Suitable for children aged 13 to 16
Maths | Citizenship

Measuring Meat Free Monday

Section 1: Beef Burgers and Baths

Activity 1: Discussion

Start this section by discussing the ways water is used in meat production generally. A vast amount of water is needed to grow the grass, forage and feed that cattle eat over their lifetimes and there is also the water needed for drinking, cleaning and processing. Ask the students what they think this means in terms of the amount of water used in producing just one 150g beef burger. Ask them to guess roughly how many bath tubs of water would be needed. After some discussion, say that the maths unitary method will be used to get an answer to this question.

Activity 2: Introducing the Unitary Method

The unitary method is a way of adapting some given information involving two or more variables (e.g. '5 oranges cost £1.50') into a form that is desired for some other purpose (e.g. '9 oranges cost ?'). It involves scaling down one of the variables to a single unit (e.g. '1 orange costs ?'), and then performing an operation to alter it to the desired value. Start with some simple examples, such as those below. Here, each scaling operation is indicated in bold and an arrow points to the result of the operation.

Example 1

5 oranges cost £1.50. How much do 9 oranges cost?

Answer:

	5 oranges cost £1.50
÷5 →	1 orange costs 30p
x9 →	9 oranges cost £2.70

Example 2

4 tins of beans weigh 1.83 kg. If a shopper doesn't want to carry more than 10 kg, how many tins can they buy at one time?

Answer:

	4 tins weigh 1.83 kg
÷1.83 →	$\left(\frac{4}{1.83}=\right)$ 2.19 tins weigh 1 kg
x10 →	21.9 tins weigh 10 kg

So the shopper can buy at most 21 tins of beans.

Background

Animal agriculture results in vast amounts of greenhouse gases being released into the atmosphere. It requires increasingly unsustainable levels of precious resources including land, water and energy. It is a major contributor towards global environmental degradation and climate change. This series of lessons will prompt students to calculate for themselves the environmental impact of meat production and present their findings using measurements of comparison which are easy for people to assimilate.

Introduction

This resource is divided into three sections. The first section introduces the maths of the unitary method and is about water usage. The second section relates to the cutting down of Amazon rainforest to make way for cattle pasture. And the third section relates to the environmental benefit of doing Meat Free Monday against driving fewer miles in a car.

Learning Objectives

Students should :

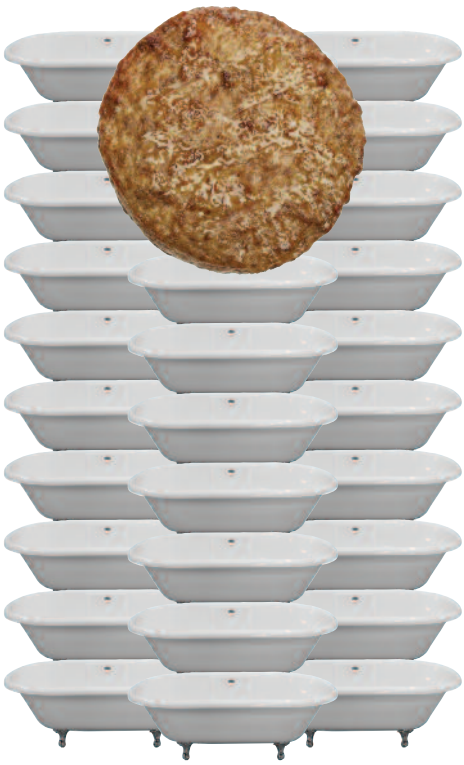
- Learn the unitary method
- Develop confidence in using the unitary method to convert factual data from one form to another
- Gain practice in converting between different units of measure
- Appreciate the power of algebra to embrace multiple scenarios
- Gain practice in using a spreadsheet
- Consider how data can be presented in different ways in order to raise awareness of an issue
- Understand the positive impact of eating less meat

Accompanying Materials

Measuring Meat Free Monday – Sources

Activity 3: Beef Burger versus Bathing

Once your students are confident in using the unitary method, move on to comparing the amount of water used in producing a beef burger to that used in taking a bath or shower by talking through the following calculations.



It is known that, on average, the amount of water used in producing one 150g beef burger is 2350 litres. It is also known that, on average, one bath uses 80 litres of water.
(See **Sources** for details.)

Start by condensing the given information into a short sentence focussing mainly on the numbers:

$$80 \text{ litres of water} \approx 1 \text{ bath}$$

Step 1 (How much of a bath uses 1 litre of water)

$$\div 80 \rightarrow \quad 1 \text{ litre of water} \approx \frac{1}{80} \text{ of bath}$$

Step 2 (How many baths use 2350 litres of water)

$$\times 2350 \rightarrow \quad 2350 \text{ litres of water} \approx \frac{2350}{80} \text{ of baths}$$

$$\frac{2350}{80} = 29.375, \text{ which is just a bit less than } 30.$$

Conclusion: The amount of water used in producing one 150g beef burger is enough to fill roughly 30 bathtubs.

5 hours

=

Activity 4: Beef Burger versus Showering

This time, instruct the students to work in groups to come up with the answer. Give them the following information.

It is known that, on average, the amount of water used in producing one 150g beef burger is 2350 litres. It is also known that on average, one 8-minute shower uses 62 litres of water.
(See **Sources** for details.)

Teacher notes:
Start by condensing the given information into a short sentence focussing mainly on the numbers:

$$62 \text{ litres of water} \approx 8 \text{ minutes of 1 shower}$$

Step 1 (How many minutes of shower use 1 litre of water)

$$\div 62 \rightarrow \quad 1 \text{ litre of water} \approx \frac{8}{62} \text{ minutes of shower}$$

Step 2 (How many minutes of shower use 2350 litres of water)

$$\times 2350 \rightarrow \quad 2350 \text{ litres of water} \approx 2350 \times \frac{8}{62} \text{ minutes of shower}$$

Step 3 (How many hours of shower use 2350 litres of water)

$$\div 60 \rightarrow \quad 2350 \text{ litres of water} \approx \frac{2350 \times 8}{60 \times 62} \text{ hours of shower}$$

$$\frac{2350 \times 8}{60 \times 62} = 5.05$$

Bring the class together and see what answers the students came up with. They should have found:

The amount of water used in producing one 150g beef burger is enough to have a five-hour shower.

Section 2: Rate of Amazon Deforestation

Activity 1: Discussion

Start a discussion about tropical rainforests. Establish that tropical rainforests draw in carbon dioxide and give out oxygen. Destroying areas of the Amazon rainforest, the largest in the world, reduces this benefit and also results in larger amounts of greenhouse gases entering the atmosphere. Deforestation also destroys the homes of millions of species of animals and plants. There are vast areas of the Amazon rainforest being cleared to make space for cattle farming.

Ask the students to imagine the size of a football pitch, and then ask them how many 'football pitch sized' areas they think are cut down every hour to create room for grazing cattle. After some discussion, say that the maths topic of converting between different units of measure will be used to get an answer to this question.

Activity 2: Planning the Calculation

Begin by asking the students what information they think will be needed in order to make the comparison. After some discussion around this, tell them that international organisations give the amount of Amazon rainforest cut down for cattle as a number of square kilometres per year. Also, from FIFA rules, the area of a football pitch is calculated as a number of square metres. Then guide the students to realising that, in order to convert the number of square kilometres per year to a number of 'football pitch sized areas per hour', it is necessary to work out:

- the number of square metres in a square kilometre
- the number of hours in a year
- the area of a football pitch in square metres

The conversion can then be carried out as follows.

km^2 per year

→ m^2 per year

→ m^2 per hour

→ 'football pitches' per hour

Activity 3: Doing the Calculation

Use the following facts:

- In 2016, the area of Amazon deforestation was 7893 square kilometres.
- The percentage of deforested area used for cattle pasture was in the range 70-80%. For this project, assume a figure of 70%.
- FIFA approved football pitch dimensions are: length between 90 and 120 metres, and width between 45 and 90 metres. A pitch 100 metres long and 60 metres wide has area (100 x 60 =) 6000 square metres.

(See **Sources** for details.)

Suggest to the students that they might find it useful to work through the following steps.

Step 1 (Finding the number of square kilometres cut down for cattle grazing per year)

The number of square kilometres cleared for cattle each year = 70% of 7893

$$= \frac{70}{100} \times 7893 = 5525.1$$

Step 2 (Changing to square metres per year)

1 kilometre = 1000 metres, so
1 square kilometre = 1000000 square metres

The number of square metres cleared for cattle each year = 5525.1 x 1000000
= 5,525,100,000

Step 3 (Number of hours in a year)

1 year = 365 days
1 day = 24 hours

The number of hours in a year = 24 x 365
= 8760

Step 4 (Changing to square metres per hour)

The number of square metres cleared for cattle each year = 5,525,100,000
The number of hours in a year = 8760

The number of square metres cleared for cattle each hour = $\frac{5,525,100,000}{8760}$ = 630719

Step 5 (Changing to football pitches per hour)

Area of forest cleared for cattle each hour = 630719 square metres

Area of football pitch = 6000 square metres

Number of football pitch sized areas cleared for cattle each hour = $\frac{630719}{6000}$ = 105.1

Conclusion: An area of Amazon rainforest the size of more than a hundred football pitches is cut down every hour to create room for grazing cattle.

Activity 4: Algebraic Formula

Talk through the following.

The calculation in Activity 3 was based on particular values for the area of Amazon deforestation (7893 km²), the percentage of this used for cattle (70%) and the area of a football pitch (6000 m²). In the next activity, these numbers are replaced by symbols.

Suppose that:

- the annual average area of Amazon deforestation is x square kilometres,
- the percentage cleared for cattle pasture is p%,
- the area of a football pitch is y square metres.

How many football pitch sized areas of Amazon rainforest are cut down each hour to make room for cattle grazing?

Step 1 (Finding the number of square kilometres cut down for cattle grazing per year)

The number of square kilometres cleared for cattle each year $= p\%$ of x

$$= \frac{p}{100} \times x$$

$$= \frac{px}{100}$$

Step 2 (Changing to square metres per year)

1 kilometre = 1000 metres, so
1 square kilometre = 1000000 square metres

The number of square metres cleared for cattle each year

$$= \frac{px}{100} \times 1000000$$

$$= 10000\,px$$

Step 3 (Number of hours in a year)

1 year = 365 days
1 day = 24 hours
The number of hours in a year = 24×365
$= 8760$

Step 4 (Changing to square metres per hour)

The number of square metres cleared for cattle each year = $10000px$
The number of hours in a year = 8760
The number of square metres cleared for cattle each hour

$$= \frac{10000\,px}{8760}$$

$$= \frac{1000px}{876}$$

Step 5 (Changing to football pitches per hour)

Area of forest cleared for cattle each hour

$$= \frac{1000\,px}{876} \text{ square metres}$$

Area of football pitch = y square metres
Number of football pitch sized areas cleared for cattle each hour

$$= \frac{1000\,px}{876} \div y$$

$$= \frac{1000\,px}{876y}$$

So an area of Amazon rainforest the size of $\frac{1000px}{876y}$ football pitches is cut down every hour to create room for grazing cattle.

Activity 5: Using a Spreadsheet

Ask your students to start a new spreadsheet and type the following headings in the following squares.

In B2, type 'area cut down'
In D2, type '% for cattle'
In F2, type 'football pitch area'
In H2, type 'pitches per hour'
In H3, type: =(1000*B3*D3)/(876*F3) and drag this down the H-column for, say, 10 rows.

Students can now type in any values for the area cut down, the percentage for cattle and the football pitch area in the squares B3, D3 and F3 (respectively) and a figure will automatically appear in the square H3. This figure will be the number of football pitch sized areas of Amazon rainforest cut down each hour to make room for cattle grazing (corresponding to the values entered in B3, D3 and F3).

They can do the same thing for rows 4, 5, and so on, to get a whole range of different scenarios.

Activity 6: Conclusions

Eye-catching statistics and newspaper headlines can sometimes be misleading. The statement about the number of football pitches lost to cattle grazing per hour is valid, but students should be aware that there are three variables involved:

(a) The number of square kilometres of Amazon deforestation per year,
(b) The percentage of (a) cleared for cattle pasture,
(c) The area of a football pitch.

There is variation in (a) according to which year is considered or which range of years is considered (from which an average annual figure is calculated) and there is variation in (c), as FIFA specified lengths and widths of pitches have a fairly wide range (even different ranges for international matches and non-international matches). There is even some variation in (b), as these figures are very difficult to estimate and depend on which subsidiary factors are taken into account. Recent papers indicate a range of 70-80%.

In view of the variation in these three variables, students could explore what choices of their values give various different answers. For example, they could consider the average annual deforestation over the ten years 2007-2016 (7502 sq km), a cattle percentage mid-way in the range (75%) and the smallest international-sized pitch (6400 sq m). (These values also give that an area of Amazon rainforest the size of more than a hundred football pitches is cut down every hour to create room for grazing cattle.)

Although less related to the current situation, students could also consider the extreme values of the data: the 2004 figure of 27772 sq km of deforestation, 80% for cattle and a 4050 sq m football pitch size. These values give a figure of 626 pitches per hour. This could be presented as '10 a minute' or as 'one every six seconds'. Which of these do your students think has the most impact? Their answers could lead on to a more general discussion about choices in the presentation of statistics.

Having seen how varying inputs on the spreadsheet produces varying outputs, students may wish to do some online research and construct their own spreadsheets for sets of data in other areas. If they come up with any new hard-hitting Meat Free Monday facts, please send them to info@meatfreemondays.com – we'd love to see them!

Section 3: Meat Free Monday versus Not Using the Car

Activity 1: Discussion

Burning petrol or diesel when driving a car emits carbon dioxide into the atmosphere. It is known that, for a person whose car does 30 miles to the gallon, doing Meat Free Monday would reduce their carbon footprint by the same amount as driving 448 fewer miles each year. (See **Sources** for details.) How can we use this fact to explore the various consequences of people doing Meat Free Monday? How many days of taking a car off the road would reduce greenhouse gas emissions by the same amount as someone skipping meat one day a week for a year? Or if everyone did Meat Free Monday for a year, how many hours of all cars being taken off the road would that be equivalent to, in terms of benefit to the environment?

Extension Idea

Having estimated the impact of one person doing Meat Free Monday for a year (in terms of a period of their car being off the road), further work could include an investigation of the environmental impact of *everyone* skipping meat for just *one* day. Additional data needed would be population and car total figures which, for Great Britain in 2016, were 63.8 million and 30.9 million, respectively. Assumptions similar to those used earlier in this lesson lead to the conclusion that, if every person in Great Britain skipped meat for one day, it would reduce our carbon footprint by more than if every car was taken off the road for one day!

