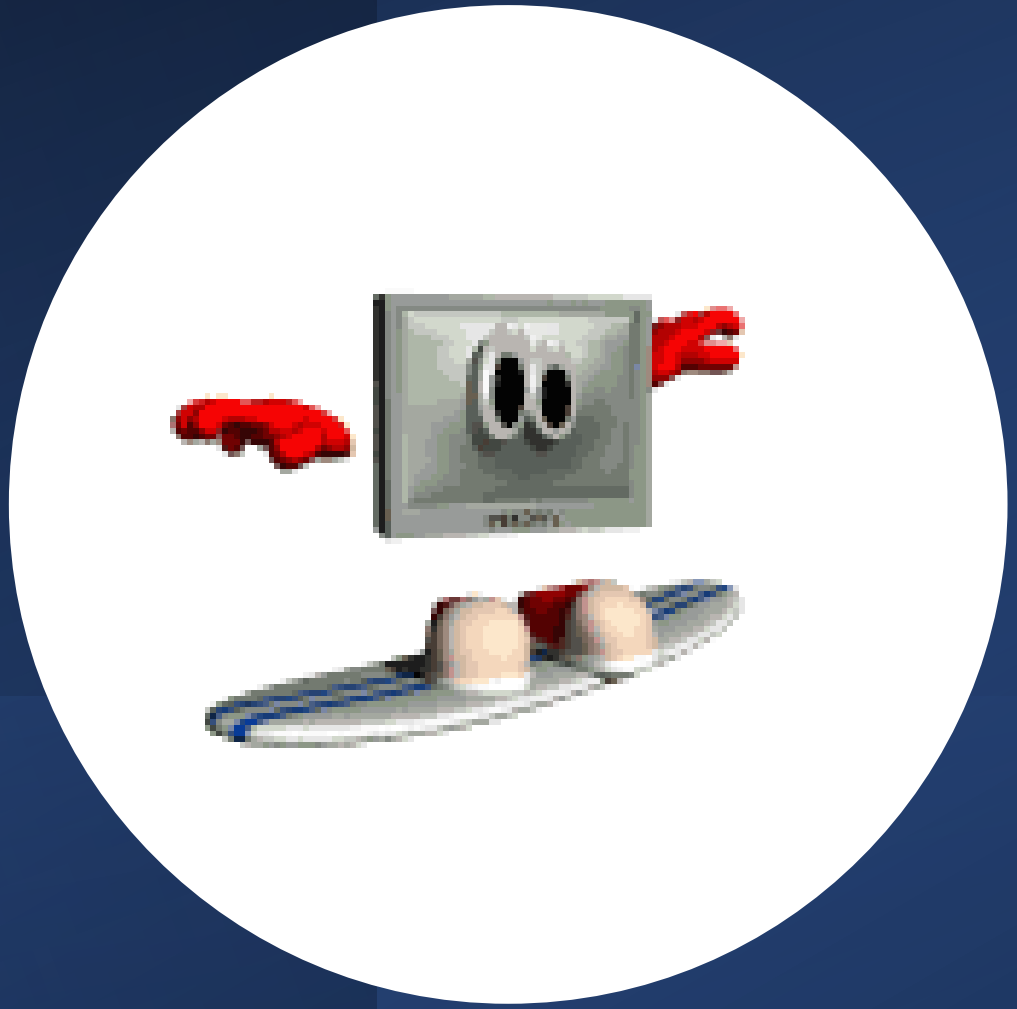
Learning Maths in context



Fiona Allan

14 April 2025

Why contextualise?

“Contextualisation’ – or engagement with mathematical ideas and structures in real-world situations – is a key element of mathematical courses that aim to prepare students for effective and successful engagement in daily life, workplace settings, and broader social, economic, political and environmental activities. Clearly, such a capacity to successfully engage with contextualized mathematics is essential for many Further Education (FE) students, not least because for many of them their study programmes and their aspirations are vocationally focussed.”

Why contextualise?

“Contextualisation of mathematics may also serve to motivate students: it has the potential to highlight the practical relevance and usefulness of mathematics ensuring a sense of utility and purpose.

“Contextualisation supports students in forming a relationship with mathematics that focuses on its use-value rather than merely for its exchange value as a gatekeeper subject.”

Tiling a bathroom

Tiling a bathroom

Tiling calculator

← See all Calculators

Calculate how many tiles you will need for your project.

What are the dimensions of the area to be tiled in metres?

Length 0 m

Width 0 m

What size of tile would you like to use (mm)?

Length 0 mm

Width 0 mm

☑ **Include 10% wastage?**

We recommend purchasing at least 10% extra product to allow for errors, damages or obstacles

Calculate

What does work?

What worked

- Nursery nurse tutor embedded Maths into her curriculum
- She was supported by a Maths tutor
- Everything was therefore relevant to the whole course

But

- Expensive model

So what works?

