number of people in your home
5. Size and type of your home
6. Type of fuel used in their your home
7. Use of electricity in the home
8. Use of energy-efficient lights in the home
9. Percentage of home's energy from renewable sources (national average is about 7 percent)
10. Distance traveled on public transportation per week
11. Distance traveled by car per week
12. Gas mileage for your family's car(s) (if you have one)
13. Amount of time you fly on a plane each year
14. Amount of money spent on clothing and household goods each month
15. Amount of money spent on household upgrades
16. Amount of money spent on entertainment
17. Amount of waste materials that are recycled

Profiles:

Notes on taking the quiz from the profiles:

1. Assume that if an item on the quiz, such as time spent on a plane or train, is not mentioned in the profile, then the character does not participate in that activity.
2. Assume that none of the students profiled are driving on their own yet.
3. If there is not information in a profile to answer a certain question, you may be able to answer, "I don't know."



Name: _____ Date: _____

Watch Your Step

Student Worksheet

Argentina - Nahual

It is 7:30 a.m. and time for 17-year-old Nahual to get up for school. He lives in Salta, a city in Argentina with nearly half a million residents. His family's row house (classified as a Calmat II) is on a busy street, and although it is a small, 4-room house, 112 square meters for the five of them, it has running water and electricity, with most of its power from natural gas and about ten percent from renewable sources. Recently, he helped his father replace all of the incandescent light bulbs with more efficient compact fluorescent ones that the government distributed to households. Other than that, his family doesn't spend much time or money on upgrades to their home. Sometimes he fights with his two younger sisters about sharing the bathroom, but his parents say that he should be more mature now that he is finishing high school.

At lunchtime, he walks home to eat the main meal of the day. He especially likes barbeque, pasta, and pizza. Nahual and his family have meat every day at most meals, fish about once a week, and eggs most days for breakfast. After lunch, he has a siesta and does something relaxing before walking back to class. At 5 p.m. they have a quick teatime when everyone drinks "mate," which is a bitter tea. Nahual's favorite part of the day is the evening when he plays soccer with his sports club.

On Fridays, Nahual likes to hang out with his friends and have pizza, and on Saturdays they go dancing. He typically spends about \$12 a month on entertainment and about \$20 a month on a new shirt or soccer gear. Like most families, Nahual's family has a car that they use to make the 14 km roundtrip to church each Sunday. Because he doesn't drive yet, Nahual often takes the bus. He travels about 55 km a week using public transportation. After church, Nahual's family gets together for "asado," or barbeque. All the grandparents and aunts and uncles come too. Afterwards they walk to the park for ice cream; then Nahual has to hurry home and finish his homework for school on Monday.

Nahual's total footprint in hectares: _____

Nahual's total footprint in acres (multiply number of hectares by 2.47): _____



Name: _____

Date: _____

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Student Worksheet

China - Wu Dong

It is a warm morning in Shiping, Yunan, China, as 15-year-old Wu Dong bikes to school. Biking is the most common form of transportation in his town. Like most families in his town, Wu Dong's family does not own a car. Most of the time, Wu Dong walks or bikes everywhere he goes, except on Saturday when he makes a 30 km roundtrip with his mother on the bus to the large market. They buy foods such as rice and oil that they don't grow themselves. His family grows tomatoes, cabbage, squash, and cucumbers in their courtyard kitchen garden and grapes on a trellis, so most of what they eat is produced locally.

Wu Dong's home sits on the edge of a brook, which feeds through a gate into the pond where the family raises fish. At harvest time, all the family members take turns sleeping by the pond so that the fish are not stolen. Off in the distance, Wu Dong can see the smoke from the coal-burning power plant in town that powers most of the area's homes. Wu Dong lives with his parents, two of his grandparents, his aunt and uncle, and their newborn baby girl in their 110 square meter house. When he has finished his homework, he likes to watch TV with his family, but he usually stays very busy with homework and helping with chores. Wu Dong's family works hard but they also have a good time.