Activity 2: Applying the Unitary Method

Guide your students through the following calculations.

Start by condensing the given information into a short sentence focussing mainly on the numbers:

1 person going meat free for 52 days ≈ 1 car with 30 mpg reducing driving by 448 miles.

This sentence has 5 variables, rather than just two or three as in the earlier examples, but the same principle of successively writing parallel sentences applies. Other (British) data to be used are:

- Average driving per car in one year = 7800 miles
- Average fuel consumption = 45 mpg

(See **Sources**.)

Step 1 (Changing to average fuel consumption)

1 person going meat free for 52 days ≈ 1 car (30 mpg) reducing driving by 448 miles.

÷30 → 1 person going meat free for 52 days ≈ 1 car (1 mpg) reducing driving by $\frac{448}{30}$ miles

×45 → 1 person going meat free for 52 days ≈ 1 car (45 mpg) reducing driving by $45 \times \frac{448}{30} = 672$ miles

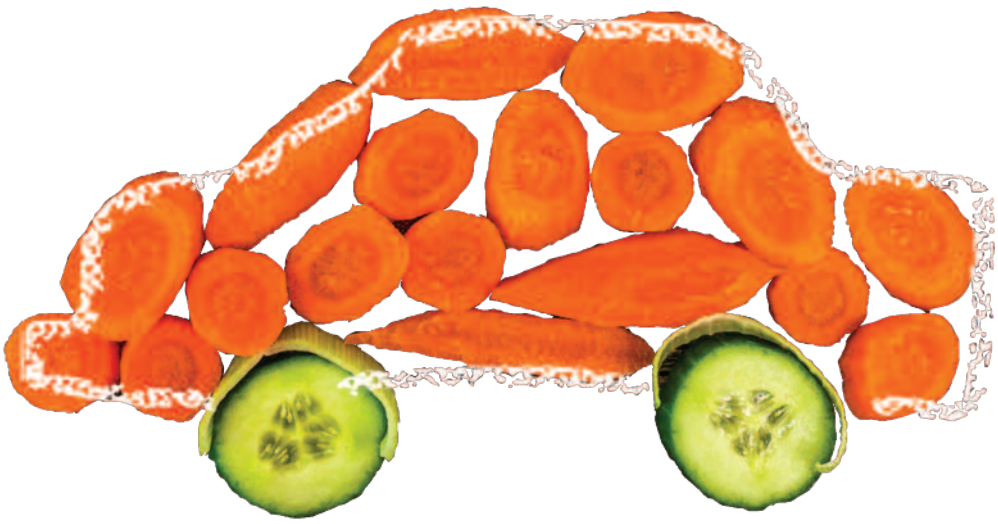
Step 2 (Changing to 'driving days')

Car drives 7800 miles in 365 days

÷7800 → Car drives 1 mile in $\frac{365}{7800}$ days

×672 → Car drives 672 miles in $672 \times \frac{365}{7800} = 31.4$ days

Conclusion: Doing Meat Free Monday for a year reduces a person's carbon footprint by more than taking their car off the road for 31 days – a whole month!



Activity 3: Algebraic Formula

Talk through the following.

The calculation in Activity 2 was based on a person driving 7800 miles a year with a car whose fuel consumption was 45 mpg. In order to consider different scenarios, we can consider cars with different fuel consumptions and drivers with different annual mileages. We are then varying the number of miles per gallon and the number of miles driven in a year, and considering these numbers as variables.

Suppose a person has a car with fuel consumption of x miles per gallon and they drive an average of y miles a year. How much time of not driving their car has the same environmental benefit as skipping meat for one day a week?

As before, begin with the fact that for person driving a car with a fuel consumption of 30 miles per gallon, skipping meat for one day a week reduces their annual carbon footprint by as much as reducing their driving distance by 448 miles.

Remind your students to start by condensing the given information into a short sentence focussing mainly on the numbers:

1 person going meat free for 52 days ≈ 1 car with 30 mpg reducing driving by 448 miles.

Then ask the students to work on their own (or in groups) through the following two steps.

1 Changing to x miles per gallon
2 Changing to 'driving days'

It may be helpful to talk with the class as a whole, consolidating the first step before going on to the second.

Step 1 (Changing to x miles per gallon)

1 person going meat free for 52 days ≈ 1 car (30 mpg) reducing driving by 448 miles

$\div 30 \rightarrow$ 1 person going meat free for 52 days ≈ 1 car (1 mpg) reducing driving by $\frac{448}{30}$ miles

$\times x \rightarrow$ 1 person going meat free for 52 days ≈ 1 car (x mpg) reducing driving by $\frac{448}{30}x$ miles

Step 2 (Changing to 'driving days')

Car drives y miles in 365 days

$\div y \rightarrow$ Car drives 1 mile in $\frac{365}{y}$ days

$\times \frac{448x}{30} \rightarrow$ Car drives $\frac{448x}{30}$ miles in $\frac{448x \times 365}{30y}$ days

As $\frac{448 \times 365}{30} = \frac{16352}{3}$ the conclusion is that skipping meat for one day a week reduces the person's annual carbon footprint by as much as not driving their car for $\frac{16352x}{3y}$ days.

So now, rather than just using the average fuel consumption and average annual mileage, students can work out the environmental benefit (in terms of the number of days of the car being off the road) for any combination of fuel consumptions and annual mileages.

Activity 4: Questions

The following questions could be given to the students to work on in groups. Alternatively, you may wish to set them as homework.

1 A person has just bought a new car which does an average of 52 mpg and they drive 9,000 miles in the first year. How many days would they have had to leave their car off the road in order to reduce their carbon footprint by the same amount as by doing Meat Free Monday for the year? (Answer: 31.5 days)
2 A person has an older car which does an average of 30 mpg and they only drive 5000 miles a year. How many days of not driving their car has the same environmental benefit as doing Meat Free Monday for a year? (Answer: 32.7 days)
3 A person who drives their car 6000 miles a year knows that if they kept if off the road for 40 days each year, this would reduce the amount of carbon dioxide emitted into the atmosphere by the same amount as if they skipped meat for one day every week. What is the fuel consumption (mpg) of the car? (Answer: 44 mpg)

Activity 5: Using a Spreadsheet

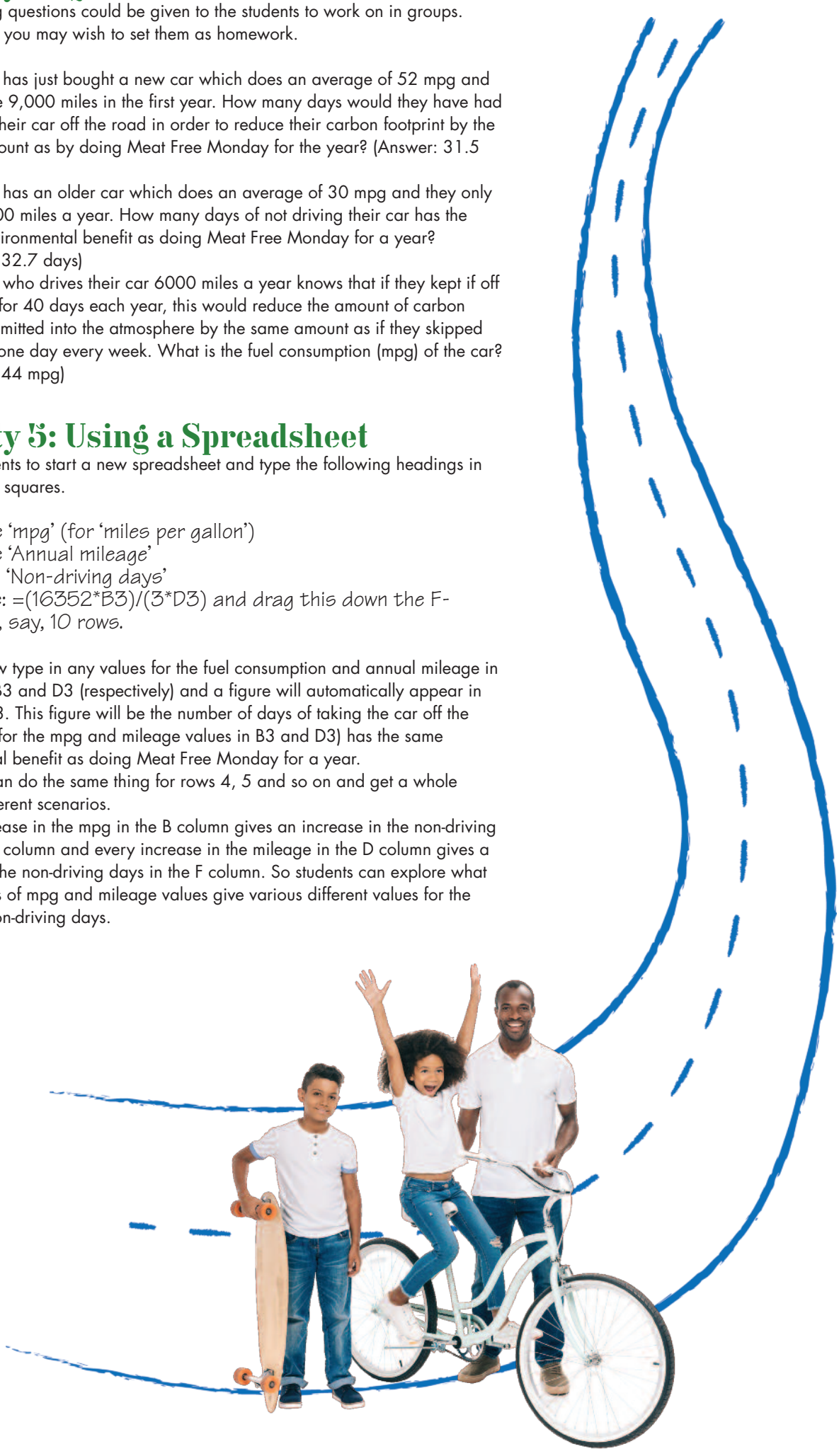
Ask the students to start a new spreadsheet and type the following headings in the following squares.

In B2, type 'mpg' (for 'miles per gallon')
In D2, type 'Annual mileage'
In F2, type 'Non-driving days'
In F3, type: =(16352*B3)/(3*D3) and drag this down the F-column for, say, 10 rows.

They can now type in any values for the fuel consumption and annual mileage in the squares B3 and D3 (respectively) and a figure will automatically appear in the square F3. This figure will be the number of days of taking the car off the road which (for the mpg and mileage values in B3 and D3) has the same environmental benefit as doing Meat Free Monday for a year.

Students can do the same thing for rows 4, 5 and so on and get a whole range of different scenarios.

Every increase in the mpg in the B column gives an increase in the non-driving days in the F column and every increase in the mileage in the D column gives a decrease in the non-driving days in the F column. So students can explore what combinations of mpg and mileage values give various different values for the number of non-driving days.



Measuring Meat Free Monday – Sources

Section 1: Beef Burger versus Bathing or Taking a Shower

1.1. Water for Baths and Showers

Average amounts of water used in taking a bath (80 litres) or shower (62 litres) are given at: Fishwick, Carmen, 'Bath or shower: what floats your boat?', The Guardian, 23 August 2017, https://www.theguardian.com/lifeandstyle/shortcuts/2017/aug/23/bath-or-shower-what-floats-your-boat (accessed 27 July 2021).

1.2. Water for Burgers

The average amounts of water used in producing one 150g beef burger (2350 litres) and one 150g veggie burger (158 litres) are given in the article *The water footprint of soy milk and soy burger and equivalent animal products*, by Ercin AE, Aldaya MM and Hoekstra AY, in Ecological Indicators, 18, 2012, p.400. (As 2350 ÷ 158 = 14.9, it follows that the amount of water used in producing a beef burger is roughly 15 times the amount used in producing a veggie burger.)

Section 2: Rate of Amazon Deforestation

2.1. Amazon Deforestation

The numbers of square kilometres per year of deforestation are calculated from the figures given by PRODES for each of the years 2004 to 2016 [Instituto Nacional de Pesquisas Espaciais, INPE – PRODES (2016) at http://www.obt.inpe.br/OBT/assuntos/programas/amazonia/prodes (accessed 27 July 2021) These figures are as follows.

2004: 27772	2009: 7464	2014: 5012
2005: 19014	2010: 7000	2015: 6207
2006: 14286	2011: 6418	2016: 7893
2007: 11651	2012: 4571	
2008: 12911	2013: 5891	

In addition to the figures used in **Measuring Meat Free Monday** for the single years 2016 and 2004, the average for the 10-year period 2007-2016 was used. This was obtained by adding the relevant 10 annual figures and dividing by 10: 75018/10 = 7501.8.

2.2. Cattle Pasture Percentage

A source for the percentage of deforested area used for cattle pasture being in the range 70-80% is:
Bustamente MMC, et al., *Estimating greenhouse gas emissions from cattle raising in Brazil*, Climatic Change, 115 (2012) pp 559–577 [DOI 10.1007/s10584-012-0443-3]. Although this paper was published in 2012, it was confirmed in September 2017 by a Senior Manager in Tropical Forest and Agriculture at the National Wildlife Federation that 70% continues to be a conservative estimate for the percentage of deforested area used for cattle pasture.

2.3. Football Pitch Sizes

FIFA approved football pitch dimensions are given on page 36 of FIFA's 'Laws of the Game 20/21' (https://digitalhub.fifa.com/m/5371a6dcc42fbb44/original/d6g1medsi8jrrd3e4imp-pdf.pdf, accessed 28 July 2021)

The length of the pitch must be between 90 and 120 metres, and the width must be between 45 and 90 metres. For international matches, the length must be between 100 and 110 metres, and the width must be between 64 and 75 metres.

Section 3: Meat Free Monday versus Not Using the Car

3.1. Food Miles

In the paper *Food-miles and the relative climate impacts of food choices in the United States*, by CL Weber and HS Matthews, in Environmental Science & Technology (2008), 42(10), pp 3508-13, it is stated that an average US household shifting their calories from red meat to a vegetable-based diet for 52 days (one day a week for one year) reduces GHG emissions by an amount equivalent to the emissions from a car, with a petrol consumption of 25 miles per US gallon, driving 1160 miles. The 2000 US Census gives the average number of people per US household to be 2.59, and 1160 divided by 2.59 is 448. A petrol consumption of 25 miles per US gallon is the same as 30 miles per UK gallon (as 1 UK gallon is roughly 1.2 US gallons and 25 x 1.2 = 30). So we have that one person shifting their calories from red meat to a vegetable-based diet for 52 days reduces GHG emissions by an amount equivalent to the emissions from a car, with a petrol consumption of 30 miles per UK gallon, driving 448 miles.

