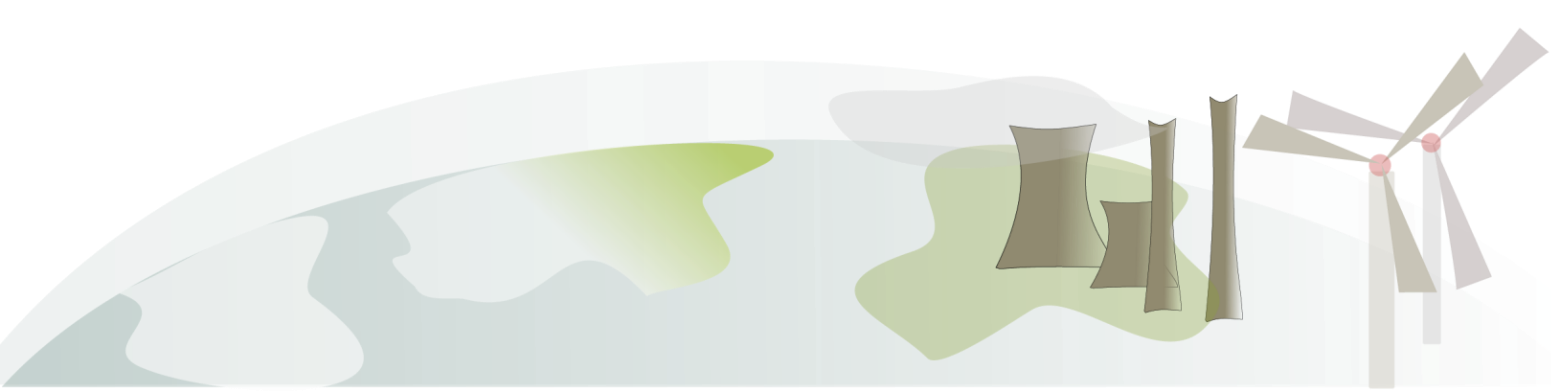


Climate Change – Resources

Thank you for downloading this Climate Change resource from *GeoBus* - https://geobus.st-andrews.ac.uk/.

This resource pack was developed in partnership with Dr James Rae of the School of Earth & Environmental Sciences, University of St Andrews. Special thanks are due to Rasa Juras and Dr Rosanna Greenop for their involvement.

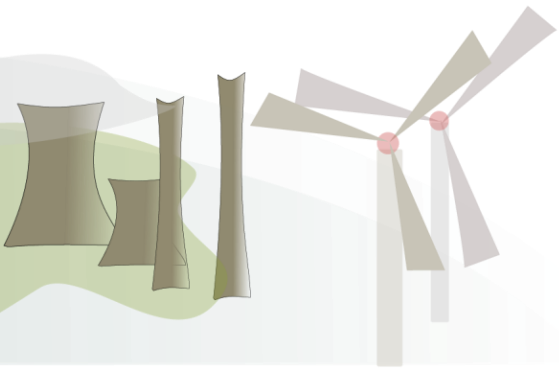
The development of these resources would not have been possible without the generous support of the *GeoBus* sponsors, past and present - which we gratefully acknowledge.

GeoBus

Climate change:
it's happening, it's us, it's serious, it's solvable

Climate Change: it's solvable

Carbon Footprint



Overview

Activity Description	Students learn about CO_2 emissions and the concept of a carbon footprint. They calculate their individual carbon footprint and consider how behavioural changes could reduce it, contributing to a climate change solution.
Time	20 minutes* (excluding extensions)
Learning Outcomes	• Understand carbon emissions • Define the concept of a carbon footprint • Investigate the impact of lifestyle changes on carbon footprint
Student Organisation	Individual (calculation) & small groups (discussion)
Materials Needed	Computers & internet access
	Worksheets, Climate Change Snakes & Ladders board (available as separate download), Game pieces & dice (provided as cut-outs on game board sheet, or use monopoly/cludo/etc. pieces)
Preparation	Pupils should fill in the Student Worksheet & Energy Diary at home in preparation for the classroom activity
	*Alternatively, allow more time in class and ask them to estimate these values – you could then encourage them to see how close they were by keeping a note of values the following week

Background Information

Carbon Footprint is a measure of carbon dioxide (CO_2) emissions attributed to an individual, family or business based on lifestyle and behavioural choices over a specified time period (usually a year).