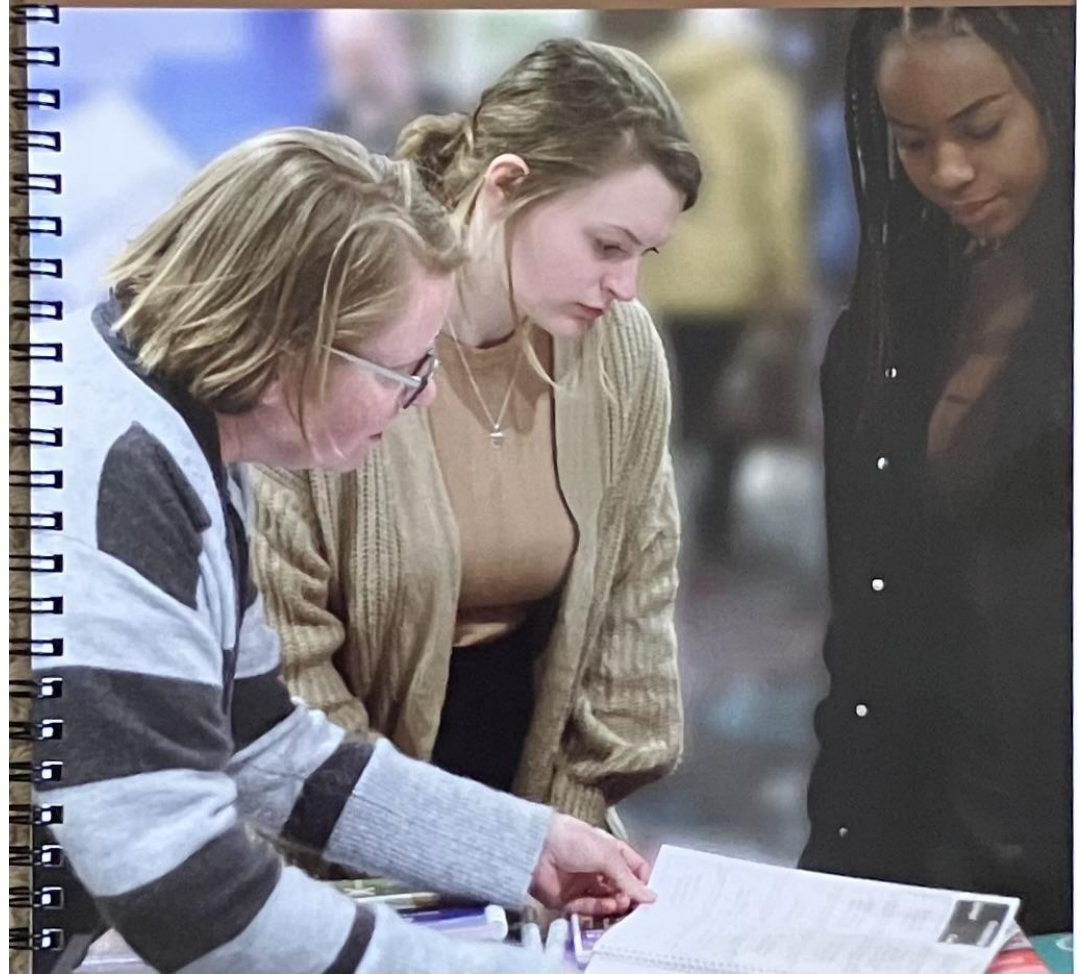
Personal contextualisation

“My starting scenario was a story about watching my football team Manchester United at Old Trafford in the early 1980s. I would show a short video of a football match played in 1983 ask for difference and similarities to a football match today. I would talk about standing in the Stretford End and paying £2.50 for a ticket in 1983, this would normally engage most of the class into a discussion they would say things like. ‘I’m a Stoke fan’, ‘Tickets are much more than that now’, or even ‘I hate football’. It didn’t really matter at this point what they said, I was just pleased that they were saying something and were therefore engaged.

Association of Teachers of Mathematics

This worked for me!

For teachers of students resitting GCSE Maths



Financial literacy sessions

- Evaluation forms completed by participating students show that the sessions on personal finance were received well, and I am looking to book more sessions in the next school year. Having the sessions online means that the number of students does not have to be restricted. Another good aspect of the personal finance sessions is that they have enabled students to work with students from different year groups and with different ability levels.

- To any colleague looking to introduce personal finance sessions in schools, I suggest that you consider which students would benefit from being involved, what sessions would be suitable for them and how you would evaluate the impact of the sessions. I would be happy to recommend the sessions run by HSBC, but I recognise that equivalent material is available from other banks. Links to material provided by other large banks are given below. A paper by The London Foundation for Banking & Finance says that, in the UK, nearly 50 banks provide free resources such as budgeting guides, and that 30 of them run or fund dedicated financial literacy programmes.
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Financial Maths

Lots of resources available from

- Barclays
- Lloyds
- HSBC
- NatWest
- Santander
- MEI
- Oak Academy and
- Martin Lewis – free textbook https://www.young-enterprise.org.uk/resources/your-money-matters-financial-education-textbook/