Remark. In going from '25 miles per US gallon, 1 US household ~ 1160 miles' to '30 miles per UK gallon, 1 person ~ 448 miles', there are two applications of the unitary method which, in themselves, could be used as exercises for students.

3.2. Car Mileage

The figure of 7800, for the average number of miles within Great Britain (England, Wales and Scotland) driven by an England-registered car in 2016, is given in 'National Travel Survey: England 2016' (p.12) at:
www.gov.uk/government/uploads/system/uploads/attachment_data/file/633077/national-travel-survey-2016.pdf (accessed 27 July 2021).

3.3. Fuel Consumption

Table Env0103 from the UK Government's fuel consumption statistics at: https://www.gov.uk/government/statistical-data-sets/energy-and-environment-data-tables-env (accessed 28 July 2021) gives the average fuel consumption in 2015 for new cars in Great Britain to be 52.1 mpg for petrol and 61.6 mpg for diesel. The figures for the previous five years (2010-2014) are between 44.7 and 51.1 for petrol, and between 51.8 and 59.9 for diesel. The figure of 45, chosen for the application of the unitary method, is at the lower end. Using a higher figure would give a result higher than 31.4 days.

Suitable for children aged 11 to 16
Assembly | Citizenship | English

Meat Free Monday Rhyme

Activity

Recite the Meat Free Monday rhyme in class or at a school assembly and invite feedback from the students. To highlight key points, you may wish to accompany the reading with images (for example by using a PowerPoint presentation).

Extension Ideas

- If you have presented the rhyme in a classroom environment rather than assembly, a role play can be set up whereby pairs of students take on the characters of Emma and Grundy to show what they picked up from the rhyme. Can the students come up with any additional points/arguments for either character?
- Have the students think of their favourite meat free school dinner/packed lunch and describe it using powerful/persuasive language to make others want to taste it. This can be done in assembly by having volunteers out at the front. Instruct the students not to actually name the food/dish, so that it becomes a guessing game.
- Encourage students to write their own rhymes about Meat Free Monday.

Background

Meat Free Monday encourages participants to improve their health in a fun and simple way that helps to combat global warming. The campaign is becoming a global phenomenon with an increasing number of schools, restaurants, universities, businesses and even cities getting involved.

This lesson (which can be effectively delivered as an assembly) introduces different reasons for supporting Meat Free Monday in a light-hearted way – via a rhyme. The rhyme features a conversation between two characters – Grundy, who knows about the campaign, and Emma, who initially does not like the idea of cutting down on meat. The conversation results in the two children becoming enthusiastic about Meat Free Monday and coming up with their own ways of promoting it.

Learning Objectives

Students should learn the following:

- To understand why their school supports Meat Free Monday
- To consider what food options will be available on Mondays
- To develop spiritually, morally, socially and culturally

Meat Free Monday Rhyme

Things had changed at Emma's school.
At lunch she almost felt a fool.
She queued and asked for peppered steak
But instead was given pasta bake!

"What's up?" she asked. "Where's all the meat?
What on Earth's a girl supposed to eat?"
"It's gone", said Emma's best mate, Grundy.
"From now on, school does Meat Free Monday!"

"Meat free what? That can't be true!
What a crazy thing to do!"
"Actually", said Grundy, "I think you might find
When you learn about meat, you'll soon change your mind!"

But still Emma felt surprise and dismay –
Who'd have envisioned a whole meatless day!
"I really don't get it! Would you say it's a fad?
How can eating meat be bad?"

Grundy explained, "It's now a known fact
If we cut down on meat, we have global impact.
We used to produce fewer greenhouse gasses,
But then it all changed and today we make masses.

Cows emit methane, which has a harmful effect.
We should try to ensure that the planet's not wrecked!
The project encourages compassion and caring,
Citizenship, kindness and worldwide sharing.

Instead of producing so much animal feed,
We could grow maize and soya for people in need.
And consider how animals' lives are filled –
Caged and transported, and then they are killed".

"But Grundy", said Emma, "meat has iron and zinc!
And animals can't reason, imagine or think!"
Grun shook his head. "No, you're hugely mistaken.
Animals are like us and should not be forsaken.

They, too, like to play with their friends and to run,
Spend time in the open and lie in the sun.
As for protein and zinc – you can get them from beans,
From tofu and other non-animal means!

If you really like burgers and hot dogs, like me,
There are great veggie versions – just wait and you'll see!
Shops these days sell nuggets and barbecue sauce
Mock 'duck' and mock 'turkey' – made with soya, of course!

Vegan lunches are really nutritious,
Colourful, exciting, fresh and delicious!"
Emma pondered, then said, "That makes sense to me, so …
I reckon I'll give Meat Free Monday a go!"

They both soon found Mondays to be so much fun
That they wanted to shout and to tell everyone!
They made banners and leaflets and recipe books.
They even got help from celebrity cooks!

They wrote to the Pope and they wrote to the Queen
And persuasively asked the Prime Minister to go green!
If school kids can do it, then surely can't they?
It's simple to eat veggie food for a day!

They went on TV – on the BBC news!
A nationwide platform – they had nothing to lose!
Meat Free Monday spread quickly beyond the UK,
From Paris to Sydney, Hong Kong to LA.

Emma smiled at Grundy with a glint in her eye:
"What next? Shall we give Meat Free Tuesday a try?"

Suitable for children aged 13 to 16
English | Science | Citizenship

A Future Without Fish

Activity 1: Class Discussion

Start the lesson with a short class discussion. Do students know the names of any fish? What fish have they seen? Have they ever been snorkelling? Do they know about fish that cooperate with other marine life (e.g., pilot fish have often been observed swimming into sharks' mouths to clean away fragments of food from between their teeth)? You may find that students have learned other interesting facts from watching documentaries.

Activity 2: Fishing Facts

Prepare the following "Fishing Facts" for display on the interactive whiteboard or print them on a handout. Go through each statement and discuss it. If using the interactive whiteboard, reveal the facts one at a time. Encourage students to ask questions if they don't understand something. Are students surprised by any of the facts?

Fishing Facts

1. Commercial fishing uses a method called "bottom trawling" which involves dragging nets larger than football fields along thousands of miles of ocean floor. After scraping the ground clear of coral, ocean plants and all the fish and marine animals in their path, trawlers leave huge gashes in the ocean floor.
2. The biggest fishing net is large enough to contain 13 Boeing 747s.
3. Plastic straws comprise only 0.03% of plastic entering the ocean. A huge amount of plastic waste comes from discarded fishing gear.
4. Industrial fishing lines (longlines) can be as long as 75 miles – the equivalent distance as from sea level to space.
5. Bycatch is a way of describing unwanted fish that get caught in nets and on lines. The global average ratio for bycatch is 6:1. In other words, six fish are thrown dead and dying back into the sea for every single fish caught. Greenpeace estimates that anywhere between 6.8 to 27 million tonnes of fish are discarded as bycatch each year.
6. 11,000-30,000 sharks are killed per hour! Almost half of these are killed as bycatch from commercial fishing fleets and discarded as waste back into the oceans. Birds, turtles and dolphins are also often caught in nets.
7. More than 30 per cent of all the sea animals consumed each year are now raised on fish farms, where they spend their entire lives crammed together, constantly bumping against each other and against the sides of their extremely crowded cages.
8. Fish farms cause environmental problems as the fish raised on them are plagued by diseases and parasites – such as sea lice, resulting from the high concentration of fish in each pen – which can also spread to wild fish.

Background

Our oceans are the Earth's "heart and lungs". They produce half of the world's oxygen and absorb 30 per cent of man-made carbon dioxide. So, for those taking part in Meat Free Monday, it's important to understand where fish fit into the picture and the ways in which industrialised fishing and aquaculture is as damaging and wasteful as industrialised farming. This lesson encourages students to explore how the commercial fishing industry has transformed entire ecosystems while pushing our oceans to the brink of environmental collapse.

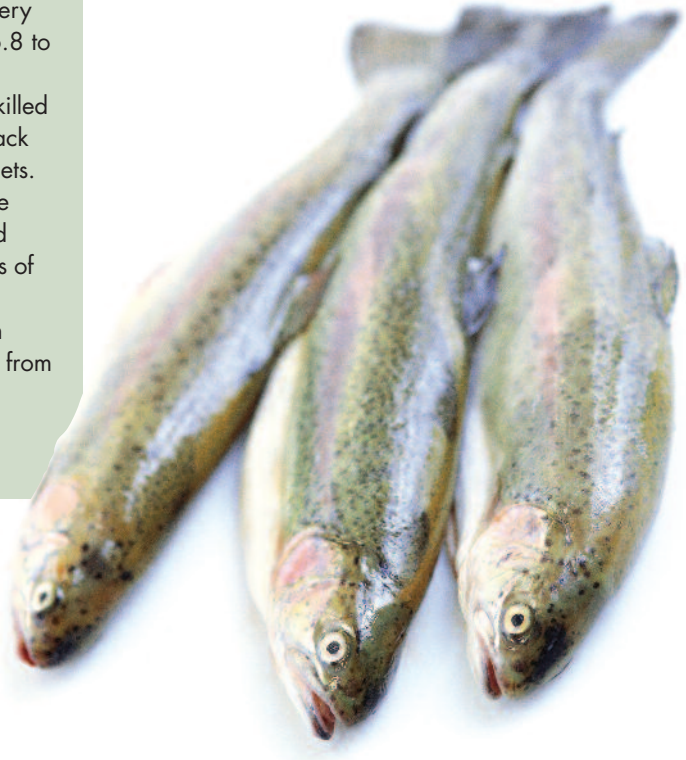
Learning Objectives

Children should learn the following:

- To explore the environmental impact of commercial fishing and aquaculture
- To communicate in ways that are appropriate to a particular task and audience

Accompanying Materials

- Friendly Planet (student worksheet)
- A Future Without Fish – Recipe Demo (teacher sheet) for extension



Activity 3: Research and Writing Task

Tell the students to imagine that they work on the letters page of an environmental magazine called Friendly Planet. The magazine, aimed at teenagers, has a strong environmental ethic. This month, the magazine is publishing a special feature on fish. Distribute copies of the **Friendly Planet Problem Page** worksheet and ask students to answer the readers' letters, keeping responses concise yet informative. One answer has been given as an example. Discuss different methods of presenting information including informal writing styles. Students may need to do some research, either by using the internet, going to shops or contacting vegetarian and health organisations. Each student can add his or her photo to the top of the page (or draw a picture). Students can also add appropriate fish images to the page if desired.

Useful Resources

- "Fish-Free for Life" by Dr Justine Butler and Jane Easton of the Vegetarian and Vegan Foundation. This publication can be ordered or downloaded at https://cdn.viva.org.uk/wp-content/uploads/2020/03/fishfish.pdf
- "Health Concerns about Fish" by the Physicians Committee for Responsible Medicine (PCRM). This report is available at https://p.widencdn.net/zsvtil/Health-Concerns-About-Fish-Fact-Sheet

Extension Ideas

- Present an interactive vegetarian faux fish cooking demonstration in the food technology department, teaching students how to make Veggie Tuna, Tofu Chowder, Sushi or Fishless Patties (see "A Future Without Fish – Recipe Demo" handout).
- Set up a tasting session whereby students try samples of ready-made fish alternatives such as vegan "fishcakes" and "fishless fingers".
- Show students a film such as Seaspiracy, The End of the Line or Sea the Truth. Follow up the viewing with a class debate. Divide the class into two groups. Have one group argue for the motion and one against it. Suggested motion: "This House believes that people should eat less, or no, fish." You may wish to use the structure of a British Parliamentary Debate. This could consist of four teams of two speakers, with two teams on either side of the case. Speakers, and students in the audience, should offer Points of Information (POIs) to their opponents. At the end of the debate you should vote to see if the motion is carried or opposed.

Suitable for children aged 13 to 16
English | Science | Citizenship

A Future Without Fish – Recipe Demo

Fishless Patties

Makes 8 patties

Ingredients

- 750 g potatoes, cooked in vegetable stock (e.g. 2 x vegetable stock cubes)
- 225 g smoked tofu
- 2 teaspoon capers
- freshly ground black pepper
- vegetable or sunflower oil

Method

1. Pre-heat the oven to 200°C/400°F/gas mark 6.
2. Mash the potatoes. (Do not add any liquid so that the mixture remains dry.)
3. Mash the smoked tofu and add this along with the capers and black pepper to the mashed potato.
4. Form 8 small patties.
5. Lay out the patties out on a greased baking tray, brushing the tops of the patties with a dash of oil.
6. Cook in oven as above for approximately 20 minutes, until slightly brown.

Tip:

- Fishless Patties can be served either hot or cold.

Veggie Tuna

Use as a substitute for tinned tuna for a great kids' lunch!
Makes 4 servings

Ingredients

- 2.3 kg carrots
- 2 celery stalks, chopped
- 1 small red onion, diced
- finely chopped green or red pepper (optional)
- tomato, chopped (optional)
- 115 g vegan mayonnaise
- 2 tablespoon soy sauce
- 1 tablespoon salt
- 2 teaspoon kelp powder

Method

1. Juice the carrots in an electric juicer. Save the pulp for the Veggie Tuna and enjoy the juice as an energizing beverage.
2. Combine the celery and onion. Add chopped pepper and tomato if desired. Stir in the carrot pulp. Mix in the mayonnaise, soy sauce, salt and kelp powder.

Tip:

- If preferred, you can make the mayonnaise from a few simple ingredients. Combine 225 g soft or medium-firm tofu, 75 ml safflower oil (or sunflower oil), 1 to 1½ tablespoons lemon juice and ½ teaspoon salt in a food processor and blend until smooth.

Tofu Chowder

Traditional chowders are stews or thick soups made from seafood, often made with milk or cream and eaten with salt crackers. This tofu version has just as much flavour but is kinder to the oceans and the oceans' inhabitants!
Makes 8 servings

Ingredients

- 1 medium onion
- 2 carrots
- 3 celery stalks
- 2 tablespoon oil
- 500 ml water
- 500 ml plant milk
- 225 g tofu, crumbled
- 2 teaspoon salt
- ½ teaspoon pepper
- ½ teaspoon celery seeds
- 2 large potatoes (about 500 g), peeled and cubed

Method

1. Chop the onion, carrots and celery.
2. Heat the oil in a large cooking pot. Add the onion, carrots and celery and sauté for 15 minutes.
3. Add the water and milk and stir.
4. Add the tofu, salt, pepper and celery seeds and bring to a boil.
5. Add the potatoes and let the chowder simmer until the potatoes are soft.
6. Serve with crackers.

