

Global Footprint Exploration

Objectives:

Students will understand:

1. Some key elements that characterize the difference between the 20th and 21st Centuries (population growth, resource depletion, degradation of natural systems, climate)-the implications of these differences and how human civilization will need to adapt.
2. That the “environmental problem” or “climate change problem” is directly tied to ecological footprint.
3. How nations compare to in their ecological footprints and how “development” and “technology” are related.

Introduction/Context setting inquiry discussion(variable/ optional)--establish notion of “ecological footprint”

Engage students in open inquiry discussion on the following questions. You might post them and list discussion ideas.

1. What is difference between 20th and 21st centuries?
<many things, steer discussion toward population>
2. what will be the effect of increasing population
<variable--world more interdependent, need for efficient technologies, stress of resources, etc.>
3. How much land area is needed for YOU to live the life you live--to support your life?
<answers vary, students will guess small, this depends on how you have or haven't established the idea of an ecological footprint. this can be a juncture to do that on a need to know basis before proceeding with the activity.>
4. Where is the land that provides you with what you need and absorbs your waste (raw materials, energy, textiles, food, etc.), is it only in your country?
<no— we use land all over the world to support how we live. This is totally global. Its important to point out a counter intuitive point for them; that the size of a footprint of a nation is not related to the geographical size of that nation, its related to the lifestyle of that nation, the consumption and waste production patterns—or, that nation's use of natural capital (resources) >
5. Show the ecological footprint of nations to students—why is it so much, and so different between nations?
<review previous examples, maybe the biography of the tomato or any other activity that has established the idea of a supply chain, corresponding waste and resource depletion associated with it.>
6. Suggest to class it would be a good idea to explore this-introduce the activity. You can connect the need to do this to understand climate change

drivers and solutions at this point or let that emerge from students' inquiry after the activity.

Activity Script/Plan

1. Let's look at the world to understand this better
2. Post the following chart on the board and discuss. Explain how it will be helpful to do a model and simulation of what is going on to visualize it. (of course compare their EF guesses to the reality, and how this perception gap is actually a big problem in all environmental science action work, especially climate).

Country	students	population	Footprint (global hectares per capita)
China	13	1,334,190,000	2.1
United States	3	301,958,000	9.4
Germany	1	81,882,342	4.2
Indonesia	2	231,369,500	.9
Mexico	1	107,550,697	3.4
Nigeria	2	154,729,000	1.3
Brazil	2	192,055,000	2.4
India	11	1,172,720,000	.9

Source: Global Footprint Network

Materials:

1. Wall signs for each nation in the chart, placed around perimeter of the room.
2. about 60 8.5x11 footprint sheets that have foot and "1 Hectare" written on them.
3. Nation assignment cards, 5x8, with the nation name printed on them. Make one card for each 100,000,000 in population. You will need to tweak and adjust for the number of students in you class

Process:

Provide students with an overview of the following process:

1. Each student will be assigned a nation, 1 student per 100,000,000 in population

(If china is used you will need 33 students. you may omit china for you class size)

2. Pass out nation cards to students randomly. Direct them to assemble below the sign for the nation they have been assigned.

3. Instruct them to construct their nation's TOTAL footprint on the floor at their station using the footprint sheets and the per capita footprint numbers. (they will need to round the per capita footprint numbers to a whole number and multiply it by the number of students representing their nation. Note that this is all proportional. U.S. will have 27 footprint sheets. Brazil--4 sheets. India--12 sheets, etc.

Observe/Discuss/Analyze

Generally I do this as a whole group and then do some followup journal reflections. The key however you proceed is to run through this line of inquiry. They key visual will be to observe the variability between nations of population (kids) and total footprint as constructed at each station.

1. Which country is using more of the earth, as we see it now (largest ecological footprint)
< most will agree, U.S.>
2. Which country has the largest population?
<India>
3. Discuss: Why is this the case?
4. Why doesn't the country with the largest population have the largest footprint? <standard of living, consumption rates, waste production rates per capita>
5. What can a country do to lower its overall ecological footprint?
6. What can a country do to lower their per capita (per person) footprint?
7. What would happen if all the nations had the per capita footprint of the U.S.? <discuss, India would have 108 footprint sheets. It might not fit in the room. And guess what, that level of consumption would not fit on the planet!>
8. What will happen if per capita footprints remain the same as population rises to 10 billion around 2050?
9. What is the connection between standard of living and ecological footprint? <high standard of living=high EF>
10. Discussion: most low EF nations are trying to expand their standard of living as modeled by the U.S., they are aspiring to be like the U.S. as an ideal

standard. They are currently moving in that direction. So in fact, as we move to 10 billion the per capita footprints will likely increase as well, a double hit. What would turn that around.

11. What is the impact of EF on climate? How is it connected? WHAT DOES IT IMPLY ABOUT WHAT WE NEED TO PAY ATTENTION TO TO SOLVE THE CLIMATE CRISIS?

Followup:

Consider the math problems that look at overshoot, and compare global human footprint to biologically viable land area of the planet. (we are already in overshoot by 20%...)