Financial Maths

- https://www.young-enterprise.org.uk/
- https://themoneycharity.org.uk/
- https://www.hsbc.co.uk/financial-education/
- https://www.hsbc.co.uk/financial-education/
- https://www.thenational.academy/blog/helping-pupils-get-smart-about-financial-education-and-online-spending-new-lesson-resources-for
- https://ncetm.org.uk/features/teaching-that-adds-up-how-mastery-can-support-financial-literacy/
- https://www.ncetm.org.uk/features/managing-money-starts-in-the-maths-classroom/
- https://www.bbc.co.uk/bitesize/guides/z8wjh39/revision/2

Financial Maths

Work, income and deductions

1 _____ Tax is tax that you pay on your income. (Fill in the blank)

2 National _____ is a tax on income which qualifies you to certain benefits, such as the State Pension and maternity pay. (Fill in the blank)

3 _____ Tax (VAT) is a tax that is added to most products and services sold by businesses. (Fill in the blank)

4 The amount of money you can earn without having to pay Income Tax is called your ... (Tick **1** correct answer)

- ☐ additional rate
- ☐ basic rate
- ☐ higher rate
- ☐ personal allowance

5 A store in the USA has a pair of sneakers on display. The price tag reads $31.99 and the Sales Tax is 15%. What do the sneakers cost?

_____

6 A shop in the UK has a pair of trainers on display. The price tag reads £55.99 and VAT is 20%. What do the trainers cost?

_____

Activity A

Why borrow

True or False

£220 MILLION

Borrowers in the UK paid **£220 million** a day in interest on average, as of August 2024.

DEBT

As of August 2024, the average credit card debt for an adult in the UK was **£1,324**.

A credit card on the average interest rate would take **25 years and 8 months** to repay if you only paid the legal minimum repayments (interest plus 1% of the outstanding balance) each month.

The current average total debt per household, including mortgages was **£65,665**.

Source: The Money Charity

Title: Overdraft

Definition: This allows you to borrow money from the bank, usually through a current account, by arranging to take money or make a payment from the account which exceeds the money in the account. There are two kinds: an arranged one which you can set up in advance for a specific amount, and an unarranged one, where the bank agrees to lend you money to cover payments you want to make, but for which you don't have enough money.

Sometimes it is free and sometimes you must pay interest if you use it.

Clue: Feels a bit chilly!

Title: Pay day loan

Definition: A short-term loan for small amounts of money. They are available from high street shops and internet sites.

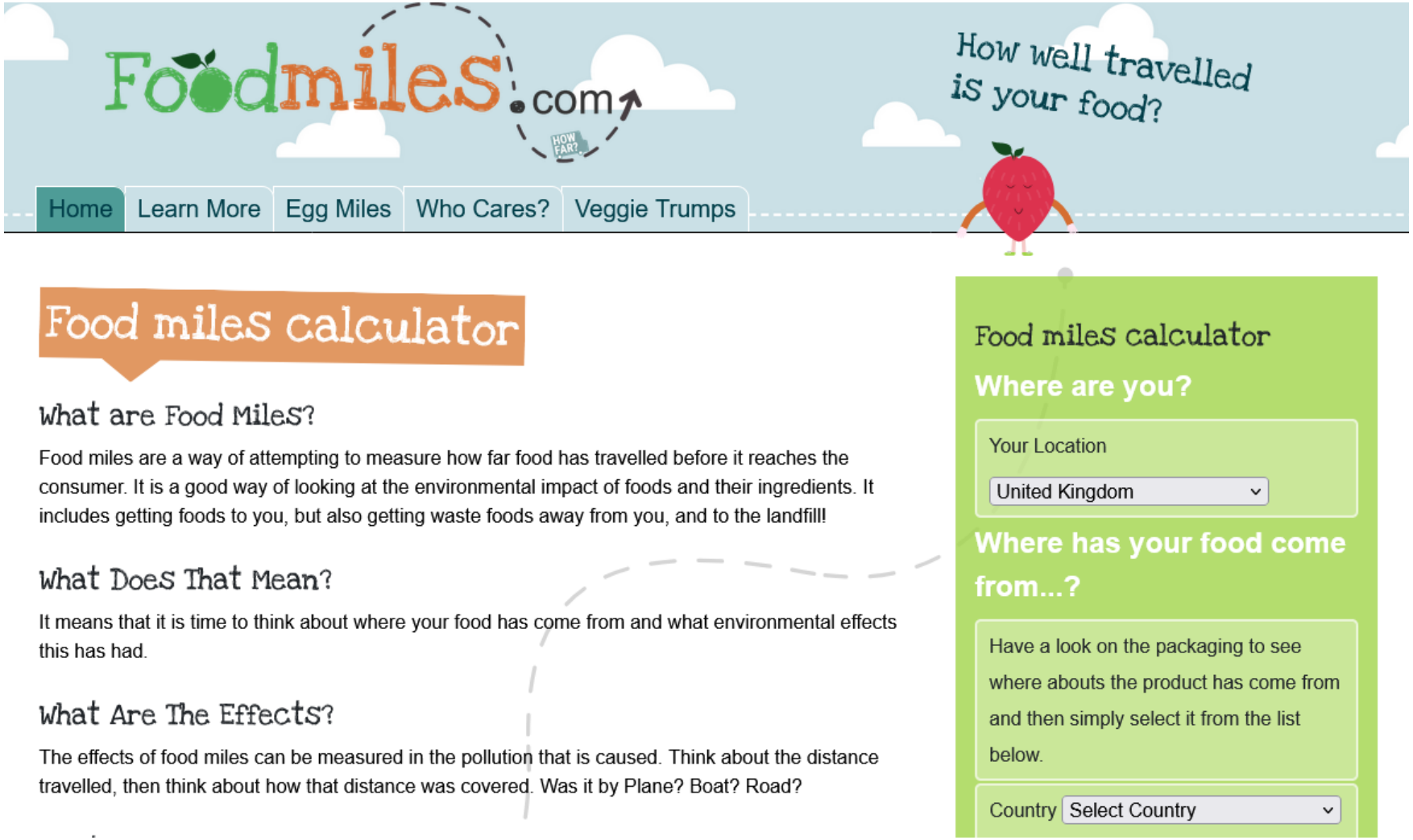
This way of borrowing can be a risk as they are easy to get but interest rates are very high.