Tip:

- Use sea salt instead of regular salt to really bring out the "chowder" flavour.

Sushi

This recipe is loaded with goodies, but you can also add radish, asparagus, spring onions, mushrooms, sesame seeds or avocado.
Makes 36 pieces

Ingredients

- 1.5 litres water
- 675 g short-grain brown rice
- 1 small cucumber
- 1 small courgette
- ½ green pepper
- ½ red pepper
- 2 small carrots
- 225 g fresh spinach
- 160 ml rice wine vinegar
- 15 g brown sugar
- 1 packet pre-toasted nori sheets (or toast your own by briefly passing the sheets over a hot flame)
- wasabi paste, to taste (can be hot, so be careful!)

Method

1. Bring the water to a boil. Add the rice, lower the heat and simmer for 40 minutes, stirring occasionally.
2. Seed and julienne the cucumber and julienne the courgette, peppers and carrots. Steam these vegetables and the spinach over boiling water for 5 to 7 minutes. Let cool to room temperature.
3. Mix together the vinegar and brown sugar and stir until the sugar is dissolved. When the rice is cooked, stir in the vinegar/brown sugar mixture and let cool to room temperature.
4. When the vegetables and rice are cool enough to handle, lay out the first nori sheet.
5. Place a handful of rice in the centre of the sheet. Moisten your hands with water, and gently but firmly spread out a thin layer of rice, in a line, to the edges of the sheet. Spread a bit of wasabi paste on top of the rice, approximately 4 cm from one edge of the nori sheet. Lay vegetable strips parallel to the wasabi, in a width of approximately 2.5 cm, along the wasabi line.
6. Carefully wrap the closest edge over the vegetables, then roll the nori delicately but tightly. Seal by moistening the edge of the nori. Once the nori sheet is completely rolled, slice the roll into 6 pieces and arrange on a platter. Repeat with the remaining nori sheets.

Tips:

- If your nori rolls won't stay rolled, try sealing the seam with maple syrup or brown rice syrup.
- Use an inexpensive bamboo sushi mat to roll up the nori sheets in order to prevent them from tearing.

Friendly Planet Problem Page

Meet the expert

Q I saw a documentary about commercial fishing – it's really bad for the environment because huge bottom trawlers scrape the ocean floor clean of all life, even coral reefs. Is fish farming better for the environment than fishing?
– **Anita, 15, London**

A Actually, fish farming, or "aquaculture", is not better for the environment. The extremely high stocking densities on aquafarms can lead to the rapid spread of diseases and parasites, which hurt and even kill farmed fish and also spread to wild fish. Fish farming is also inefficient because farmed fish need to be fed wild-caught fish! It takes 5 kilograms of anchovies to produce 1 kilogram of salmon!

Q I've just gone vegetarian, but I miss eating fish! Are there any fish-free alternatives on the market?
– **Sandeep, 15, Cardiff**

A

Q I'm worried. Apparently if humans carry on overfishing and polluting the oceans, there will soon be no fish left! What can young people do to prevent this from happening?
– **Sarah, 17, Hastings**

A

Q I've heard that fish contains omega-3 fatty acids, which are an important part of a healthy diet. Why are omega-3 fatty acids so important, and what meat free foods contain them?
– **David, 13, Glasgow**

A

Q I've started supporting Meat Free Monday but last week my Dad made us fish fingers. He says that fish don't count as meat. What can I say to help him understand it's important to leave fish out on Mondays too?
– **Nadia, 11, Manchester**

A

Q I used to be a huge lover of tuna but am trying not to eat it now, after hearing about over-fishing. Can you share any easy mock tuna recipes? – **Claire, 16, Hull**

A

Suitable for children aged 14 to 16
Citizenship | Geography | English | Science

Feed the World

Activity 1: Article

Students should be instructed to read **Feast or Famine: Meat Production and World Hunger** by Mark Hawthorne carefully.

Activity 2: Comprehension

Students should answer the following questions in order to heighten their comprehension of the issues surrounding world hunger:

Questions

1. The writer describes a picture he saw in a museum in Washington. What does the picture symbolise to him?
2. How is meat consumption linked to hunger?
3. What happened during the Ethiopian famine of 1984?
4. Why is the writer particularly worried about recent trends in meat consumption?
5. Why does the writer argue that it's better to grow soya beans than to raise cattle for meat?
6. What pun does the writer use?
7. What might someone from the meat industry say about growing grain and soya beans rather than meat?
8. What action does the writer think should be taken?

Background

There is more than enough food in the world to feed the entire human population, but millions of people still go hungry. By designing their own multiple-choice quizzes, students will explore the link between meat production and world hunger.

Learning Objectives

Children should learn the following:

- To explore the link between the meat industry and world hunger
- What it means to be a global citizen
- That local actions can have global implications

Accompanying Materials

Feast or Famine: Meat Production and World Hunger by Mark Hawthorne (student handout)

Activity 3: Multiple-Choice Quiz

1. Divide the class into teams. Teams could be named after different countries. Each team should prepare five multiple-choice questions (with three possible answers for each question) based on the content of the article and other Meat Free Monday issues. For example, they might come up with something like, "According to the United Nations, how many people go hungry every day? a) 14 million b) 500 million c) 854 million".
2. Once the questions are prepared, each team's members should choose a delegate to read out the questions for them. Give each team a small whiteboard, a whiteboard pen and 10 coloured counters.
3. The Team A delegate should ask the first question. Members of Team A should not participate, but all the other teams should write down a), b) or c) on their whiteboards. Depending on how confident they are about their answers, team members should then decide whether to should risk one, two or three counters, and place these in the centre of the table. One member of each team should hold up their whiteboard. The Team A delegate should then announce the correct answer. The teams holding up the right answer double up the number of counters they risked. The teams holding up incorrect answers forfeit the counters.
4. The quiz continues in the same vein, with teams taking turns reading their questions. If a team runs out of counters, it can still take part but will only receive one counter for each correct answer. The aim is to accumulate as many counters as possible. When all the questions have been answered, the team with the most counters wins.

Extension Ideas

- Explain that The United Nations is meeting to discuss the problems that come with an increasing world population. Students should do further research and write a formal report about how everyone can be fed.
- Design a public-information poster highlighting the problems the world faces and ways that the public can help.
- Teach students how energy is transferred in an ecosystem. Demonstrate how to draw and explain food chains and webs. Focus in particular on a human vegetarian's and a human omnivore's food chains. Show students why it is more efficient to eat grain directly than to transfer the energy through animals (since only 10 per cent of the energy from the food that is given to animals is transferred up each level of the food chain and the rest is used to support respiration, growth, movement, etc.). Have students draw biomass pyramids and make graphs to compare land-use efficiency in beef, pork, milk, egg, wheat, potato and soya bean production.
- The Belgian city of Ghent promotes an official meat free day each week (Donderdag Veggidag), and initiatives such as Meat Free Monday (UK), Meatless Monday (USA) and Segunda Sem Carne (Brazil) advocate a similar reduction in meat consumption. There are also weekly meat free day campaigns in Argentina, Australia, Bolivia, Canada, Chile, Colombia, Croatia, Denmark, Estonia, France, Germany, Ghana, Honduras, Hong Kong, Hungary, Indonesia, Iran, Israel, Italy, Jamaica, Japan, Kuwait, Luxembourg, Malaysia, Mexico, Myanmar, Nepal, the Netherlands, New Zealand, Norway, Peru, the Philippines, Portugal, Russia, Slovenia, South Africa, South Korea, Spain, Sweden, Taiwan, Thailand, Togo, Turkey and the United Arab Emirates. Have students research and report on one of these campaigns. Discuss the similarities and differences between them.

Feast or Famine: Meat Production and World Hunger

By Mark Hawthorne, *American Chronicle*, 12 August 2008

Hanging in the Newseum in Washington, DC, is a photo that is about as heart-rending an image as you're likely to find anywhere. Taken by Kevin Carter for The New York Times in 1993, the photo depicts a starving Sudanese toddler crumpled on the ground, as if her stick-like legs could no longer bear the weight of her large head and swollen stomach, bloated from the malnourishment disease called kwashiorkor. While that alone is disturbing, what makes the tableau truly haunting is the vulture patiently waiting just a few feet behind the emaciated child. This photograph earned Carter a Pulitzer Prize and epitomized the toll famine is taking on developing countries around the world.

Tragically, of course, hunger has only become an even graver issue in the last 15 years – a point made clear in a report released July 29 from the Center for Strategic and International Studies (CSIS). Recommending urgent action for long-term relief, the CSIS report calls for "a strategic U.S. approach to the global food crisis."

"Food crisis," however, implies some recent, short-term cause and effect, when in fact the "perfect storm" of rising energy costs, grain hoarding, government subsidies, drought and the demand for biofuels diverts attention from an entrenched industry and a remedy neither the CSIS nor many social activists want to contemplate: eliminating meat production.

"Whoa!" you say. "Don't take away my steaks and cheeseburgers." Meat-eating is such an ingrained aspect of Western culture that proposing its demise, even to save the world, deserves some discussion. Fair enough.

The United Nations estimates that 854 million people – nearly 13 percent of the world's human population – go hungry every day. And the problem is only getting worse. Josette Sheeran, executive director of the UN's World Food Program, says, "The world's misery index is rising."

So is our hunger for meat. As Gene Baur observes in "Farm Sanctuary: Changing Hearts and Minds About Animals and Food," in 1950, 50,000 farms produced 630 million "meat" chickens in the United States. By 2005, the U.S. had 20,000 fewer farms – but they were producing 8.7 billion chickens for meat. That's a lot of chicken feed. In fact, every year industrial animal factories in the U.S. feed 157 million metric tons of legumes, cereal and vegetable protein to livestock, resulting in 28 million metric tons of animal protein for human consumption. Nutritious plant-based food that could feed humans instead goes to feed animals in a very inefficient use of resources.

Jeremy Rifkin, president of the Foundation on Economic Trends in Washington, DC, states it succinctly: "People go hungry because much of arable land is used to grow feed grain for animals rather than people." He offers as one example the Ethiopian famine of 1984, which was fueled by the meat industry. "While people starved, Ethiopia was growing linseed cake, cottonseed cake and rapeseed meal for European livestock," he says. "Millions of acres of land in the developing world are used for this purpose. Tragically, 80 percent of the world's hungry children live in countries with food surpluses which are fed to animals for consumption by the affluent."

The demand for meat has been especially dramatic in developing countries. "China's meat consumption is increasing rapidly with income growth and urbanization, and it has more than doubled in the past generation," says Rosamond Naylor, an associate professor of economics at Stanford University. As a result, land once used to provide grains for humans now provides feed for chickens and pigs.

The USDA and the United Nations state that using an acre of land to raise cattle yields 20 pounds of usable protein. If soybeans were grown instead, that same acre would yield 356 pounds of protein. Animal agriculture also wastes valuable water resources. Population biologists Paul and Anne Ehrlich note that a pound of wheat can be grown with 60 gallons of water, whereas a pound of meat requires 2,500 to 6,000 gallons.

Here's another way to look at it. According to the aid group Vegfam, a ten-acre farm can support 60 people growing soybeans, 24 people growing wheat, ten people growing corn and only two people producing cattle. Reducing meat production by just ten percent in the U.S. would free enough grain to feed 60 million people, estimates Harvard nutritionist Jean Mayer. Sixty million people – that's the population of Great Britain, which, by the way, could support 250 million people on an all-vegetable diet.

Not surprisingly, the meat industry has a beef with these statistics. They say, for example, that the grains and soybeans fed to farmed animals are not of the high quality that humans would expect to eat (tell that to a starving child). Yet it's difficult to dispute the fact that animal agribusiness uses land and water that could be used to grow plant foods for human consumption.

As Rifkin observes, it is ironic that millions of consumers in developed countries are dying from diseases of affluence such as heart attacks, diabetes and cancer, brought on by eating animal products, while the poor in the Third World are dying of diseases of poverty caused by being denied access to land to grow food grain for their families.

"We are long overdue for a global discussion on how to promote a diversified, high-protein, vegetarian diet for the human race," says Rifkin, whose book "Beyond Beef: The Rise and Fall of the Cattle Culture" addresses the moral paradoxes of eating meat.

Are those steaks and cheeseburgers really worth all the lives they take – human and non-human? It would be naïve to think the world will go vegetarian overnight, or even in a few decades. But looking at Carter's powerful photograph, I can't help but believe we have been woefully mistaken in how we treat those with whom we share this planet. If we hope to bequeath a sustainable world to future generations, we'll have to shake loose this meat-produced disaster and embrace a kinder way of living.

Suitable for children aged 11 to 14
Food Technology | Geography | Citizenship | ICT

Food From Around the World

Introduction

Display a picture of a simple food dish such as pasta and tomato sauce. Ask students to analyse its basic ingredients – pasta, tomatoes, olive oil, basil, etc.

- Where might these ingredients have originated?
- How are they grown?
- How do local conditions affect their production?
- How can we find the answers to these questions?
- You can prompt a discussion or model some research techniques (use the school library or do an internet search) as necessary.

Group Task

Divide the class into groups (according to the needs of the students or by asking them to pull the names of countries out of a hat). Assign each group a different country (examples may include India, China, Greece, Jamaica, Israel, etc.). Each group should then work through the following task:

1. Find five foods grown in the assigned country.
2. Research how these foods are grown and processed.
3. Choose one of these foods and list three dishes from anywhere in the world that use it as their core ingredient.
4. Create a brand-new meat free dish in which this food is the core ingredient. (Each group should decide on a means to convey its idea, e.g., annotated drawing, description, recipe, etc.)

Bring the class together to share findings and ideas. Trace the journey of a couple of ingredients across the globe.

Background

Food is grown and processed in a multitude of ways. Factors such as climate and the availability of resources affect its production in different locations. This lesson will prompt students to investigate how conditions for growing food may differ around the world. They will also look at how ingredients have spread to different areas around the globe and explore some of the imaginative ways they are eaten.