Examples:

1. When you drive a car, the engine burns fuel which creates a certain amount of CO_2, depending on its fuel consumption and the driving distance

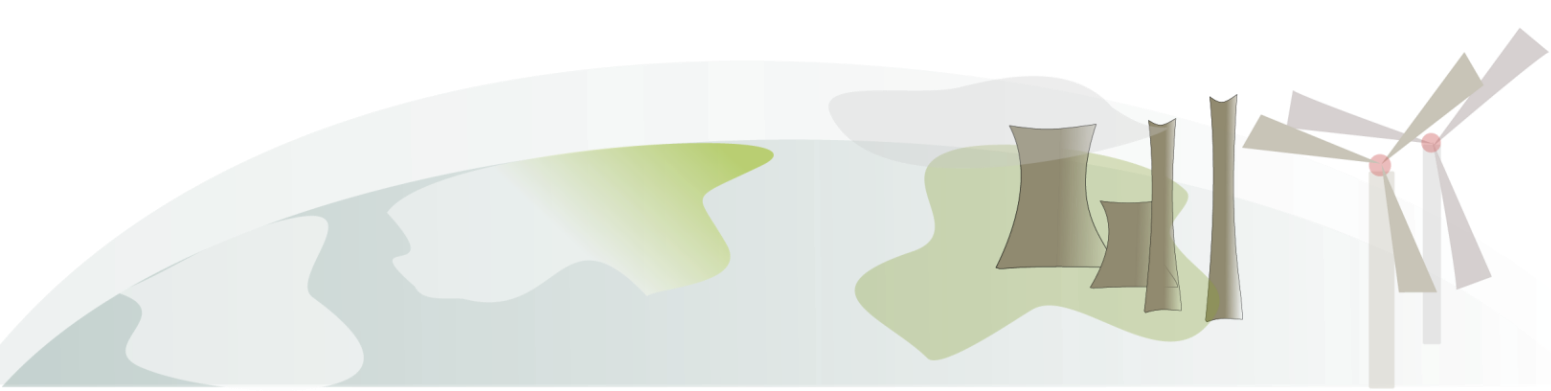
2. When you heat your house with oil, gas or coal, then you also generate CO_2 – even if you heat your house with electricity, the generation of power may have emitted CO_2

3. Food and other goods also have an associated emission of CO_2 – production, packaging, transport all contribute to this, so part of your carbon footprint comes from the products that you chose to buy

Your carbon footprint is the total emission of CO_2 resulting from your activities in a given time frame

Preparation task – Homework

Ask the students to take home the Student Worksheet and My Energy Diary and fill them in over a period of a week.



Classroom Activity

Students should use the completed worksheet to calculate their carbon footprint online using:

http://footprint.wwf.org.uk/

If computer/internet access is not available, why not hold a class discussion about some of the talking points below, and encourage pupils to try out the carbon footprint calculator at home.

[Extension: ask pupils to share their results and create a scatter graph of the class values]