Clue: They are often advertised on TV.

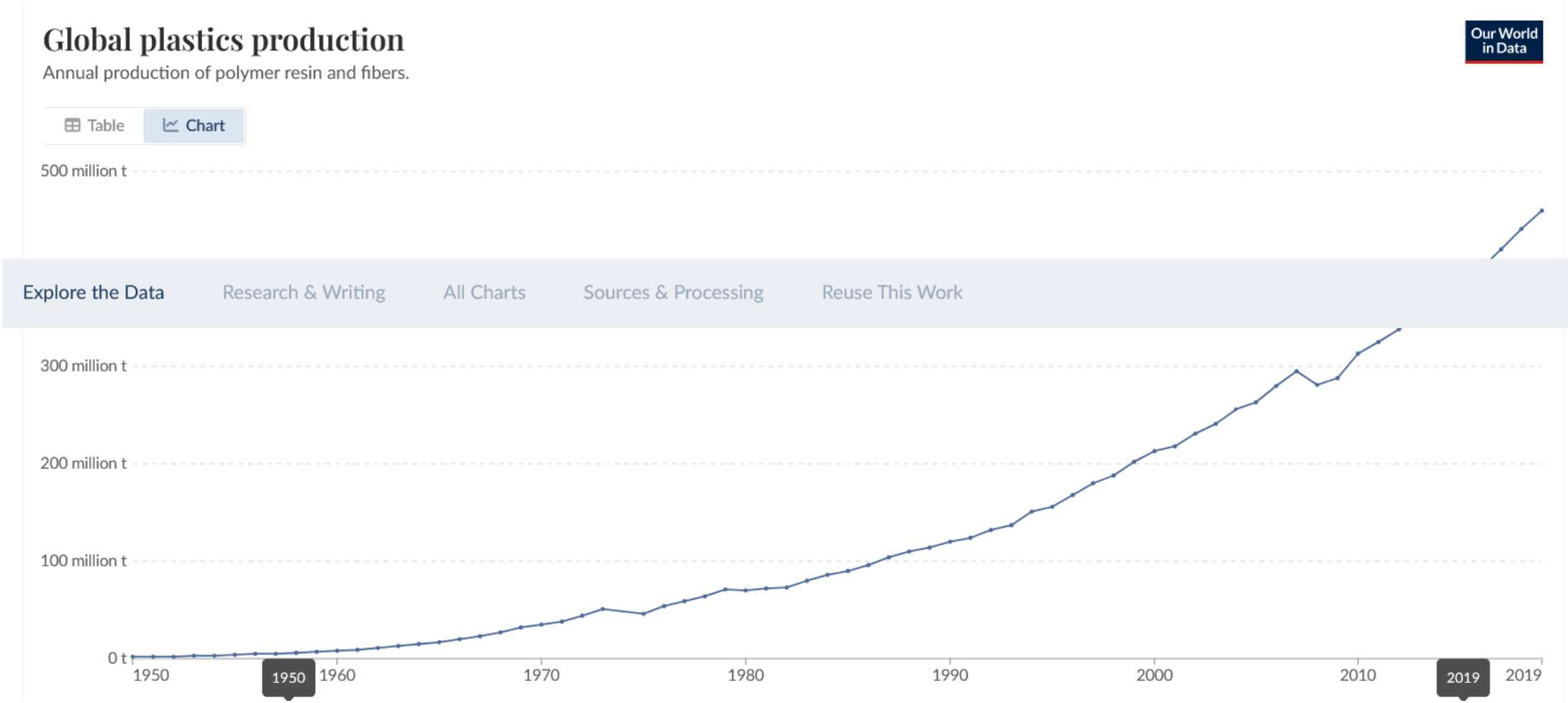
Ethical/global issues

- Food miles
- Plastic waste
- Rising sea levels

Food miles

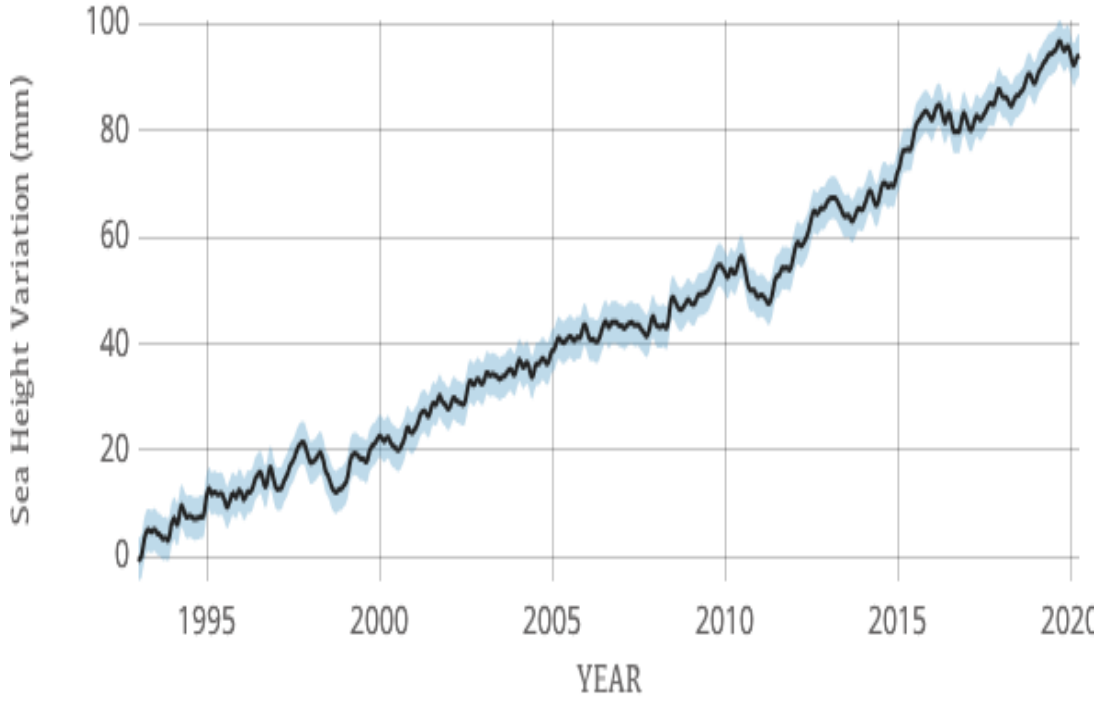

Foodmiles.com
HOW FAR?
How well travelled is your food?
Home
Learn More
Egg Miles
Who Cares?
Veggie Trumps
Food miles calculator
What are Food Miles?
Food miles are a way of attempting to measure how far food has travelled before it reaches the consumer. It is a good way of looking at the environmental impact of foods and their ingredients. It includes getting foods to you, but also getting waste foods away from you, and to the landfill!
What Does That Mean?
It means that it is time to think about where your food has come from and what environmental effects this has had.
What Are The Effects?