Learning Objectives

Children should learn the following:

- Where certain foods are grown and processed around the world
- To apply knowledge of existing dishes in order to create their own

Accompanying Materials

Food From Around the World – Recipe Demo (teacher sheet) for extension

Extension Ideas

- Use the recipes in the "Food From Around the World – Recipe Demo" sheet provided to present an interactive meat free global food demonstration in the food technology department.
- Create a class recipe book by combining the recipes created by the students.
- Cook the dishes which students have created.
- Play "Guess the Dish – 20 Questions". One student can think of a meat free dish and the others ask a series of "yes or no" questions.
- Set a competition whereby groups of students create a leaflet providing cooking tips and recipes suitable for Meat Free Mondays. The group to come up with the most inspiring leaflet wins a prize.

Food From Around the World – Recipe Demo

Cinque e Cinque (also known as Torta di Ceci)

This dish is a specialty of Livorno, Tuscany, which is located on the northwest coast of Italy. It's a chickpea pancake which is traditionally cooked in a clay oven and served on oily bread (schiacciatina) with extra pepper. Sometimes, cinque e cinque is also served with a little fried garlic and aubergine on top. In Nice (in the south of France), a very similar dish called socca is served.

Two cooking options are given below – the traditional oven-cooking method and a quick method which is more practical for a class demonstration.

Ingredients

- 150 g chickpea flour (gram flour)
- 430 ml water
- 1 tablespoon olive oil
- salt
- pepper

Demo Tips

Tell students you are going to prepare cinque e cinque. Where might this dish be from? Ask students if they have used chickpea flour before. Ask them where they might buy it. Gram flour is now widely available in ethnic shops and in the Indian sections of supermarkets. Has anyone been to Italy? Which areas have they been to? Italy is known for its regional cooking variations – do the students know any regional dishes?

Traditional Method

Mix the ingredients together to make a smooth batter and leave to stand for at least two hours. Oil a shallow tin – approximately 30 cm in diameter – and pour in the batter to form a thin layer. Cook for half an hour in a very hot oven (250°C) until the surface is golden. Serve warm on bread with extra pepper.

Quick Method

Mix the ingredients together to make a smooth batter. Heat some oil in a frying pan. Pour in a thin layer of the batter and allow to cook. Either turn the pancake over carefully with a spatula, or if you're feeling adventurous, flip the pancake up in the air! Use the remaining batter to cook more pancakes. Serve warm on bread with extra pepper.

Guacamole

Originally from Mexico, guacamole is a dip made primarily from avocados. It dates back to the time of the Aztecs, who referred to guacamole as "ahuaca-mulli" (roughly translated, this means "avocado sauce" or "avocado mixture").

Ingredients

- 3 ripe avocados
- 2 spring onions
- 1 clove garlic
- 1 mild green chilli
- 1 tablespoon freshly squeezed lime juice (approx 1½ limes)
- few drops hot pepper sauce
- salt and ground black pepper
- 2 tomatoes, stems and seeds removed

Demo Tips

Ask students if they have ever tried guacamole. What country is it from? What ingredients does it contain?

It's important that students be able to tell which avocados to buy, so have a selection of avocados with you, including some which are not yet ripe. Ask the students to feel them and tell you which ones should be used. Check for ripeness by gently pressing the outside of the avocado. If there is no give when you press an avocado, then it is not ripe yet and will not taste good. If there is a little give, the avocado is ripe. If there is a lot of give, the avocado may be overripe – black inside and not good.

Ask students why it's important to avoid touching their eyes after cutting chillies.

Have any of the students visited Mexico? What are some of the country's other traditional foods?

Method

Cut the avocados in half, scoop out the fruit and place it in a mixing bowl. Mash the avocado well with a fork. Chop the spring onions, garlic and chilli and add these. Squeeze the juice from the limes and add the juice, the hot pepper sauce and some salt and pepper. Remove the seeds from the tomato, chop finely and add the tomato to the mixture. Serve the guacamole with corn chips.

Suitable for children aged 11 to 16
Science
Citizenship | English | Geography | ICT

How Burgers Are Damaging the World

Introduction

Start the lesson by asking the class to list ways in which we can help the environment.

Expect to get answers such as "recycle", "use energy-efficient light bulbs", "cut down on flying" and so on. Perhaps someone in the class will come up with "reduce our meat intake". Before starting the following quiz, it may be a good idea to initiate a class discussion to get students thinking about these issues.

Activity 1: Quiz

Divide the class into teams and tell them that they are going to play **20 Questions – An Environmental Quiz**. Not only should this get them more engaged in the subject matter, it will also give you a chance to assess what they already know. Ask the questions and get the groups to confer and write down what they think. Wait until the quiz is over to review the correct answers. Alternatively, you could give each group the questions and let them work on them at their own pace, going around the class to help as necessary. For younger students, you may wish to adapt the quiz so that all the questions have multiple-choice answers. It could even be prepared as a computer quiz with tick boxes. The winning team could be awarded a prize such as some fair trade, dairy-free chocolate.

Activity 2: Design a Leaflet

Using the answers to the quiz and further internet research, instruct students to design a public information leaflet. The leaflet should help the public understand the devastating environmental impact of meat, which is not widely known. How can the students get the message across most effectively?

Activity 3: Essay

Set the following essay: You can't be a meat-eating environmentalist. Would you agree?

Background

Climate change. The overexploitation of natural resources. Deforestation. The loss of land from inefficient land use. Water and air pollution. Some of the most serious environmental problems of our time are directly linked to meat-eating. These are complex issues, but this lesson tackles them in a way that seeks to engage students and get them thinking.

Learning Objectives

Students should learn the following:

- To consider how individual actions taken at a local level may have positive or negative effects locally and globally
- To identify ways in which they can help the environment
- To select and present information clearly and comprehensively, using appropriate methods

Accompanying Materials

- 20 Questions – An Environmental Quiz (student handout)
- Quiz Answers (teacher sheet)

Extension Ideas

- Some people don't believe climate change is actually happening. Have students research alternative viewpoints.
- Show students the film Food, Inc. starring Eric Schlosser and Michael Pollan. Available from Amazon, the film explores America's corporate controlled food industry and its effect on the planet.
- Hold a class discussion titled "Think Globally, Act Locally".
- Ask students to create the "20 Questions" quiz electronically using "forms" in Word (drop-down menus, text fields, check boxes, etc.). They may wish to add further multiple choice options on any questions they found difficult. Students can then take this to another class so that students from that class can complete it on the interactive whiteboard, or students can get friends/family members to complete it outside school.

MEAT Monday FREE

20 Questions – An Environmental Quiz

1 Approximately how much of the Earth's land surface do you think is used for raising farmed animals?
a) 10 per cent b) 20 per cent c) 30 per cent

2 Order the following three foods according to their environmental footprint ('1' causing the most greenhouse gas emissions and '3' causing the least): cheese, tofu, beef

3 Where are rainforests cut down to make room for cattle grazing and for growing crops to feed animals?

4 Name at least one problem associated with cutting down rainforests.

5 What can soya be used for?

6 What percentage of the world's soya crop is currently fed to animals?

7 Up to how many kilograms of grain can it take to produce 1 kilogram of beef?
a) 4 kilograms
b) 8 kilograms
c) 12 kilograms

8 One method of commercial fishing is called "bottom trawling". Can you describe in one sentence what this activity might involve?

9 Some people argue that raising animals for food is very inefficient. Why?

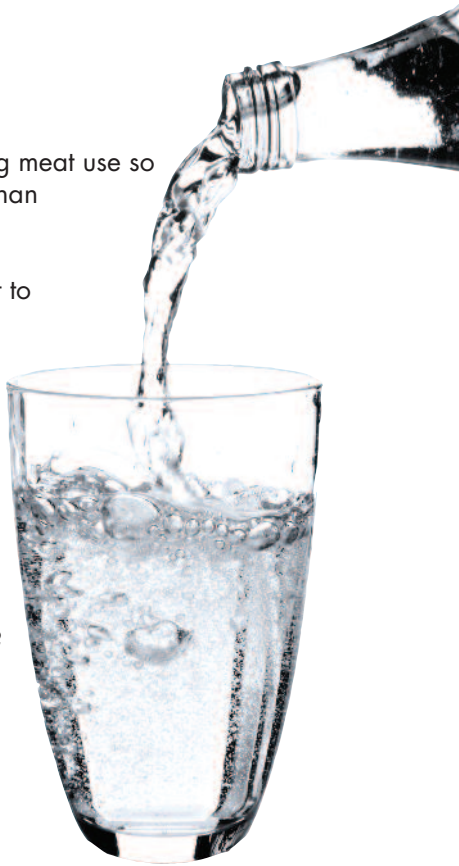
10 Name three ways in which we can we conserve energy in our everyday lives.

11 Why does producing meat use so much more energy than producing plant foods?

12 Why is it important to conserve water?

13 Name one way we can all conserve water.

14 The water used to produce one beef burger could be used to produce how many soy burgers?
a) 3
b) 10
c) 15



15 According to a 2013 United Nations report, what percentage of the world's greenhouse-gas emissions does the meat industry produce?

16 CO_2, CH_4 and N_2O are three greenhouse gases. Do you know their full names?

17 Which of the greenhouse gases listed above is the most environmentally devastating?

18 Can you think of one more way in which the meat industry is damaging the environment?

19 Name three ways we can eat more sustainably.

20 Can you name five different countries which have meat free day campaigns?

Quiz Answers

1: c) 30 per cent
30 per cent of all land on Earth is used for livestock and feed production. Source: Food and Agriculture Organisation of the United Nations

2: 1) beef, 2) cheese, 3) tofu
Source: Environmental Working Group

3: South America (Amazon rainforest)

4: Possible answers: Climate change; displacing people from their homes; threatening people's livelihoods (by destroying their sources of fuel, wood, medicinal plants and food); making land infertile; endangering plant and animal species; decreasing the amount of oxygen produced by plants

5: Possible answers: Food for humans (soya milk, soya ice cream, soya yoghurt, tofu, soya mince, veggie burgers, veggie sausages), food for animals

6: 97 per cent. Source: Food and Agriculture Organisation of the United Nations

7: c) 12 kilograms
Source: US Department of Agriculture

8: Possible answer: Bottom trawling literally scrapes the ocean floor clean of life. The largest bottom trawl nets are as wide as the length of a rugby field. Using heavy metal rollers they crush everything in their path.
Source: Greenpeace

9: Because animals eat large quantities of grain, soya beans, oats and corn but produce relatively small amounts of meat, dairy products or eggs.

10: Possible answers: Turn off the lights when we leave a room, turn the TV off, use energy-efficient light bulbs, install roof and wall insulation in our homes

11: Possible answer: There are so many energy-intensive stages involved in producing meat, including growing grain for animal feed, transporting the grain, operating feed mills, operating factory farms, transporting animals to slaughter, operating slaughterhouses, transporting meat to processing plants, operating meat-processing plants, transporting meat to shops and supermarkets and keeping meat refrigerated or frozen.

12: Possible answers: We are all part of a connected system which is fragile and threatened by water shortages. Only 2.8 per cent of the Earth's water is fresh water; it is concentrated in lakes, streams, glaciers, ice caps and atmospheric water vapour. We are using the planet's fresh water faster than it can naturally be replenished. During droughts, the supply of fresh water is reduced.
NB: As Western diets spread to the rest of the world, even nations in Africa and the Middle East which have large amounts of desert land are pouring what little water they have into meat production.

13: Possible answers: Turn the taps off when we brush our teeth; don't turn the washing machine on unless we've got a full load; water our gardens with a watering can instead of a sprinkler; take a shower instead of a bath; fix dripping taps; use the minimum amount of water required when we boil water; reduce our meat intake.

14: c) 15
Source: AE Ercin, MM Aldaya and AY Hoekstra, "The water footprint of soy milk and soy burger and equivalent animal products"

15: 14.5 per cent
Source: Food and Agriculture Organisation of the United Nations

16: CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide

17: Nitrous oxide. Nitrous oxide is about 300 times more potent as a greenhouse gas than carbon dioxide. According to the UN, the meat, egg and dairy industries account for a staggering 65 per cent of global nitrous-oxide emissions. And methane is more than 23 times more powerful than carbon dioxide when it comes to trapping heat in our atmosphere.
Source: Food and Agriculture Organisation of the United Nations

18: Possible answers: Animal waste, antibiotics, hormones, fertilizers and pesticides sprayed on crops can all damage river and stream ecosystems and the surrounding environment.

19: Possible answers: Eat less meat and dairy, choose local, seasonal ingredients and use leftovers rather than throwing food away.

20: Possible answers: Argentina, Australia, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Croatia, Denmark, Estonia, France, Germany, Ghana, Honduras, Hong Kong, Hungary, Indonesia, Iran, Israel, Italy, Jamaica, Japan, Kuwait, Luxembourg, Malaysia, Mexico, Myanmar, Nepal, the Netherlands, New Zealand, Norway, Peru, the Philippines, Portugal, Russia, Slovenia, South Africa, South Korea, Spain, Sweden, Taiwan, Thailand, Togo, Turkey, the United Arab Emirates, UK, USA.

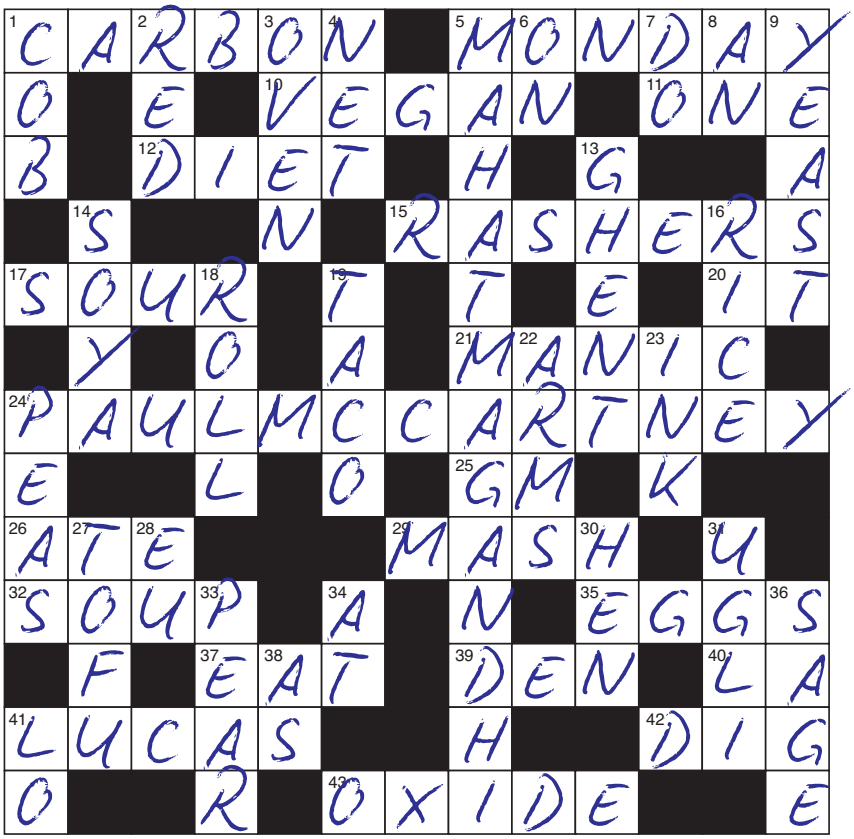
Suitable for children aged 11 to 16
English | ICT | Maths

Meat Free Monday Crossword

Activity 1: Complete a Crossword

Distribute photocopies of the **Meat Free Monday Crossword** to students and ask them to complete the puzzle in pairs or groups. Strongly discourage students from calling out the answers.