Talking Points

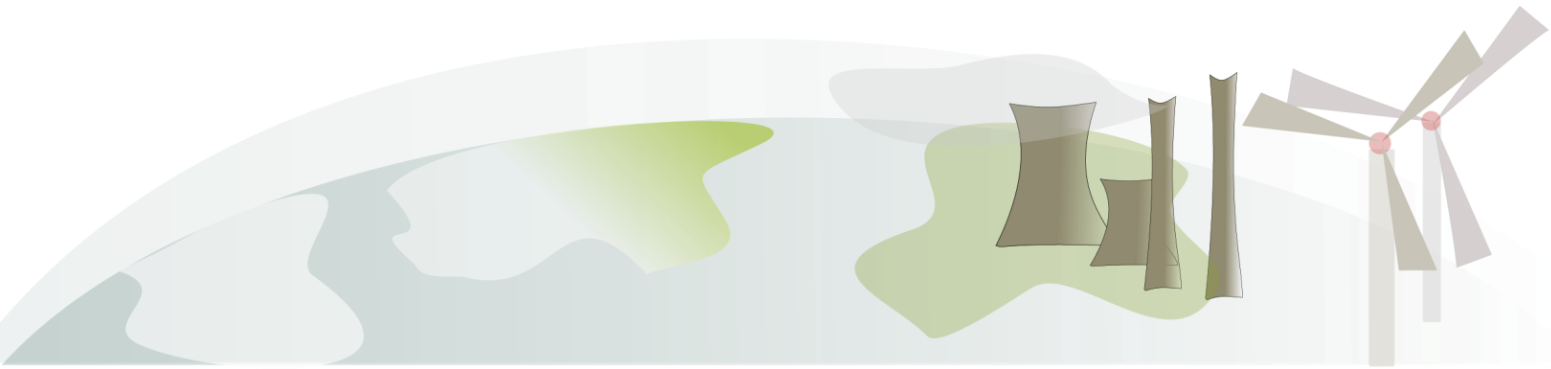
How much electricity do you think you use? How often do you travel by car? Do you travel by aeroplane? Do you eat lots of red meat or imported fruits?

What kind of behaviour most influences your carbon footprint? What could you be doing to reduce yours? What could the school be doing to reduce theirs?

Encourage pupils to consider what small changes could make the biggest potential differences to their carbon footprint – you could also get them to share ideas through posters or presentations.

Tip!

Ask the students to leave the first question on the worksheet blank. Give them maps of the local area (available from Google Maps or Digimaps - https://digimapforschools.edina.ac.uk/) and get them to estimate the distance from school to their house using the map scale (and a piece of string if necessary).



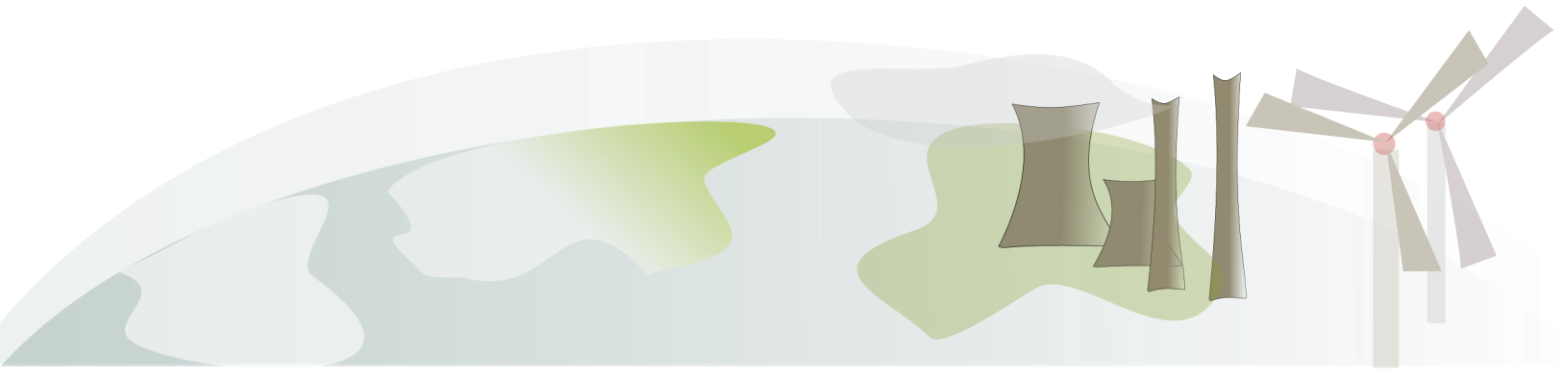
Classroom Activity Extension

This extension activity encourages pupils to further consider negative and positive actions related to CO_2 emissions by designing a Climate Change Snakes & Ladders board.