The effects of food miles can be measured in the pollution that is caused. Think about the distance travelled, then think about how that distance was covered. Was it by Plane? Boat? Road?
Food miles calculator
Where are you?
Your Location
United Kingdom
Where has your food come from...?
Have a look on the packaging to see where abouts the product has come from and then simply select it from the list below.
Country
Select Country

Plastic waste

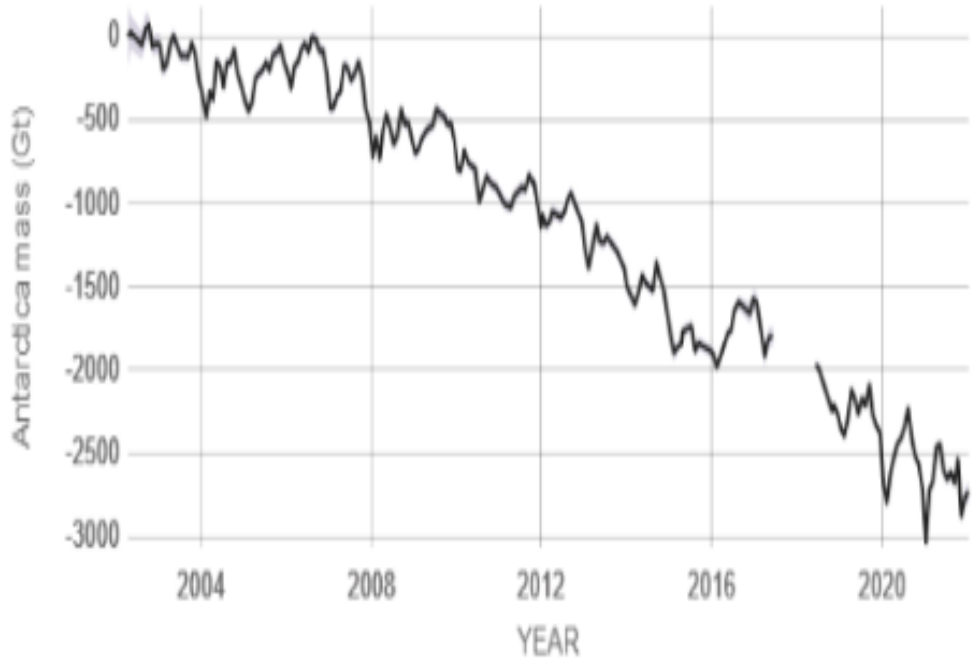


Global warming

Global mean sea level since 1995



Antarctica mass variation since 2002



Research-based activities

- Bowland Maths
- Realistic Maths Education

Bowland Maths

https://www.bowlandmaths.org.uk/

Bowland Maths aimed to make maths engaging and relevant to pupils aged 11-14, with a focus on developing thinking, reasoning and problem-solving skills.