Answers



Background

Solving crossword puzzles helps one develop reasoning skills and improves one's vocabulary and spelling. Crossword puzzles are also associated with recreation, so they can provide an engaging activity during subject reviews. This lesson goes one step further, allowing students to create their own crossword puzzles, thereby improving their ICT skills and getting them to think in greater depth about the reasons for having a weekly meat free day.

Learning Objectives

Students should learn the following:

- To explore Meat Free Monday issues in the context of crossword puzzles
- To use ICT skills such as cell formatting in spreadsheets
- To consider and create definitions for a variety of words

Accompanying Materials

- Meat Free Monday Crossword (student worksheet)
- Meat Free Monday Crossword Calculators (student handout)

Activity 2: Create a Crossword

Help students create their own Meat Free Monday crossword puzzles.

After they finish, students can complete each other's puzzles. Alternatively, the puzzles can be compiled in a "Meat Free Monday Puzzle Compendium" (a necessary addition to the staff room coffee table and the head teacher's office!).

Students can see how "dense" and "green" their crossword puzzles are by using the "How Crossed Are Your Words?" and "How Green Are Your Words?" calculators. These should be photocopied or displayed for your students so they can assess their puzzle-making skills. The aim is to have as many blank squares and as many words that relate to Meat Free Monday as possible.

Students who find this task too challenging might enjoy creating a word-search puzzle instead.

How to Make a Crossword Puzzle in 10 Easy Steps

1. Open spreadsheet software such as Excel, highlight all cells and manually resize into squares.
2. Make a grid by adding cell borders. (A 10-by-10 grid would allow for an easy percentage calculation at the end of the lesson.)
3. Think of words you would like to include in the crossword puzzle. Make sure that words related to topics such as the environment, the Earth, animals and health are prioritised.
4. Add these words to the grid, placing one letter in each square.
5. Highlight the whole grid and neaten it up by formatting the cells so the letters are centred and appropriately sized. Fill in the remaining blocks with a solid colour.
   Note: Pay close attention to where the solid blocks go. At the end of each word, there should usually be a solid block, and whenever letters are adjacent to each other, there should be an accompanying clue. Some people make the mistake of confusing crossword puzzles with word-search puzzles.
6. Complete the grid. Don't expect to complete your grid without having to change any words. Constant editing is a necessary part of the process.
7. Highlight and copy the completed grid to another part of the spreadsheet and delete all the letters.
8. Insert a number into every square of the grid where a word should begin (across and down). See other crossword puzzles for standard numbering conventions.
9. Highlight the numbered copy of the grid and format the cells so that the numbers are in a smaller point size and aligned to the top left.
10. The blank, numbered crossword puzzle is now ready. Highlight and copy it into a word-processing document. You may wish to give your puzzle a title. Type the "across" and "down" clues underneath it using dictionaries and thesauruses to help generate clues.

Meat Free Monday Crossword Calculators

"How Crossed Are Your Words?"

Instructions: Divide the number of blank squares in your crossword puzzle (i.e., the squares into which people put their answers) by the total number of squares in the grid, and then multiply by 100.

The Meat Free Monday Crossword achieved a 70 per cent crossed-word rating (119 blank squares divided by 169 total squares multiplied by 100).

Results

0 to 50 per cent:
OK, but can you make a crossword puzzle with more blank squares than solid ones?
50 to 60 per cent:
Good going. You really did well!
60 to 70 per cent:
Wow, that's a quality crossword puzzle!
70 to 100 per cent:
Unbelievable! You're a crossword pro!

"How Green Are Your Words?"

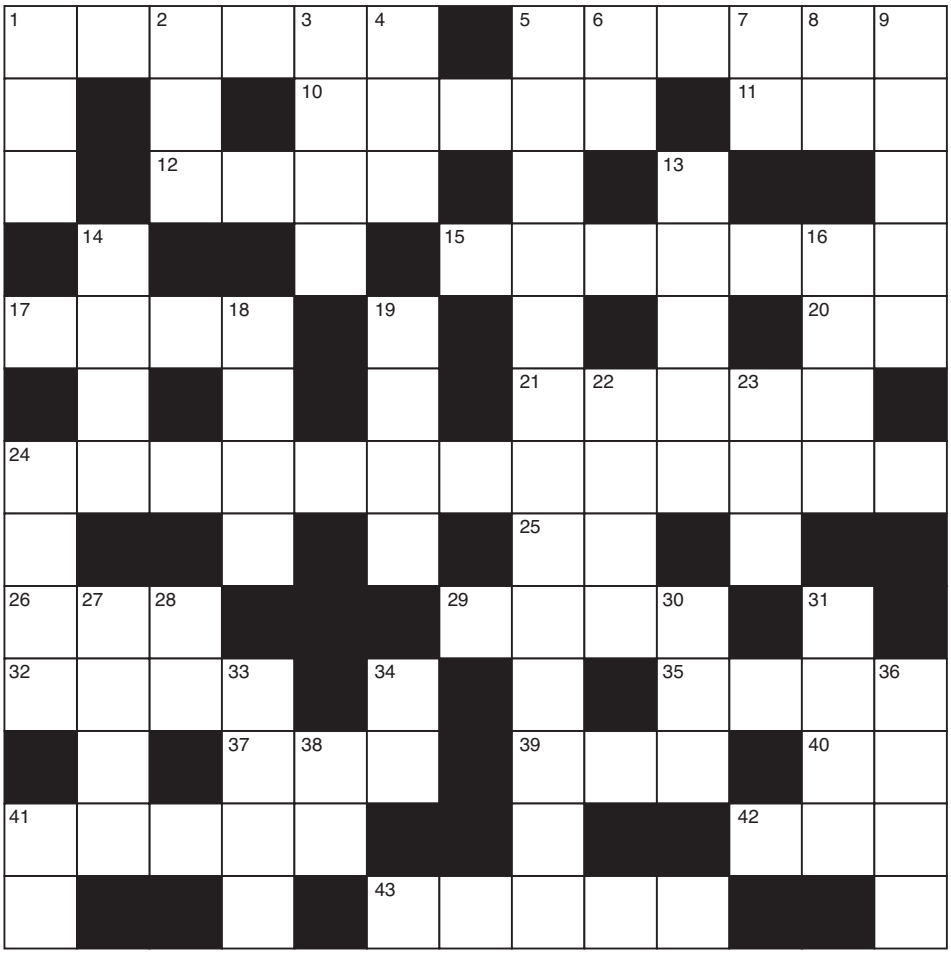
Instructions: Divide the number of words relating to Meat Free Monday in your crossword puzzle by the total number of words in the grid, and then multiply by 100.

The Meat Free Monday Crossword achieved a 51 per cent green rating (24 words that relate to Meat Free Monday divided by 47 total words multiplied by 100).

Results

0 to 50 per cent:
Nice try. Could any of your words be greener?
50 to 60 per cent:
Great job! The majority of your words are spot on!
60 to 70 per cent:
Wow, that's fantastic – not easy to do!
70 to 100 per cent:
Definitely send this in. The Meat Free Monday campaign would love to see it!

Meat Free Monday Crossword



Across

1 This kind of footprint is your mark on the planet. (6)
5 The best school lunch is served on this day! (6)
10 A person who doesn't eat animal products of any kind (5)
11 MFM slogan: _____ day a week can make a world of difference. (3)
12 MFM encourages people to have a meat free _____ on Mondays. (4)
15 These meat free bacon-style strips are among the many alternatives to meat products available in shops. (7)
17 Sweet and ____ vegetable stir-fry is a delicious meat free meal. (4)
20 Common pronoun (2)
21 Frenzied, excited and full of energy (5)
24 Meat Free Monday celebrity, Beatle (4, 9)
25 Genetically modified (2)
26 Past of 37 (3)
29 What you do to potatoes if you want them soft and smooth (4)
32 "Cream of Tomato" and "Minestrone" are common meat free examples of this. (4)
35 Chickens hatch out of these. (4)
37 What you do at lunchtime (3)
39 Bears live in this (3)
40 This city in the USA supports Meat Free Monday. (2)
41 Matt _____ : Meat Free Monday supporter and star of Little Britain (5)
42 What you must do to get potatoes and other root vegetables from the ground (3)
43 Nitrous _____ is a greenhouse gas 310 times more powerful than CO2. (5)

Down

1 Corn on the _____ makes a tasty meat free starter. (3)
2 The colour of strawberries (3)
3 Roast potatoes are cooked in this. (4)
4 Fish are trapped in this. (3)
5 Vegetarian Indian political and spiritual leader (7, 6)
6 Opposite of "off" (2)
7 Verb - to perform an act, duty, role, etc. (2)
8 Indefinite article used before words beginning with vowels (2)
9 Bakers use this to make their bread rise. (5)
13 This Belgian city has an official weekly meat free day. (5)
14 97 per cent of the yield from this versatile crop is currently fed to animals (4)
16 Grain grown in warm, wet climates or countries (such as India and China) with rainy seasons (4)
18 Bap, cob, barm cake, muffin or _____; veggie burgers taste good in this! (4)
19 Tortilla wrapped around beans and vegetables (4)
22 Limbs on a body (4)
23 Liquid used in pens (3)
24 These small green vegetables go well with a meat free roast or veggie bangers and mash. (4)
27 Bean curd – great in meat free stews and curries! (4)
28 European Union (2)
30 A social animal who likes to scratch for food, take dust baths and build nests (3)
31 Unattractive fruit – cross between a grapefruit and a mandarin (4)
33 Common fruit picked in autumn (4)
34 Preposition used to indicate position (2)
36 Herb (used in some meat free sausages) (4)
38 Common adverb (2)
41 Interjection, used as an expression of surprise (archaic) (2)

Suitable for children aged 11 to 16
Music | English | Citizenship

Meat Free Monday Through Music

Preparation

Choose a "protest song" or song with a message and have this with you (on CD or via a YouTube link) at the start of the lesson.

Introduction

Ask the students about the music they like and listen to. Ask them if any of their favourite songs have a message. Brainstorm "protest songs", e.g. songs which express a political or ethical message, or songs which make a comment about society. Such songs often call directly for something to happen or something to be changed by informing us, by appealing to our hearts and our emotions, or by challenging commonly held ideas.

Students may come up with some of the following:

- Merry Xmas (War Is Over) – John & Yoko/Plastic Ono Band
- Give Peace a Chance – John & Yoko/Plastic Ono Band
- Born in the U.S.A. – Bruce Springsteen
- Earth Song – Michael Jackson
- Black or White – Michael Jackson
- Sunday Bloody Sunday – U2
- Blowin' in the Wind – Bob Dylan
- Do They Know It's Christmas? – Band Aid
- Meat Is Murder – The Smiths
- Fight the Power – Public Enemy
- Big Yellow Taxi – Joni Mitchell
- Redemption Song – Bob Marley
- Another Day in Paradise – Phil Collins
- Where is the Love? – Black Eyed Peas

Activity 1: Listening Exercise 1

Write the following questions on the board:

- What is the issue?
- What is the aim of the song?

Play your song and ask students to listen, bearing these questions in mind.

Have a feedback session and ask students whether the song had any effect on them. After listening to the song, do they feel encouraged to take any action?

Background

Music is powerful – it can influence how we feel, how we think and how we act. This lesson encourages students to explore Meat Free Monday through music.

Learning Objectives

Students should learn the following:

- To identify how lyrics can be used to convey mood, express an observation about society and inspire action
- To identify how repetition can make lyrics and melody easier to remember
- To compose a song with an awareness of the relationship between lyrics and melody

Accompanying Materials

- Song of your choice (see Introduction on left)
- Meat Free Monday – Song Lyrics
- Meat Free Monday Through Music – Blues Handout
- Paul McCartney's Meat Free Monday song – both versions (short and full) are available at Meat Free Monday's YouTube channel – youtube.com/user/SupportMFM

Extension Idea

- Have students think about music in adverts/commercials and then re-focus on the aims of the Meat Free Monday campaign which they brainstormed previously. In groups, students should then create an advert including a script, music/jingle and tag lines, bearing in mind a target demographic. They should then perform or record their adverts for other members of the class to hear.

Activity 2: Preparing to Write a Song

Divide the students into groups of four or five. Ask them to think about Meat Free Monday and jot down the main messages of the campaign. What kind of campaign is it? How does it compare to campaigns which students are aware of? Who are the target audience? You may wish to give students ten minutes to look at the MFM website.

Have students give feedback. Write up their suggestions of what the main messages of Meat Free Monday are on the board as well as the style of the campaign.

Main messages

- To raise awareness of the environmental benefits of eating less meat and dairy
- To highlight the fact that eating meat free is good for people's general health
- To show people that it is easy to have a weekly meat free day

Campaign style

MFM spreads these messages in a fun, positive way, which is not "preachy" or too forceful. The campaign has many high profile/celebrity supporters and provides practical advice.

Activity 3: Listening Exercise 2

Play/show Paul McCartney's Meat Free Monday song which can be found on YouTube on the Support MFM channel. Short version: youtube.com/watch?v=XQ2PH5pG9fs&feature=channel&list=UL
Full version: youtube.com/watch?v=_tPmyRIoUGQ

Students can also be given copies of the Meat Free Monday – Song Lyrics handout which has the lyrics of both versions.

- What is the tone of the song?
- What does the song tell us about the campaign?
- If the school wasn't already supporting MFM, would the song encourage students to take part?

Activity 4: Song Composition

At the end of the YouTube clip, Paul McCartney encourages people to come up with their own Meat Free Monday songs.