Activity Description	Students design their own snakes and ladders board with positive and negative actions contributing to CO_2 emissions
Time	40 – 50 minutes (including board design)
Learning Outcomes	To understand actions contributing to CO_2 emissions, and positive steps that can be taken
Student Organisation	Groups of 2–6
Materials Needed	Board printout*, dice, and a counter for each player *On the last page. Alternatively, other boards are available from the website below or give pupils squared/blank paper and ask them to design a board from scratch! This game board is taken from the CO2degrees Challenge website - **http://co2degrees.com/learn-more/educators**

Instructions

1. Prepare the game board (on the last page) by choosing 3 positive actions (i.e. using energy saving bulbs, not letting food go to waste) to go in ladders squares, and 3 negative actions (using the car for short journeys, leaving electrical items switched on) to go in snakes squares – write these in (or label the squares and use a key to refer to a separate list if there isn't enough space)
2. All players start with their counters on square 1
3. Each player rolls the dice, and the player with the highest score goes first
4. The first player rolls the dice, and moves that number of spaces on the board
5. If a player lands on a positive action square (ladder), they move up the ladder to a higher square
6. If a player lands on a negative action square (snake), they slide down the snake's body to a lower square
7. The winner is the first player to the Finish!



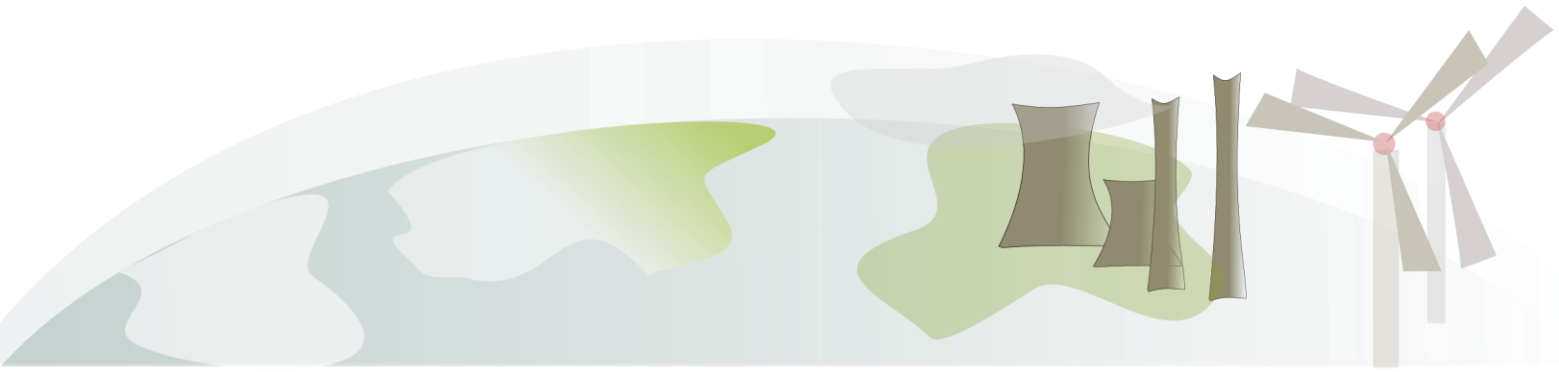
Calculate your carbon footprint

Answer the questions below as best you can to help you calculate your carbon footprint using the WWF Footprint calculator - http://footprint.wwf.org.uk/

1.	How far is your house from the school?	km
2.	How many hours a week do you travel by car?	hours
3.	How many of your meals per week contain meat?	
4.	How much locally sourced food do you eat?	NONE / SOME / LOTS
5.	How many times a week do you eat take-away? *	0 / 1 (~£10) / 2-3 (£10-50) / 4+
6.	What is the average temperature in your house?	°C
7.	Is your house on any form of green-energy tariff?	YES / NO

8. Does your house have any of the following;

Energy efficient bulbs	YES / NO
Cavity/wall insulations	YES / NO
Loft insulation	YES / NO
Condensing boiler	YES / NO
Double glazing	YES / NO
Low-flow taps	YES / NO
Solar panels	YES / NO
Solar water heater	YES / NO