At the core of Bowland Maths are 26 extended mathematical investigations called *Case Studies*. Each case study includes teaching materials to support 3-5 maths lessons. Many, but not all, include ICT activities.

BOWLAND MATHS

www.bowlandmaths.org.uk

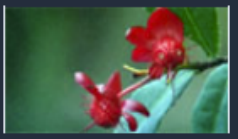
Imaginative resources for rich problem solving in secondary school Maths

BOWLAND MATHS HEADLINES

YOU'RE HIRED!
...as long as you can come up with the ultimate healthy smoothie!

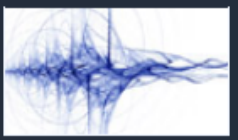
JOEY IN PERIL
It is only 12cm long and weighs just 60 grams. Will this orphaned kangaroo survive?

IN OR OUT?
Can photographs, videos and mathematics cast light on a cricketing conspiracy?



SAVE THE RAINFOREST!
Undercover environmentalists expose illegal logging operations...

DRIVING FOR DUMMIES
How do we know that cars are safe? Meet the mannequins who get smashed to bits for science!



THE BEAT GOES ON
What makes a hit? Is it all about the right beat and tempo? Do your favorite tracks measure up.

Bowland Maths materials are free for non-commercial educational use, and can be viewed online or downloaded from this website.

Welcome to Bowland Maths

Not in school?
There are problems and activities here that you can try at home.

The Assessment Tasks are a good place to start.

More notes on using the materials at home...

Bowland Maths aims to make maths engaging and relevant to pupils aged 11-14, with a focus on developing thinking, reasoning and problem-solving skills. In these materials, the maths emerges naturally as pupils tackle problems set in a rich mixture of real-life and fantasy situations.

Assessment tasks

Assessment tasks

Bowland Maths includes a collection of over thirty 20-60 minute tasks with progression guides to support formative assessment of progress in mathematical reasoning and problem-solving skills.

Classroom projects – the *Case Studies*

Classroom projects

At the core of Bowland Maths are 26 extended mathematical investigations called *Case Studies*. Each case study includes teaching materials to support 3-5 maths lessons. Many, but not all, include ICT activities.

Professional development

Professional development

The Bowland materials demand different approaches to teaching, such as collaborative learning through discussion and reflection, self- and peer-assessment and the use of less structured tasks. These 7 video-based professional development modules help teachers explore these techniques.

Improving learning in mathematics

https://www.stem.org.uk/elibrary/collection/2933

The Standards Unit: Improving Learning in Mathematics resources were produced as a response to the Smith report. The materials use active learning approaches originally designed for post-16 mathematics but can be used across the secondary phase.

The resources built on research evidence which suggested that learning mathematics is far more successful if learners are actively engaged, encouraged to think mathematically and to see links and connections.

I said I taught him to whistle

I didn’t say he’d learned it

Realistic Maths Education (RME)

https://rme.org.uk/

RME is about making sense of mathematics.

Realistic Mathematics Education builds deep and long-term mathematical understanding by working from contexts that make sense to students.

The RME curriculum is built around ***contexts*** that have the potential to elicit powerful yet flexible mathematical models. Contexts can be taken from the real world, from fiction, or from an area of mathematics with which students are already familiar. .

Realistic Mathematics Education

An engaging, problem-solving approach to learning and teaching secondary mathematics

About RME

Our materials

Getting started

Going further

"RME helps my pupils to visualize & put maths into real life contexts. It encourages discussion and depth of understanding. I love teaching it and am now sharing it with my whole department!"