For younger students (11 – 12 year olds):

Encourage the students to use rhythm, pulse and patterns to create short group compositions. Rhythmically chanting the names of fruit or vegetables (e.g. apple, apple, pineapple) can create hypnotic rhythmic patterns. Students should work in pairs at a table with two other pairs and the patterns they create can then be developed into three layered cross-rhythms running at the same time. Scores of the music should be created using graphic notation with a link to traditional notation – this could be set as homework.

For older students (13 – 16 year olds):

Song-writing works well when there is a structure underpinning it – for this exercise the blues can be effective so that students then have a lyric structure to follow.

Use a lyric structure with 3 lines – lines 1 and 2 should be the same and line 3 should be different but should rhyme with lines 1 and 2. The music should follow the traditional chord pattern using the tonic (chord I), the subdominant (chord IV) and the dominant (chord V).

The blues would need to be introduced in previous lessons, so that once you reach this part of the Meat Free Monday session, students will already have some background and will be familiar with blues structures. You may wish to give students the **Meat Free Monday Through Music – Blues Handout** to use as a planning tool.

Students should form small bands in which to write, rehearse and perform their Meat Free Monday songs.

Play these songs to the class and record them. Which are most effective? Why? Which ones didn't quite work? Why not? How could they be improved?

Meat Free Monday Through Music – Blues Planning Sheet

Blues Lyric Structure

"The first line of the Blues is always sung a second time.
The first line of the Blues is always sung a second time.
So by the time you get to the third line you've had time to think up a rhyme"

Group members
Elements: Vocals/rap? Tune/melody? Blues chords? Bass? Rhythm?
Producer: (Group leader)
Rehearsal notes: Who is doing what?
Final Blues Lyrics Line 1
Line 2
Line 3

Meat Free Monday – Song Lyrics

Meat Free Monday by Paul McCartney
(short version)

Well, Meat Free Monday
It's a fun day
Yeah, Meat Free Monday
Is happening round the world

It's Meat Free Monday
Yeah, it's a fun day
And it's happening all around the world

Come on join us
Join Meat Free Monday
It's a fun day
And it's happening around the world

Meat Free Monday
Hey, it's a fun day
And it's happening all around the world

Yeah, Meat Free Monday
Oh such a fun day
And it's happening all around the world

Meat Free Monday by Paul McCartney
(full version)

(Intro)

Meat Free Monday
It's a fun day
And it's happening all around
the world

Meat Free Monday
It's a fun day
And it's happening all around
the world

Think about the future
How the world will be
If we don't do something
We face calamity

Think of greenhouse gases
Melting polar ice
Ocean levels rising
Better not think twice

Meat Free Monday
It's a fun day
And it's happening all around
the world

Meat Free Monday
It's a fun day
And it's happening all around
the world

Think of too much livestock
Warming up the land
Gotta think of answers
Gotta have a plan

Think about the future
How the world will be
If we don't do something
We face calamity

Meat Free Monday
It's a fun day
And it's happening all around
the world

After Sunday
Meat Free Monday
And it's happening all around
the world

(Instrumental)

Meat Free Monday
It's a fun day
And it's happening all around
the world

Meat Free Monday
It's a fun day
And it's happening all around
the world

Meat Free Monday
It's a fun day
And it's happening all around
the world

(Fade)

Suitable for children aged 11 to 16
English | Science | Citizenship

Meat on Trial

Introduction

Explain to the class that "meat" has been accused of some terrible crimes against human health. These crimes include increasing a person's risk of heart disease, strokes, certain types of cancer, diabetes and obesity. "Meat" will now be put on trial, and it's up to students to prepare cases for the defence and prosecution. A jury will then decide whether "meat" is guilty on all counts, guilty on some counts or innocent.

Practicalities

Divide the class into two groups – the prosecution and the defence. From these two groups, create six subgroups or pairs: "general", heart disease, strokes, diabetes, cancer and obesity. Each group or pair should be given the handout **Meat on Trial**. You should read through this handout before students start their research. You should also print out a picture of some meat. This picture will later serve as the "defendant".

Trial Preparation

Each pair or group of three should research the health issue that it's been assigned. For example, if the students in the group or pair are on the "heart disease" prosecution team, they should find as much evidence as possible that eating meat increases a person's chance of developing heart disease. If they're on the "heart disease" defence team, they should try to find evidence disproving a link between meat-eating and heart disease. Students in the "general" groups should confer with the others on their team and prepare an opening statement. Opening statements should be clear and well organised and rely on persuasive techniques (such as rhetorical questions). They could also question the credibility of the opposition's "witnesses" (for the purposes of this lesson, "witnesses" could be meat industry websites, nutritionists' advice, vegetarian organisations' websites, newspaper reports and so on). The trial preparation could be assigned as homework so that class time could be devoted to the trial itself. Advise students that a useful way to find information is to enter the disease they're researching into a search engine along with the word "meat".

The Trial

Choose 12 students for the jury (they should be chosen from both the prosecution and the defence) and have them sit separately in a group. Alternatively you may wish to arrange for students from another class to sit as the jury, to encourage a non-biased verdict. The teacher (or perhaps a confident student) should preside as the judge. The prosecution and defence should take turns reading their opening statements. After they're finished, the defence should call its witnesses, and each of the subgroups should succinctly tell the court what they discovered about each disease's purported link to meat consumption. The defence should then report its findings. Next, call for a short break to allow the prosecution and the defence to plan their closing statements (based on what they have heard). Finally, the teams should present their closing statements, and the jury should give its verdict. If meat is found guilty, you may want to give it a "sentence" (e.g., reduced meat consumption required, no meat consumption permitted, etc.).

Background

This lesson looks at opposing views on meat consumption. Some people and organisations claim that meat is good for you while others say that a vegetarian or vegan diet is healthier than a diet that includes meat and that meat consumption can actually contribute to a number of serious health problems. This lesson uses the format of a court case to engage students and encourage lively interaction.

Learning Objectives

Students should learn the following:

- To explore the purported health benefits of a meat free diet
- To use the internet to find information and evidence
- To evaluate arguments and draw their own conclusions
- To contribute to a structured oral presentation in front of the class

Accompanying Materials

Meat on Trial (student handout)

Extension Ideas

- Hold a class discussion. Were students surprised by the evidence presented at the trial? What did they think of the different websites they visited and how the information was presented? Were references given? Will the trial have any effect on their future dietary choices?

Useful Webpages

Academy of Nutrition and Dietetics: eatright.org/food/nutrition/vegetarian-and-special-diets/vegetarianism-the-basic-facts
British Dietetic Association: bda.uk.com/resource/vegetarian-vegan-plant-based-diet.html
Meat and Health: meatandhealth.com
NHS: nhs.uk/livewell/vegetarianhealth/pages/vegetarianhealthhome.aspx
Physicians Committee for Responsible Medicine (PCRM): pcrm.org/health
Meat Free Monday: meatfreemondays.com/category/health-and-wellness

Meat on Trial

"Meat" has been accused of increasing the risk of heart disease, strokes, certain types of cancer, diabetes and obesity. There have been countless studies and many newspaper articles pointing to a link between meat consumption and these health problems.

General

"Eating meat 'raises risk of heart disease, diabetes and pneumonia'"
– The Guardian
theguardian.com/food/2021/mar/02/eating-meat-raises-risk-of-heart-disease-diabetes-and-pneumonia

"Vegetarian diet proved to fight disease"
– The Daily Mail
dailymail.co.uk/health/article-56669/Vegetariandiet-proved-fight-disease.htm

Heart Disease

"Heart attack: One of the best diets to significantly reduce your risk of deathly condition"
– The Express
express.co.uk/life-style/health/1473027/heart-attack-diet-vegan-meat-reduce-risk

"From omnivore to vegan: The dietary education of Bill Clinton"
– CNN
edition.cnn.com/2011/HEALTH/08/18/bill.clinton.diet.vegan/index.html

Strokes

"A vegetarian or vegan diet could reduce the risk of stroke by up to 10 per cent, say researchers"
– iNews
inews.co.uk/news/health/vegetarian-and-vegan-reduces-risk-of-strokes-907603

"Going vegetarian could lower your risk of stroke, says study"
– Metro
metro.co.uk/2020/02/27/going-vegetarian-lower-risk-stroke-says-study-12311348

Cancer

"Vegetarians 'avoid more cancers'"
– BBC
news.bbc.co.uk/1/hi/health/8127215.stm

"Even moderate intake of red meat raises cancer risk, study finds"
– The Guardian
theguardian.com/society/2019/apr/17/even-moderate-intake-of-red-meat-raises-cancer-risk-study-finds

Diabetes

"Major study examines meat-diabetes link"
– Fox News
foxnews.com/health/2013/06/18/major-study-examines-meat-diabetes-link

"Brits who eat more steak and sausages are a third more likely to get diabetes, study warns"
– The Sun
thesun.co.uk/news/14207000/eating-more-red-meat-increased-chance-diabetes

Obesity

"Rejecting meat 'keeps weight low'"
– BBC
news.bbc.co.uk/1/hi/health/4801570.stm

"Doctors 'to call for cigarette-style health warnings on red and processed meat'"
– The Mirror
mirror.co.uk/news/uk-news/doctors-to-call-cigarette-style-13911641

Preparing for the Trial

Prosecution

Find as much evidence as you can to prove that eating meat increases the risk of heart disease, strokes, cancer, diabetes and obesity.

Defence

Find as much evidence as you can to disprove a link between meat consumption and an increased risk of heart disease, strokes, cancer, diabetes and obesity.

Tips

- Keep any quotes that you use short and succinct.
- Use reputable websites and studies rather than blogs or forums.
- Practice summarising your information with a partner.

Suitable for children aged 13 to 16
Citizenship | Science | English

Meet Your Meat

Activity 1: True or False?

Divide the students into pairs or groups so they can discuss each statement as a team before writing down their answers. Read the following statements and ask students to write down "true" or "false":

1. Mother hens cluck to their unborn chicks, and the chicks chirp back to their mothers from inside their shells. True
It is thought that the mother and chick chirp back and forth to each other to help the chick identify the mother and establish communication between them.

2. Geese mate for life and grieve over their lost partners for a long time. True
If one mate is killed, it is common for the other goose to stop grooming, lose interest in food and even move slowly – all of which are classic signs of deep depression. The bereaved goose may never take another partner.

3. Pigs are naturally dirty animals. False
Pigs are naturally clean animals, but on factory farms, pigs are forced to stand in their own manure – or sit above it and breathe in its fumes if it falls into a waste pit below.

Pigs do not have sweat glands, so pigs sometimes lie in mud in order to stay cool and ward off flies.

4. Cows naturally produce milk at all times during their lives. False
Cows produce milk for about 10 months after having a calf and are then impregnated again. Cows produce milk for the same reason that humans do: to nourish their young. On dairy farms their calves are taken away from them shortly after birth, and humans drink the cows' milk instead.

5. In nature, mother pigs build nests out of twigs and give birth in them. True
Pigs kept on factory farms live in concrete enclosures and are unable to dig holes in the dirt as they naturally would. On factory farms, you can find sows who have bloody noses from trying to "root" in the concrete as they get ready to give birth.

6. Sheep all look very similar, so members of a flock cannot recognise each other. False
Every sheep has a different face, and flockmates can recognise each other. Studies have shown that they can even recognise other sheep they know from photographs – even after they've been separated for years.

7. When given a round object such as a melon, turkeys and chickens will play with it and roll it around in much the same way that we might play with a football. True
Many animals love to play as we do, and as with people, some animals are more athletic than others.

8. Chickens communicate with each other by using just two different sounds – a cluck and a peep. False
Chickens communicate using at least 24 distinct sounds, including separate alarm calls that identify different kinds of predators, such as a dog on the ground or a hawk in the sky.

Background

No matter what your school's primary reason for taking part in Meat Free Monday – be it to reduce the school's environmental impact, encourage healthy eating or cut school spending – most people find it reassuring to know that taking part is also a compassionate step that helps prevent cruelty and suffering.

Over 60 billion animals are farmed and killed for meat each year. Most of them are raised in intensive factory farms, in cramped, overcrowded cages, sheds and pens.

This lesson prompts students to consider the issues by giving them the opportunity to "meet their meat".

Learning Objectives

Students should learn the following:

- To recognise that animals have the same basic needs and experience similar sorts of emotions to humans
- To be aware of the ways in which animals are treated on factory farms today
- To contribute ideas, discuss issues and listen to others' views

Accompanying Materials

Meet Your Meat (student handout)

Go through the answers and ask the students if they were surprised by any of the facts. You can extend this part of the lesson by asking the students if they know any interesting facts about animals' abilities, feelings or ways of life. They might have learned other facts while watching documentaries about animals and can use these to create more true-or-false questions for other students.

Activity 2: Reading Comprehension

Photocopy the student handout **Meet Your Meat**. Ask students to read the information carefully, then instruct them to answer the comprehension questions which follow.

Activity 3: Question Time

This part of the lesson covers the moral and ethical issues associated with vegetarianism. Divide the class into groups, and give each group a different question to discuss. Prompt students if necessary (as appropriate to the students, or using the suggestions below), or let them conduct internet research at home or in class. Have a class feedback session in which all groups report back to the class by reading their questions and conclusions. Members of groups may disagree, but all opinions should be represented in the feedback. Other members of the class can also comment.

- What would happen to all the animals if everyone went vegetarian, and how would farmers make a living?
- Are humans natural carnivores?
- Is it OK to eat animals whom we believe to be less intelligent than humans?
- Humans have eaten animals throughout history. If it were wrong to eat animals, wouldn't it be illegal?

Teacher Prompts (Vegetarian Perspective)

What would happen to all the animals if everyone went vegetarian, and how would farmers make a living?

People wouldn't stop eating animals overnight. As the demand for meat decreased, fewer animals would be raised for their flesh. If there were fewer of these animals, those remaining would be able to live more natural lives. Farmers would turn to other types of agriculture – after all, no one who stops eating meat stops eating!

Are humans natural carnivores?

This is a much-debated question. Often highlighted is the fact that our long, winding intestines make it impossible for us to rapidly expel meat from our bodies as true carnivores do. Not only do carnivorous animals have short digestive tracts, they also have claws and long, curved fangs, and they do not perspire through their skin. We have flat, flexible nails and do perspire through our skin, and our "canine" teeth are minuscule compared to those of carnivores.

Is it OK to eat animals whom we believe to be less intelligent than humans?