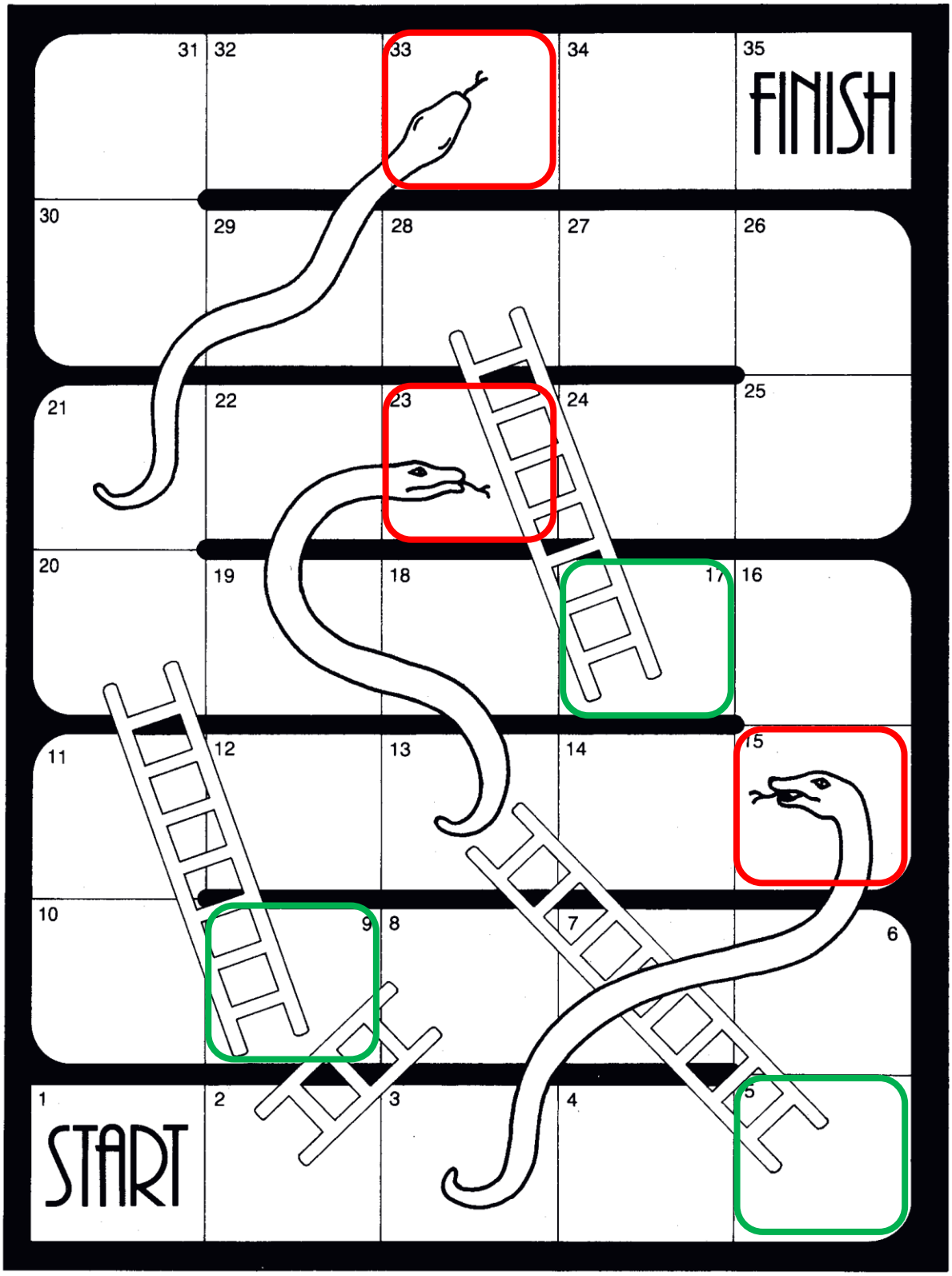


My Energy Diary

Make a note of the following activities for a week to give you an idea of how much energy you – as an individual – are using. Think about how you might easily be able to reduce this amount.

	Mon	Tues	Wed	Thu	Fri	Sat	Sun
TV (hours)							
Computer (hours)							
Mobile Phone (hours charging)							
Microwave (minutes of use)							
Lights (hours)							
Car Journeys (hours / minutes)							
Showers (minutes)							
Hairdryer / Straighteners (minutes)							
Games Console e.g. Xbox (hours)							
Other (hours)							

Climate Change Snakes & Ladders



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