

TEACHER BACKGROUND : HOW A CARBON FOOTPRINT WORKS



Footprints offer clues about where we came from and where we're headed. Their impressions tell us something about the animals that leave them. But while actual footprints offer details on size, weight and speed, **carbon footprints** measure how much carbon dioxide (CO₂) we produce just by going about our daily lives. A drive to work, a flip of a **light** switch and a flight out of town all rely on the combustion of fossil fuels like **oil**, coal and gas. When fossil fuels burn, they emit greenhouse gases like CO₂ that contribute to **global warming**. Ninety-eight percent of atmospheric CO₂ comes from the combustion of fossil fuels.

People concerned with the environment and global warming usually try to reduce their carbon output by increasing their home's energy efficiency and driving less. Some start by calculating their carbon footprint to set a benchmark -- like a weigh-in before a **diet**. A carbon footprint is simply a figure -- usually a monthly or annual total of CO₂ output measured in tons. Web sites with **carbon calculators** turn easy-to-supply information like annual mileage and monthly power usage into a measurable tonnage of carbon. Most people try to reduce their carbon footprint, but others aim to erase it completely. When people attempt **carbon neutrality**, they cut their emissions as much as possible and offset the rest.



Carbon offsets let you pay to reduce the global greenhouse gas total instead of making radical reductions of your own. When you buy an offset, you fund projects that reduce emissions by restoring forests, updating power plants and factories or increasing the energy efficiency of buildings and transportation output. Best of all, they take about five minutes to calculate. Most carbon **calculators** ask very simple questions about consumption. They accept estimates of annual **electricity usage** or **mileage** instead of exact and

difficult-to-provide totals. Carbon calculators usually start by asking for your location.

Regardless of your personal consumption, your carbon footprint is partly determined by the state you live in. Some states rely more on dirtier sources of **power** like coal; others use larger percentages of renewable sources that produce. Most calculators also ask for the size of your household. The calculator can then differentiate between your personal carbon footprint and that of the house as a whole or less.

To determine the amount of CO_2 produced by home electricity, the calculator divides the estimated or exact usage by the price of power in the area. The calculator then multiplies this number by the state's emissions factor, a figure that relates to the type of energy the state uses. Calculators also factor in natural gas, heating oil and propane use.

Carbon footprints also include the CO_2 produced by **transportation**. Most people don't know their annual fuel usage, so calculators usually ask for an estimated annual mileage and the car's make, model and year. The calculator divides mileage by the car's **fuel efficiency** to determine annual fuel usage. This figure is then multiplied by the **emissions factor** of gasoline or diesel fuel, which converts it to pounds of CO_2 .

For air travel, some carbon calculators ask for an annual estimate of mileage. Other calculators account for increased emissions during takeoff and ask for the number of short, medium, long or extended flights.

Of course, individual efforts to reduce emissions can go only so far. Cutting CO_2 and other greenhouse gases down to safer levels requires significant government regulation. Lessening carbon footprints does, however, let people see where they are and how they can change. Those who think government regulation moves too slowly or who want to accept personal responsibility for their emissions can track their own reductions and alter their individual habits

Carbon footprints help people keep track of changes. Because footprints quantify an amount of carbon that increases or decreases based on energy use, they let people know that a new **hybrid car** or home insulation really does help lower emissions.

- ✚ Transportation accounts for 33 percent of CO_2 emissions in the **United States**, so many people try to lower their mileage [source: **EIA**]. Some walk or **bike** whenever possible; others carpool, take public transport or invest in **fuel-efficient cars**.
- ✚ Home energy use accounts for 21 percent of U.S. CO_2 emissions, so it helps to have an efficient home. Setting the **thermostat** at a moderate temperature and installing good insulation and double-paned windows

lowers energy costs while keeping your house comfortable. **Compact fluorescent lamps** (CFLs), energy-efficient appliances and green power sources also help lower consumption.

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