

Noyce Project Week 1: Carbon Emissions and the Destruction of the Environment

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Biology Standard: 7.1c Human beings are part of the Earth's ecosystems. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems. Humans modify ecosystems as a result of population growth, consumption, and technology. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems may be irreversibly affected.

Earth Science Standard: 2.2d Temperature and precipitation patterns are altered by: Human influences including deforestation, urbanization, and the production of greenhouse gases such as carbon dioxide.

To use the model, use the slider to select the amount of people you want to include. Click setup followed by either Go or Go Once. Go will run the model continuously, while Go Once will run the model once time. The gray circles coming out of the people represent carbon emissions. Use the slider above to alter the speed of which the simulation runs.

This model was created to describe the effect of human emissions on the environment, including carbon footprints. The collection of the grey carbon circles at the top of the simulation represent the collection of carbon in the atmosphere over time. The carbon emissions can also be traced through the use of the Emissions plot. From this simulation, students can compare carbon emissions from few or many individuals, the spacing of these individuals (representative of different areas of the world), and will be able to analyze how these emissions can affect the environment over time.

Carbon Footprint Worksheet

Instructions: Answer the questions below, then fill in the corresponding values. Tally the values to find your carbon footprint. Only fill in one value for each question, unless otherwise stated.

Ex. Do you turn off the lights when you leave a room?

- a. Yes a. 133 133
- b. No b. 268

1. How do you get to school?

- a. walk 0
- b. bike 0
- c. car 1115
- d. bus 131
- e. carpool 459

2. Do you eat mostly...

- a. fast food 4818
- b. home cooked food 629

3. Do you eat mostly...

- a. vegetables/fruits a. 153
- b. meat 644
- c. bread 364

4. Do you turn off lights when you leave a room?

- a. yes 133
- b. no 268

5. Do you unplug appliances/chargers when not in use?

- a. yes 9
- b. no 18

6. How do you dry clothes?

- a. hang to dry 0
- b. dryer 750
- c. both 375

7. Do you turn off the water when brushing your teeth?

- a. yes 34
- b. No 274

8. Do you turn off the TV when you're not watching it?

- a. yes 47
- b. no 140

9. Do you turn off your video game system when you're not using it?

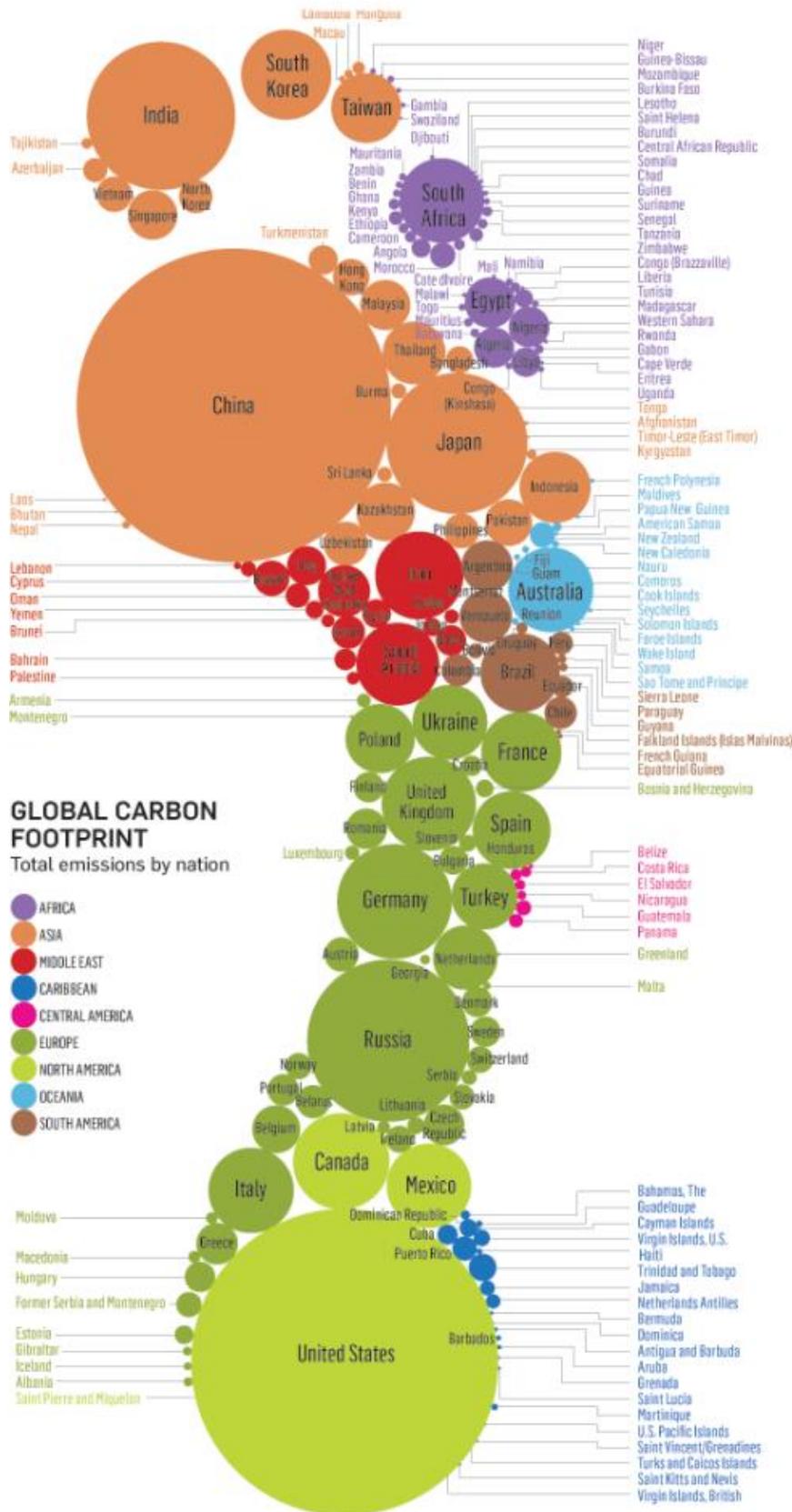
- a. yes 29
- b. no 90
- c. don't have/use one 0

10. Do you recycle? (for this question, select all that apply)

- a. magazines -15 _____
- b. newspaper -90 _____
- c. glass -7 _____
- d. plastic -19 _____
- e. aluminum and steel cans -86 _____

Add together all the values in the far right column and report here:

1. Was your carbon footprint bigger or less than you expected? Why or why not?
2. Have 3 people in the simulation and go for 500 ticks. Repeat this with 28 people. How do the two simulations compare? Use the associated plot and total emissions from each trial in your comparison.
3. Run a trial using between 10 and 15 people. Describe how the emissions are spread out or grouped? How do you think this compares to different countries throughout the world?
4. Look at the associated photo. Does this support or refute your answer to question 3? Why or why not?
5. Describe why it is important to monitor and limit carbon emissions now? Use time and emission totals in your response.



<https://sustainablesummercamp.wordpress.com/2012/12/03/carbon-footprints>