Everyday his mother spends a long time preparing food from raw ingredients, and today for lunch his mother has prepared soup made from tofu and cabbage, along with lotus root, fish, cooked celery, two types of beans, hot sauce, and rice. The family has meat a few times a week, fish daily from their pond, and eggs every day from their neighbor who has chickens. While his family is well-fed, they live simply and Wu Dong spends very little on clothing (about 30 yuan a month) and even less on entertainment. His uncle is very handy with home repairs, so they rarely have to spend much for the upkeep of the house.

Wu Dong's total footprint in hectares: _____

Wu Dong's total footprint in acres (multiply number of hectares by 2.47): _____



Name: _____

Date: _____

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Student Worksheet

Italy - Costanza

Costanza studies at the language high school in Piacenza, Italy, which is only a short bicycle ride away from her home. If she has free time during the week, Costanza likes to see friends or visit the shops, always traveling on her bicycle. Costanza saves up her allowance to spend on clothes while shopping with her friends; usually she'll buy a new outfit (pants or skirt and a top) every month or so. On Sundays, after going to mass with her parents, the three of them take a traditional passeggiata (family stroll). They greet their friends and family whom she has known all of her 15 years. She and her parents rent a 120 square meter row house. Her home has energy-efficient appliances and lights, as do all of the homes of her extended family and friends. Local authorities in Piacenza have recently provided all of the households with several bins to recycle most of their waste. Because households are charged for each bag of garbage collected, they are motivated to recycle what they can. While Italy has a goal to increase the use of renewable energy, many of the homes, like Costanza's, receive less than 20 percent of their household electricity from renewable sources. Costanza's family spends a modest amount of money (about 1,000 euros) each year on home furnishings.

Piacenza has a population of just over 100,000 and is only a 45-minute drive from Milan where they sometimes go to visit her cousins. On average she travels 100 km a week in her family car, which consumes 8 liters of gas per 100 km. Her family takes one special trip a year. This year they are going to Sicily, which is three hours round trip by plane.

Costanza and her parents eat their main meal at midday, the only meal of the day containing meat products. These large meals usually consist of a pasta course, followed by a main course of meat or occasionally fish. Sometimes a course of antipasto (appetizers) is served before the pasta. The antipasto may consist of a variety of cold meats and vegetable, such as spiced ham, salami, olives, and artichoke hearts. Her region of Italy is known for its local cheeses, which Costanza eats at nearly every meal. Costanza's mother likes to buy fresh food at small, local stores and the outdoor market, and so only about one-quarter of the food Costanza eats is packaged and not locally grown.

Costanza's total footprint in hectares: _____

Costanza's total footprint in acres (multiply number of hectares by 2.47): _____



Name: _____ Date: _____

Watch Your Step

Student Worksheet

South Africa - Wisani

Wisani lives in Soweto, South Africa with her parents, sister, and two brothers. She is 15 years old. There are many young people living in Soweto. In fact, 25 percent of the population is under 15 years of age. Soweto is the most populated area of Johannesburg, a city of nearly four million people.

Wisani's school is about 15 kilometers from her home and she takes the bus each way. When she wants to visit friends in other parts of Soweto or run errands, she usually takes kombis (minibuses) for about 50 kilometers of travel each week. Her family doesn't own a car and relies on public transportation.

Her family owns a small house (65 square meters), which has electricity that costs her family about 50 rand each month. They spend about 45 rand on other forms of energy as well. Their house is simply furnished, so they don't spend much on new furniture or home maintenance each much or on new clothing purchases – she and her siblings regularly wear hand-me-downs. Every house in the street looks very similar and her neighbors' houses are very close to theirs on a narrow street. Wisani's family stays inside their home after 8:00 p.m. and locks the doors because of the high rate of crime and violence. For the same reason, Wisani seldom walks or rides her bike.

The area where they live is heavily populated, so almost all their food is grown or produced in other areas of South Africa. Wisani's family most often eats mealies, or maize, which is made into porridge along with most meals. They also regularly eat fruits and vegetables, most dairy items, fish occasionally and chicken nearly every day. Beef is considered a treat which they eat less frequently. They drink tea with their meals, and her dad sometimes buys homemade beer from one of the neighbors.

Wasani's total footprint in hectares: _____

Wasani's total footprint in acres (multiply number of hectares by 2.47): _____