Doing mathematics differently >

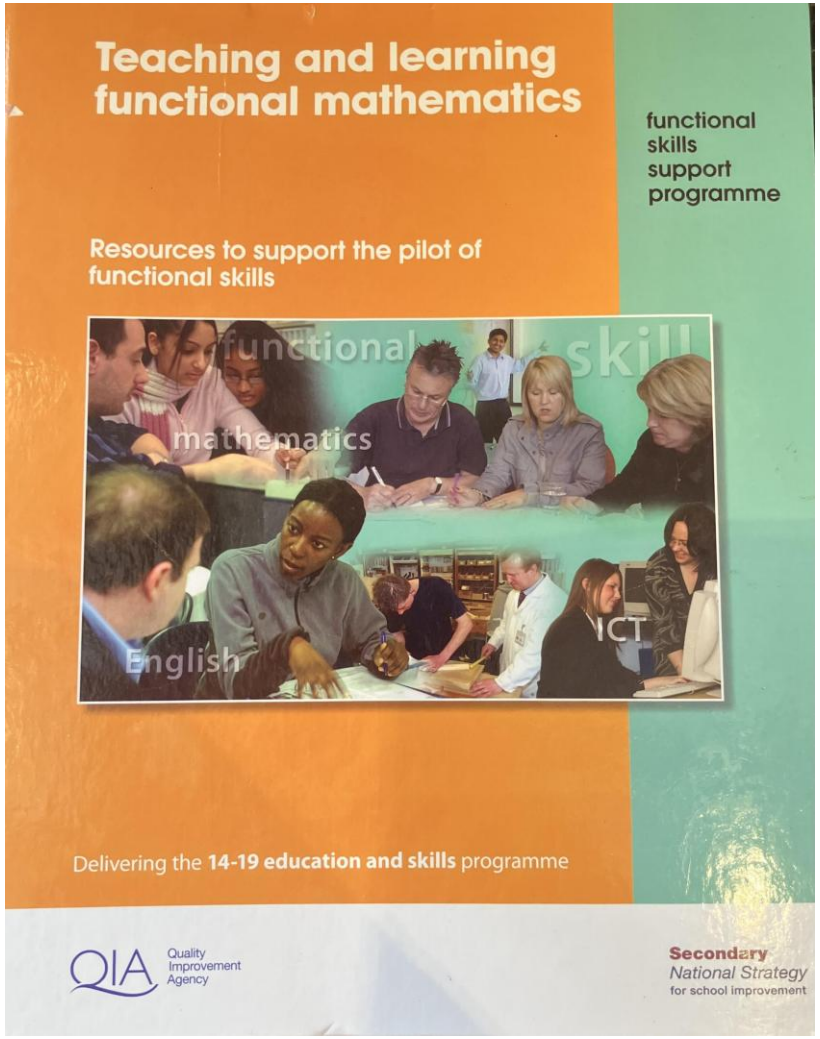
More about RME classrooms >

RME in your scheme of work >

ID	Prime Minister	Date of birth	Age at becoming Prime Minister (in years)	Age at leaving office (in years)	Date of death	Age of death (in years)
1	Robert Walpole	26 Aug 1676	44	65	18 Mar 1745	68
2	Earl of Wilmington	1673	68–69	N/A	2 Jul 1743	69–70
3	Henry Pelham	25 Sep 1694	48	N/A	6 Mar 1754	59
4	Duke of Newcastle	21 Jul 1693	60	68	17 Nov 1768	75
5	Duke of Devonshire	8 May 1720	36	37	2 Oct 1764	44
6	Earl of Bute	25 May 1713	49	49	10 Mar 1792	78
7	George Grenville	14 Oct 1712	50	52	13 Nov 1770	58
8	Marquess of Rockingham	13 May 1730	35	N/A	1 Jul 1782	52
9	William Pitt the Elder	15 Nov 1708	57	59	11 May 1778	69
10	Duke of Grafton	28 Sep 1735	33	34	14 Mar 1811	75
11	Lord North	13 Apr 1732	37	49	5 Aug 1792	60
12	Earl of Shelburne	2 May 1737	45	45	7 May 1805	68
13	Duke of Portland	14 Apr 1738	44	71	30 Oct 1809	71
14	William Pitt the Younger	28 May 1759	24	N/A	23 Jan 1806	46
15	Henry Addington	30 May 1757	43	46	15 Feb 1844	86
16	William Grenville	25 Oct 1759	46	47	12 Jan 1834	74
17	Spencer Perceval	1 Nov 1762	46	N/A	11 May 1812	49
18	Earl of Liverpool	7 Jun 1770	42	56	4 Dec 1828	58
19	George Canning	11 Apr 1770	57	N/A	8 Aug 1827	57
20	Viscount Goderich	1 Nov 1782	44	45	28 Jan 1859	76
21	Duke of Wellington	1 May 1769	58	65	14 Sep 1852	83
22	Earl Grey	13 Mar 1764	66	70	17 Jul 1845	81
23	Viscount Melbourne	15 Mar 1779	55	62	24 Nov 1848	69
24	Robert Peel	5 Feb 1788	46	58	2 Jul 1850	62
25	Lord John Russell	18 Aug 1792	53	73	28 May 1878	85
26	Earl of Derby	29 Mar 1799	52	68	23 Oct 1869	70
27	Earl of Aberdeen	28 Jan 1784	68	71	14 Dec 1860	76
28	Viscount Palmerston	20 Oct 1784	70	N/A	18 Oct 1865	80
29	Benjamin Disraeli	21 Dec 1804	63	75	19 Apr 1881	76
30	William Ewart Gladstone	29 Dec 1809	58	84	19 May 1898	88

