



Land, water and bees – don't take us for granted:

Ecological footprint

Student activity sheet

Footprint activities

The Earth is finite (it has a limited size) and the human population is growing faster than ever before. Each human needs a certain amount of healthy food, clean water, land to produce them and to live on – resources that, like the Earth, are limited. If we want to meet the needs of everyone in the expanding population, we must look after these resources carefully and share them without waste.

We can measure the effects of our activities on the Earth's resources in terms of our **ecological footprint**. This is the area or fraction of the Earth required to provide the resources – land, water, food and fuel – that you use.

Water footprint

If you have already learned about hydroponics and carried out the investigation in The Crunch, you will know that agriculture uses a lot of water and can cause water pollution, making clean water even more scarce. We do not often think about the water that is 'hidden' in our food. Watch this video, 'How much water do you eat?', for some startling facts about water and food – for example, 92% of the water we use is used in producing our food.

www.youtube.com/watch?v=EkhXeTnNqkM&feature=youtu.be

Carbon footprint

We often hear about the problems of global warming and how our excessive carbon footprints are to blame. Carbon dioxide, CO₂, is the major greenhouse gas released by humans. Your 'carbon footprint' indicates the amount of CO₂ released into the atmosphere by your daily activities – for example, you might talk about the carbon footprint of walking to school or of taking the bus, of heating your house, cooking food and so on. The size of a footprint will depend on how and how far we travel, what we eat, how much we buy and how we generate the power we use to heat our homes and run the appliances we use.

Greenhouse gases are a problem because they trap heat in the atmosphere, raising average global temperatures (global warming) and changing the climate. When we burn fuel in an engine, heat our homes with gas, oil or coal or generate electricity with fossil fuels we produce CO₂. As you know if you have studied the carbon cycle, living things produce CO₂ when they respire, and animals (including humans, cows, goats and sheep) produce methane, CH₄, a powerful greenhouse gas, when they digest food. Microbes decompose organic matter into methane, for example in rice paddies, where microbes flourish in the warm, waterlogged conditions.

It is a complicated business, but it is possible to gain some idea of your ecological footprint or your carbon footprint using an online calculator. Try out one or more of these (some of them need details that you will have to research, for example by looking at electricity and gas bills for your home and dividing by the number of people living there).

- WWF ecological footprint calculator (concentrates on food): footprint.wwf.org.uk/
- Carbon Independent carbon footprint calculator: www.carbonindependent.org/
- Carbon Footprint Ltd. calculator: www.carbonfootprint.com/calculator.aspx
- Eat Low Carbon (a US-based organisation) calculator and quiz: eatlowcarbon.org



Questions

1. Some calculators tell you whether your footprint is larger or smaller than the average for your country, and for the world. Are you using more than your fair share of the Earth's resources? If so, can you think of one simple change you could make to reduce your footprint?
2. Use your knowledge of a healthy, balanced diet to plan a menu for a day. Then use the food scores at eatlowcarbon.org to calculate the ecological impact of the menu (you may have to use the closest similar food if you cannot find the exact item you planned).
3. Compare your footprint data with others in the class. How could you change the menu to reduce the ecological impact, without making it less balanced?