One might argue that possessing superior intelligence does not entitle one human to abuse another human, so why should it entitle humans to abuse non-humans? There are also different types of intelligence: Try navigating using the Earth's magnetic field as many birds do, collecting dew to drink as the desert mouse does, crossing a river on a leaf as ants do or sending signals underground as elephants and (by tapping on tree trunks) frogs do.

Humans have eaten animals throughout history. If it were wrong to eat animals, wouldn't it be illegal?

Just because something has been going on for a long time doesn't mean that it's right. And legality is no guarantee of morality, either. The law changes as public opinion changes. Child labour, human slavery and the oppression of women were all legal and commonly accepted at one time, but that does not mean that they were ever ethical.

Use the **MFM Impact Calculator** at meatfreemondays.com/calculator to find out how many animals you could save by doing Meat Free Monday or more.

Activity 4: Debate

Motion: This House believes that humans are justified in eating animals.

- Divide the class into two groups. Have one group argue for the motion and one against it. You may wish to use the structure of a British Parliamentary Debate. This could consist of four teams of two speakers, with two teams on either side of the case. Speakers, and students in the audience, should offer Points of Information (POIs) to their opponents. At the end of the debate you should vote to see if the motion is carried or opposed.

Extension Ideas

- Show students the 27-minute film Stimulus Response, which features scientists from Britain's leading veterinary schools. Using video footage of animals, the film teaches the five steps of the stimulus-response pathway by using examples from animals' lives. The footage demonstrates that animals learn from experience, use their senses and need companionship and exercise – just as humans do. You can view the film at vimeo.com/7592583.
- Show students the 16-minute film From Farm to Fork, from Animal Aid. Covering the origins of factory farming, selective breeding of farmed animals, animal welfare impacts of intensive farming and personal action and food choices, this film is ideal for stimulating discussion and debate about the way we rear animals for food today. You can view the film at youtube.com/watch?v=u9lU7GOPWAw.
- Have students research different animal rights organisations' campaigns which encourage people to adopt a vegetarian or vegan diet in order to protect animals. They may wish to research Animal Aid, Farm Sanctuary, People for the Ethical Treatment of Animals (PETA), United Poultry Concerns (UPC), and Vegetarians' International Voice for Animals (Viva!). How do the different groups get their message across? What methods do students think are effective/ineffective? Students can be split into groups to devise their own vegetarian or Meat Free Monday campaign strategies and materials.

Meet Your Meat

MEAT Monday FREE

In order to keep up with global demand for burgers, bangers, steaks and nuggets, around 60 billion animals are farmed and killed each year. The vast majority are raised in intensive "factory farms", inside which they are crammed into small, dirty, overcrowded enclosures or cages. The life of a farmed animal is a short and unhappy one, culminating at the slaughterhouse.

What happens to cattle?

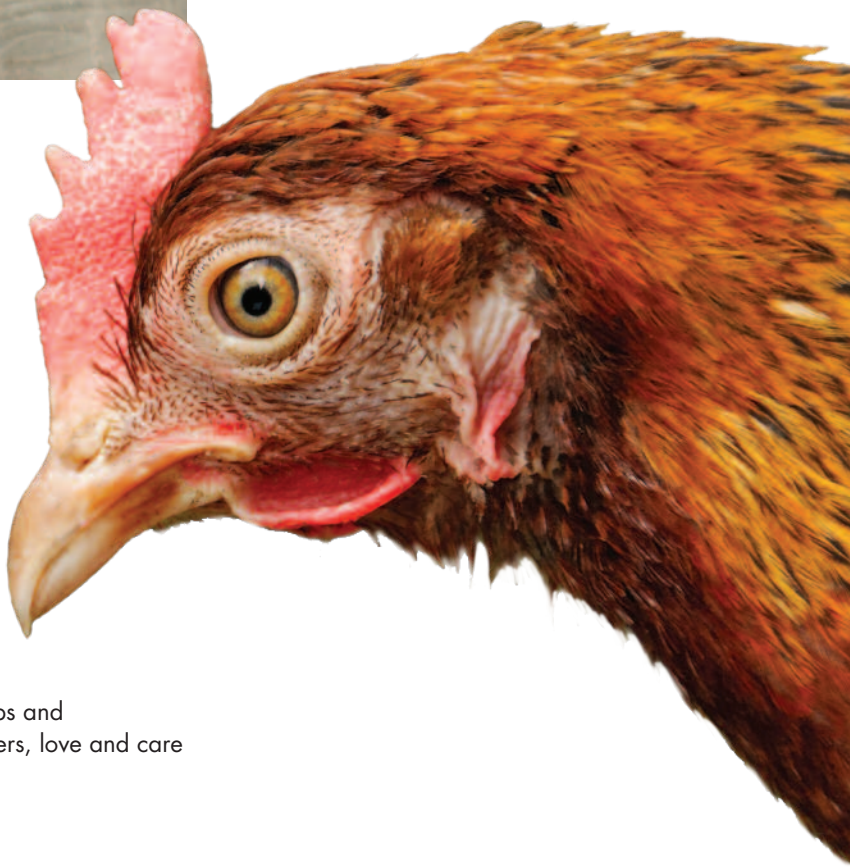
Cattle raised for beef traditionally graze in the open, although they may spend winters indoors. At about the age of one, calves can be moved into crowded sheds and fed a high-protein diet to ensure rapid growth. Cattle are often fed antibiotics to keep them alive through the stressful conditions that they're forced to endure, and many live in a chronic state of low-grade illness. In fattening sheds, animals are often forced to stand on concrete, which can result in serious leg problems. Most cattle undergo painful mutilations, such as castration and dehorning (their horns are chemically burnt off).

What happens to chickens?

The majority of "broiler chickens" and "laying hens" live in vast warehouses where lighting and ventilation are controlled by machines and where there is very little room to move around. In order to fatten them up quickly, many farmers drug and genetically manipulate chickens; as a result, birds may suffer from painful, crippling bone disorders or spinal defects.

Consumers often don't realise that even eggs labelled as "free range" often come from hens raised in dark, extremely crowded sheds, much like those that are used to confine "broiler chickens". These sheds have holes in them that allow hens to go outside, but often only the more dominant hens succeed in doing so. Most male chicks – animals of no use in egg production – are killed as soon as they hatch.

Chickens are inquisitive and interesting animals, in some ways thought to be as intelligent as cats, dogs and even primates. When in their natural surroundings – away from factory farms – they enjoy full lives in which they form friendships and social hierarchies, recognise one another, develop pecking orders, love and care for their young, dust-bathe, make nests and roost in trees.



What happens to pigs?

Most pigs reared for meat are kept indoors in extremely crowded, often filthy conditions on factory farms. A lack of exercise can cause pigs to become so weak that they can barely walk. They typically suffer from skeletal problems and diseases of the legs and feet. Pneumonia, meningitis and dysentery are commonplace.

Treated like machines, breeding sows are artificially inseminated and forced to give birth to five litters of piglets every two years. The majority of these sows are kept indoors for their entire lives and most are moved to farrowing crates to give birth in barren stalls, before being separated from their young by metal bars. They are allowed only enough room to feed their piglets but not enough room to nuzzle them. After just three to four weeks, the piglets are taken from their mothers and are fattened up in order to be slaughtered for bacon, ham or pork. Because they get frustrated in their barren surroundings, they bite one another's tails, which causes serious wounds. To prevent this, workers cut the pigs' tails off, clip their teeth with pliers or both – usually without using anaesthetic.

How do animals die?

No matter where they are kept – whether on factory farms or on free-range farms – all farmed animals are shipped to the slaughterhouse at the end of their short lives.

In most cases, slaughter is carried out by "stunning" and "sticking" animals – stunning so the animals lose consciousness before being killed (via a metal bolt through the brain, an electrical current or gas) and then sticking (where the animals' throats are cut using a sharp knife or mechanical neck cutter). Some animals are also now killed in "Controlled Atmosphere Systems" using gas. Animals killed by religious slaughter methods – Halal (Muslim) and Shechita (Jewish) – are not usually stunned first.

Slaughter processes are often poorly governed which can result in animal abuse. Abattoir veterinarian Gabriele Meurer catalogues such abuse with scientific precision in a letter to Viva!: "Not many animals stand still. They are all upset, some frightened to death and some move violently. The animals are never given time to calm down. Some of them won't calm down no matter what you do. Sometimes the slaughterman misses, wounding the animal terribly instead of stunning it".

Pigs are sometimes conscious through the entire slaughter process. Says Meurer, "The slaughtermen are in such a hurry that they often don't put the electric tongs in the correct position on the pigs' heads. The pigs get only half or insufficiently stunned, wake up while they bleed and are obviously still alive and conscious when they plunge into the boiling water. Sheep are stunned just as badly".

Chickens and turkeys are hung upside down by their already crippled legs and often regain consciousness (or because of ineffective stunning, never lose consciousness) while their necks bleed out. Thus, many of them are still conscious when they are immersed in the scalding-hot water of de-feathering tanks.

Questions

1. How many animals are killed each year?
2. What can be wrong with some "free-range" farms?
3. Can you list two activities which chickens like to do in the wild?
4. How do farmers prevent piglets biting each other?
5. Can you name one problem associated with slaughterhouses?

Suitable for children aged 11 to 16
Business and Information Studies
ICT | Design and Technology | English | Maths | Food Technology

The Restaurant

Introduction
Start the project by having the class brainstorm on "vegetarian/vegan restaurant". Do the students have any ideas about what kind of food is served at vegetarian/vegan restaurants? Are these restaurants any cheaper or more expensive than restaurants that serve meat? Have any of the students been to a vegetarian or vegan café or restaurant, and if so, what did they think of it?

Research
Divide the class into groups of four to six students and explain that they are going to research, plan and market a new vegetarian or vegan restaurant.

Marketing
On the board, write the names of three popular vegetarian/vegan restaurants in the UK:

- **Farmacy**
- **Food For Friends**
- **Ready Burger**

What images do the restaurants' names bring to mind?

- **Farmacy**: This name merges two different things – "Pharmacy", as in a place where people go for health solutions, and "Farm" where produce is grown – so students may think the food at this restaurant is healthy, home-grown and organic.
- **Food For Friends**: The name immediately evokes a warm and welcoming homely place where friends can relax together over a meal.
- **Ready Burger**: "Ready" signifies that the dishes are prepared quickly and this, along with the word "Burger", may suggest to students this is a fast food establishment.

Ask the students to visit the restaurants' websites:

- **Farmacy**: farmacylondon.com
- **Food For Friends**: foodforfriends.com
- **Ready Burger**: readyburger.co.uk

Were the students' preconceptions about the three restaurants accurate? What different images and messages are the three restaurants trying to convey? What kinds of food do they serve? Are they trying to attract both meat-eaters and vegetarians? Do the restaurants also encourage "flexitarians" and people committed to meat free days such as Meat Free Monday? How do the menus differ? In what way, if any, is each restaurant innovative? What ideas do the students like? Which don't they like? What might they do differently if they ran the restaurants?

Extension Idea
Tying in with literacy and instruction writing, students should choose one dish from their restaurant's menu and write a detailed recipe. If practical, they should then be given the chance to acquire the relevant ingredients and prepare the dish in the food technology department. Students can try each other's dishes. You could even turn this into a competition.

Background
TV programmes such as Dragon's Den and The Apprentice, which many of your students have seen, have made people aware of the steps involved in doing research for a business plan and in starting and running a successful business. This learning idea offers a great opportunity to build students' confidence whilst simultaneously improving their design and technology, literacy, numeracy and ICT skills through an exciting social enterprise project.

Learning Objectives
Students should learn the following:

- To empathise with others by representing a view that may not be their own
- To understand why branding is an important part of marketing
- To use creative approaches to answering questions, solving problems and developing ideas

Some Ideas

- **Farmacy**: Champions the belief that "food is medicine" and supports local, organic and biodynamic farming.
- **Food For Friends**: Serves a range of good quality British, Middle Eastern, North African and Mediterranean vegetarian food using fresh seasonal ingredients.
- **Ready Burger**: Offers fast food including vegan burgers, "chicken" fillets and soft serve ice cream.

Further Research

Have the groups independently research other vegetarian restaurants, particularly in their own neighbourhoods. These restaurants will be their "competition", so their own restaurants will need to feature something different in order to attract customers.

Concept

Groups should now come up with their concepts. Each message should be clear and effective. Who are they trying to attract? What kind of atmosphere will the restaurant have? Where and in what kind of building will it be located? Will it be advertised as vegetarian or vegan? Will the restaurant have a specific theme? How will the restaurant differ from all other restaurants?

Menu

Students should now come up with a basic menu which should complement their concept (health food, fast food, ethnic food, food that follows a particular theme, etc.). They may wish to consult a chart containing nutritional information if they are focusing on health food. If they are going to serve "meaty" dishes, they could research which "faux" meat products are widely available ("fishless" fingers, mock duck, soya "chicken", etc.). Students may wish to be very imaginative when naming dishes, or they may want to keep things simple. They need to link back to the initial concept.

Advertising Pitch

Each group should come up with a short advertising presentation, which they can then "pitch" to the rest of the class. Some members of the group can do the speaking while others can design visual aids, including a logo. They might also find it useful to come up with a mission statement so their objectives are clear. Each group should get a chance to present its restaurant concept in front of the class. The class can vote on the best concept and on which of the restaurants they would like to have in their area.

Role-Playing

Opening Night – Food Critic and Restaurant Owner	A Night Out – Meat-Eater and Meat-Reducer
Food Critic Your newspaper has asked you to review the new vegetarian restaurant in town. You rarely have a meal which doesn't contain meat, so you are not looking forward to the occasion. However, the menu does look quite nice. … You're interested to see how the staff came up with the ideas for the menu items. **Restaurant Owner** A famous food critic is coming to visit your restaurant on opening night. You're worried that you might get a bad review, as the critic is not vegetarian. But you believe in your restaurant and your concept and think you can convince him or her that meat free food is delicious!	**Meat-Eater** Your friend has invited you for a group meal at a new vegetarian restaurant. You haven't tried much vegetarian food in the past, but what you have tried you haven't liked. It's all just carrots and lentils, isn't it? And why should you be forced to eat vegetarian food anyway? **Meat-Reducer** It's Monday and you support Meat Free Monday so you have invited a group of friends to join you for a meal at the new vegetarian restaurant. One of your friends would prefer to go to a place which serves meat. He or she practically lives at McDonald's! How can you convince your friend to change his or her mind? You know your friend would like the food and would be surprised at how much variety there is! He or she might also learn a thing or two about why people go meat free, and might even decide to take part in Meat Free Monday.