ID	Prime Minister	Date of birth	Age at becoming Prime Minister (in years)	Age at leaving office (in years)	Date of death	Age of death (in years)
31	Marquess of Salisbury	3 Feb 1830	55	72	22 Aug 1903	73
32	Earl of Rosebery	7 May 1847	46	48	21 May 1929	82
33	Arthur Balfour	25 Jul 1848	53	57	19 Mar 1930	81
34	Henry Campbell-Bannerman	7 Sep 1836	69	71	22 Apr 1908	71
35	H. H. Asquith	12 Sep 1852	55	64	15 Feb 1928	75
36	David Lloyd George	17 Jan 1863	53	59	26 Mar 1945	82
37	Bonar Law	16 Sep 1858	64	64	30 Oct 1923	65
38	Stanley Baldwin	3 Aug 1867	55	69	14 Dec 1947	80
39	Ramsay MacDonald	12 Oct 1866	57	68	9 Nov 1937	71
40	Neville Chamberlain	18 Mar 1869	68	71	9 Nov 1940	71
41	Winston Churchill	30 Nov 1874	65	80	24 Jan 1965	90
42	Clement Attlee	3 Jan 1883	62	68	8 Oct 1967	84
43	Anthony Eden	12 Jun 1897	57	59	14 Jan 1977	79
44	Harold Macmillan	10 Feb 1894	62	69	29 Dec 1986	92
45	Alec Douglas-Home	2 Jul 1903	60	61	9 Oct 1995	92
46	Harold Wilson	11 Mar 1916	48	60	24 May 1995	79
47	Edward Heath	9 Jul 1916	53	57	17 Jul 2005	89
48	James Callaghan	27 Mar 1912	64	67	26 Mar 2005	92
49	Margaret Thatcher	13 Oct 1925	53	65	8 Apr 2013	87
50	John Major	29 Mar 1943	47	54		
51	Tony Blair	6 Mar 1953	43	54		
52	Gordon Brown	20 Oct 1951	56	59		
53	David Cameron	9 Oct 1966	43	49		
54	Theresa May	1 Oct 1956	59	62		
55	Boris Johnson	19 Jun 1964	56			

Other useful resources



https://www.lancashire.gov.uk/media/932950/tandlmathematicsht281107.pdf

Compare A with B

1. Calculate the percentage decrease from 589 to 556.
2. Calculate the values of a 12.5% decrease from 589, a 20% decrease from 589, and a 60% decrease from 589.

Scenario

Carbon dioxide is the main greenhouse gas, accounting for about 85 per cent of greenhouse gas emissions in 2005.

The carbon dioxide emissions for the period 1990 to 2005 in the UK are shown in the following table.

	million tonnes (carbon dioxide equivalent)					
	1990	1995	2000	2003	2004	2005
Total	589	549	549	556	557	556

To meet its commitment to the Kyoto Protocol, the UK has agreed to reduce total greenhouse gas emissions by 12.5% relative to the base year, 1990, over the period 2008–2012.

The UK aims to move beyond its Kyoto target (reducing emissions of carbon dioxide by 20% below 1990 levels) by 2010, and to put itself on a path to reduce carbon dioxide emissions by 60% by 2050.

Task

How well is the UK doing towards meeting these targets?

Source:
www.defra.gov.uk/environment/statistics/globatmos/gagccukem.htm

Making sense of situations and representing them

Learners have to ask

- Is the UK on course to meet the targets? (involves percentages and decreases in quantities)
- What information do I need to use? What other information do I need?)
- What is the best way to calculate percentage decrease?

Processing and using the maths (analysis)

- Do my results make sense?
- What would happen if the UK were to continue decreasing carbon dioxide emissions at the same rate over time?

Interpreting and communicating the results

- What do my answers tell me? Is the UK likely to meet its targets based on the current rate?
- Would a graph or chart show the reduction in carbon emissions over time? Is there another way to present this information?

Planning activities

Effective functional mathematics activities:

- encourage a more active approach to learning mathematics
- provide opportunities to develop, demonstrate and master functional mathematics skills
- encourage critical thinking and reflective learning
- develop application of the process skills in a range of meaningful contexts
- demonstrate the relevance of functional mathematics skills
- raise the standard of learners' work
- enable learners to see the links between their mathematical skills and the subjects they are studying, their work and life in general.

Activities need to be

- Purposeful (Give a satisfactory answer to the learner's question 'Why am I doing this?)
- Set in a realistic context that is relevant to the learner

(Did you hear in Emma's session this morning how you can use A! to contextualise questions?

- Achievable
- At the right level
  - How complex is the activity?
  - How familiar is the context to the learner?
  - What is the technical demand of the activity?
  - How much support will the learners need to do the task?
- Engaging and motivating

Writing activities

- Identify the context or topic
- Draft the activity
- Identify the mathematical skills needed
- Review the activity with colleagues and revise as necessary
- Trial with learners and review

And finally

What Maths do they use?

That’s Mathematics:

Original version with Tom Lehrer performing:

https://www.youtube.com/watch?v=2VZbWJIndlQ&list=RD2VZbWJIndlQ&start_radio=1

Various other versions available on YouTube including:

https://www.youtube.com/watch?v=bS5v-Frgjgc&list=RDbS5v-Frgjgc&start_radio=1

What Maths do they need?

And finally

- What Maths do they use?
- What Maths do they need?
- Capture their interest
- Follow up their interests

Thank you!

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