



Lab Meat Quiz

Meat is a **key part of many people's diets** and can provide an important source of nutrition and income, particularly in low income countries. However, the amount of meat people are consuming in many higher income countries is taking its toll on both our health and our planet.

In this activity your students read the passage about animal agriculture and lab grown meat before answering the comprehension questions. Prior to starting the activity, we recommend having a class discussion centred on animal agriculture. Some students may be more knowledgeable on the subject and this is a great way to engage the class and allow students to learn from each other.

Answer key

1. What percentage of global greenhouse gas emissions is caused by livestock? Why is it so high?

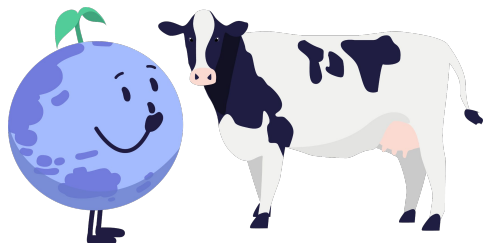
14.5% of global GHGs come from livestock. Most of this is due to enteric fermentation by ruminants like cows and sheep. This is where ruminants break down grass or hay in their stomachs and produce a lot of methane. Feed production also requires energy, land, and fertilizer.

2. How many more greenhouse gas emissions are generated from producing a kilogramme of beef compared to a kilogramme of chicken?

Greenhouse gases (GHGs) produced by a kg of beef = 295kg
 Greenhouse gases produced by a kg of chicken = 35kg
 Therefore $295\text{kg} - 35\text{kg} = 260\text{kg}$ more produced per kg beef
 (OR $295/35 = 8.43$ times more GHGs produced per kg beef)

3. Why does meat only provide 18% of the world's calories if 77% of agricultural land is required to produce it?

A lot of land is needed for animals to graze or to grow their food. However, as we move up in the food chain a lot of energy is lost or wasted, to things like movement and heat. Plants therefore tend to produce more calories than animals using the same amount of space.





4. What are stem cells? Why are they useful for making meat?

Stem cells are undifferentiated cells that are able to divide and develop into many different cell types, including muscle. We can use these cells to grow muscle tissue which can create meat.

5. Why is it more efficient to produce meat in a bioreactor than through livestock farming?

It uses much less water, land and energy. It also takes much less time.

6. Why has the price of clean meat fallen so much in recent years?

Economies of scale (where each individual product costs less because lots more are being made overall) have made production cheaper. Newer and more innovative technologies have made the process efficient and therefore cheaper.

7. Is it more environmentally friendly to eat lab grown meat or plant-based meat? Why?

Right now it is more environmentally friendly to eat plant-based meat. That's because plant-based meat uses less energy to produce.

We welcome feedback and would be delighted to hear your thoughts on this activity. Feel free to send an email to schools@climatescience.org and we'll be sure to get back to you soon :)

