

THE CARBON ON YOUR PLATE

Does what's on your plate change the climate?



Introduction

Every student eats several times a day, which makes food one of the rare geography topics they're already experts in – and one where a single dataset can genuinely shift how they see their own choices. *The Carbon on Your Plate* turns that everyday familiarity into a short data investigation: students work with real greenhouse gas figures from Our World in Data and a major UK study by Oxford University (Scarborough et al., 2023), moving from single foods up to whole diets. Lastly it punctures the “but I buy local” myth with the evidence that transport is barely 5% of a food's footprint.

The task is built to let students arrive at the pattern rather than be told it – they describe, quantify and evaluate their way to the conclusion, so the geography does the persuading. It slots into a climate unit, with only greenhouse gases and carbon footprints as the prior knowledge needed.

Relevant Links

Poore, J. & Nemecek, T. (2018) Data processed by Our World in Data. [Greenhouse Gas Emissions per Kilogram of Food Product](#). (Accessed 16 July 2026).

Ritchie, H. (2021). [How much of global greenhouse gas emissions come from food?](#) Our World in Data. (Accessed 14/07/2026).

Ritchie, H. (2022). [FAQs on the environmental impacts of food](#). Our World in Data. (Accessed 16/07/2026).

Scarborough, P., Clark, M., Cobiac, L., Papier, K., Knuppel, A., Lynch, J., Harrington, R., Key, T., & Springmann, M. (2023). [Vegans, vegetarians, fish-eaters and meat-eaters in the UK show discrepant environmental impacts](#). (Accessed 14/07/2026).

Plate Up for the Planet – [The Vegan Society](#)

TASK OVERVIEW

Timing
25–30
minutes

Setting
classroom

Curriculum links

AQA (8035): Possible causes of climate change: natural factors... human factors – use of fossil fuels, agriculture and deforestation.

Pearson Edexcel A (1GA0): Global climate is now changing as a result of human activity – How human activities (industry, transport, energy, farming) produce greenhouse gases (carbon dioxide, methane) that cause the enhanced greenhouse effect.

OCR A (J383): 2.3.2 There are a number of possible causes of climate change – How human activity is responsible for the enhanced greenhouse effect which contributes to global warming.

What you'll need

Student Worksheet.

Additional resources

Pens.

Prior knowledge needed

Greenhouse effect (plus a reminder that CO₂e includes all greenhouse gases into one single figure) and carbon footprints.

Before the lesson

- Print the Student Worksheet on A3 (1 per student).

Learning Objectives

1. To evaluate how far agriculture contributes to climate change, using evidence on greenhouse gas emissions from food and diets.



Note on framing

Present the high–meat and livestock data systemically – a feature of the wider food system, not blame directed at farmers or individual meat-eaters. Keep the tone choice-affirming throughout: students should reach their own conclusion from the evidence, not be steered toward one. If requested, there is the chance for further independent research on The Vegan Society website, individuals could look at the Plate Up for the Planet campaign, linked above.

The Task

Timings are a guide – adjust them to suit your class.

Introduction – [3 minutes]

- Write '25–35%' on the board and state that global food and agricultural systems account for this amount of greenhouse gases (GHG) globally.
- Explain that two of the leading studies on global GHG emissions vary quite significantly because the higher statistic includes post-retail emissions (food waste and cooking) (source: Ritchie, 2021).

Suggested teacher script

- [Referencing the statistic] this is the share of greenhouse gases that are produced by our food and farming systems. Not planes or other transport, food. Everything it takes to get a meal onto your plate.
- Why are these numbers a range and not one statistic? [take suggestions]. It's because two of the biggest studies on global greenhouse emissions and food systems measure slightly different things. The lower end counts emissions up to the point food is sold; the higher end also adds what happens after – the energy to cook it, and the emissions from the third or so of food that gets wasted.
- Here's the question we're investigating today: if food is responsible for that much, does what's actually on your plate change the climate? By the end you'll have used real data to answer that for yourselves and you might be surprised which foods make the biggest difference.

Task – [20 minutes]

The activity

- Students work in pairs or alone to analyse the data on their worksheet and answer the questions.
- Each dataset helps build evidence to show that human activities, specifically our food system (and our food choices), is a major driver of greenhouse gas emissions and therefore climate change.

Dataset 1: Comparing individual foods. Data source: Poore & Nemecek (2018) [Processed by Our World in Data](#).

Dataset 2: Comparing whole diets – GHG emissions based on 2000 kcal diets per day. Data source: Scarborough et al. (2023) [Table 3](#).

Myth–buster: 5% of food emissions are due to transport. Data source: Ritchie (2022) based on data by Poore & Nemecek at [Our World in Data](#).

Suggested probing questions

- Look at the top and bottom of your Dataset 1 table – what do the foods at the top have in common? What about the ones at the bottom?
- For Q4, think about what you already know about livestock and methane production/livestock and land use, how can this help your answer?
- Look at the diet chart in Dataset 2. As you move up from vegan to high meat, is it a steady climb, or are there bigger jumps in some places than others? Why might this be?
- Vegetarian and vegan diets both cut out meat so why isn't vegetarian just as low as vegan? What's still on a vegetarian's plate that isn't on a vegan's? [If stuck, point them back to the cheese row in Dataset 1 without giving the answer away].
- The shopper in the myth–buster question thinks buying local beef helps the planet. What does the 5% transport figure tell you about that claim?
- Where can you see the biggest 'jump' in either dataset? With your geography hat on, why might this be?



Consolidation – [5 minutes]

- Cold-call a few students to share figures, reasoning and/or conclusions depending on your judgement of the class.
- Ensure that the discussion ties up the underlying mechanisms of our food system causing climate change e.g. land use, methane, feed-conversion inefficiency.

Potential script

- Notice you're all using different numbers, but pointing at the same underlying pattern – animal-based foods generally take more land, water and feed to produce the same amount of food. That's the geography here: it's about how efficiently different farming systems convert resources into food, not a personal judgement on anyone's plate.

Answers

Please use your judgement for student answers outside of the below.

1. C. Nuts.
2. 96 kg CO₂e.
3.
 - Animal-based foods (beef, lamb, cheese, poultry) generally have far higher emissions than plant-based foods (tofu, bananas, potatoes, nuts).
 - There is a wide range across the foods shown, from beef at the highest (99 kg) to nuts at the lowest (0.4 kg).
4.
 - Any other valid comparative statement supported by the table (e.g. cheese being much higher than any plant food despite not being meat).
 - Animals produce greenhouse gases (methane) through digestion.
 - Animal farming needs land and feed crops grown first, an extra, inefficient, step which isn't required for farming crops.
 - Plant foods need fewer natural resources e.g. water, land.
 - Manure management and land-use change add further emissions, especially due to deforestation.
5. D. Vegan.
6. 7.77 kg CO₂e per day.
7.
 - Emissions decrease as diets contain less animal-based food, moving from high meat down to vegan.
 - The decrease isn't even – the gap between high meat and low meat is bigger than the gap between vegetarian and vegan.
8.
 - A vegan diet causes by far the lowest CO₂e in comparison to other dietary choices.
 - The farming practices of plant crops cause lower GHG emissions than the farming of animals.
 - Diet is one factor amongst several that impact individual GHG emissions.

