Family Maths Toolkit

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Everyday Activities Pack

Ages 10-11

Any questions, please email:
enquiries@nationalnumeracy.org.uk

familymathstoolkit.org.uk

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Family Maths Toolkit

However you might feel about maths, you can make a huge difference to children's numeracy abilities.

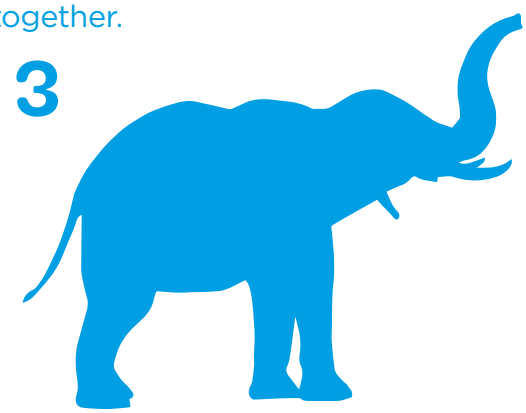
This **Everyday Activities Pack**, created by National Numeracy, contains short, fun, 'real life' activities for families to do with children. No special knowledge or equipment is needed.

All the evidence shows that talking about everyday maths helps develop children's maths confidence. Here are some ideas for questions that you can ask each other when tackling the activities:

- What do we need to do?
- What information do we have? What do we need to find out?
- Would any equipment help?
- What do you notice when...?
- Shall we make a guess and see if that works?
- What could we do if we get stuck?
- If we were doing this again, is there anything we could do differently?

The majority of activities are designed to be open ended so you can explore everyday maths together. There are a handful of activities that have answers – these are on the last page of this pack. The pack is aligned by age with England's 2014 National Curriculum. Please note these are just average expectations - children may be working below or above the curriculum links stated.

You can adapt these activities to suit your family's interests and use whatever items you may have to hand at home or out and about. You might want to take photos, draw pictures, write calculations or create diagrams – it's up to you! Do use the comment boxes to reflect your discussions and thoughts as you complete each activity together.



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Multiplication pyramid puzzle

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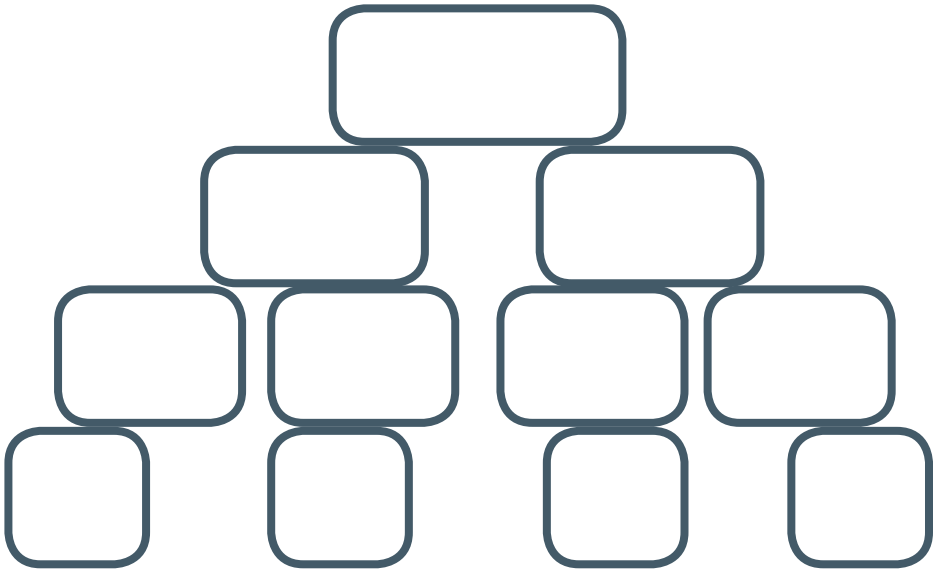

Using the single digits 1-4, insert them in each of the bottom 4 squares in any order.

Multiply 2 adjacent squares to complete the 1 immediately above.

What arrangement of bottom row digits gives the total of 96 in the top square?

Can you find more than one way to reach this total?

What other totals can you find by re-arranging the bottom row?

In how many ways can you find each total?

Family comments:

Child comments:

Curriculum Link

Multiply multi-digit numbers up to 4 digits, working systematically to find all possibilities.

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How much?

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If we travel to some other countries, we need to change our pounds for the currency in that country – this is called 'exchange'. The rates of exchange vary but this table shows the exchange rates on one day.

Exchange rates	
UK £1 (UK pounds)	USA $1.46 (United States Dollars)
UK £1	Euros €1.32

The cost of a burger in London is £4.57. How much would the same burger cost in the USA in dollars?

The cost of a pizza in Cardiff is £3.50. What would the cost of this be in France in euros?

A punnet of strawberries cost £2.60 in Edinburgh. How much would you pay for the strawberries in Spain using euros?

A Euro Disney day ticket costs 79 euros if you buy it at the park. How many pounds would you need to save to pay for 5 days?

Can you think of 3 other things you might want to buy in the UK and work out what they would much money you need to exchange to be able to buy them in the USA and in France?

Family comments:

Child comments:

Curriculum Link

Multiply and divide multi digit numbers, including decimals in the context of money to solve problems; rounding number to a degree of accuracy.

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Sports - sometimes, always, never

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Read these statements and talk about in your family.

Colour those you decide are 'sometimes' in yellow; if you decide they are 'always' colour them green and those which are 'never' colour red.

Do you all agree? If you cannot agree, colour these statements blue.

Winning 70/100 is better than winning 3/5 of the games	It is better to play sport on a warm day
The home team should have 75% of the tickets	You become better with practice
More than 50 000 people could watch a professional football match	There are double the number of football boots needed than shirts in a team
'Half price ' tickets are the same as 'Buy one, get one free' offers	A football referee can add on 10% of time at the end of a game
People play well when they have had a good sleep	There can be more people on one side than the other in a game
There are 22 players on a football pitch	2 cans of coke for £1.40 is the same value as 3 cans for £2.10
A kg of chips weighs more than a kg of crisps	A big meal is good for you before playing a game
4 tickets at £5.50 each cost more than 3 tickets at £6.50 each	14 rows of 8 seats amounts to the same as 15 rows of 7 seats

Family comments:

Child comments:

Curriculum Link

Reason and justify using a range of calculations.

Balanced fruit equations

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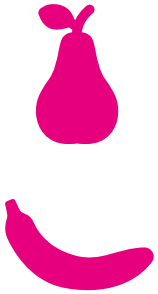


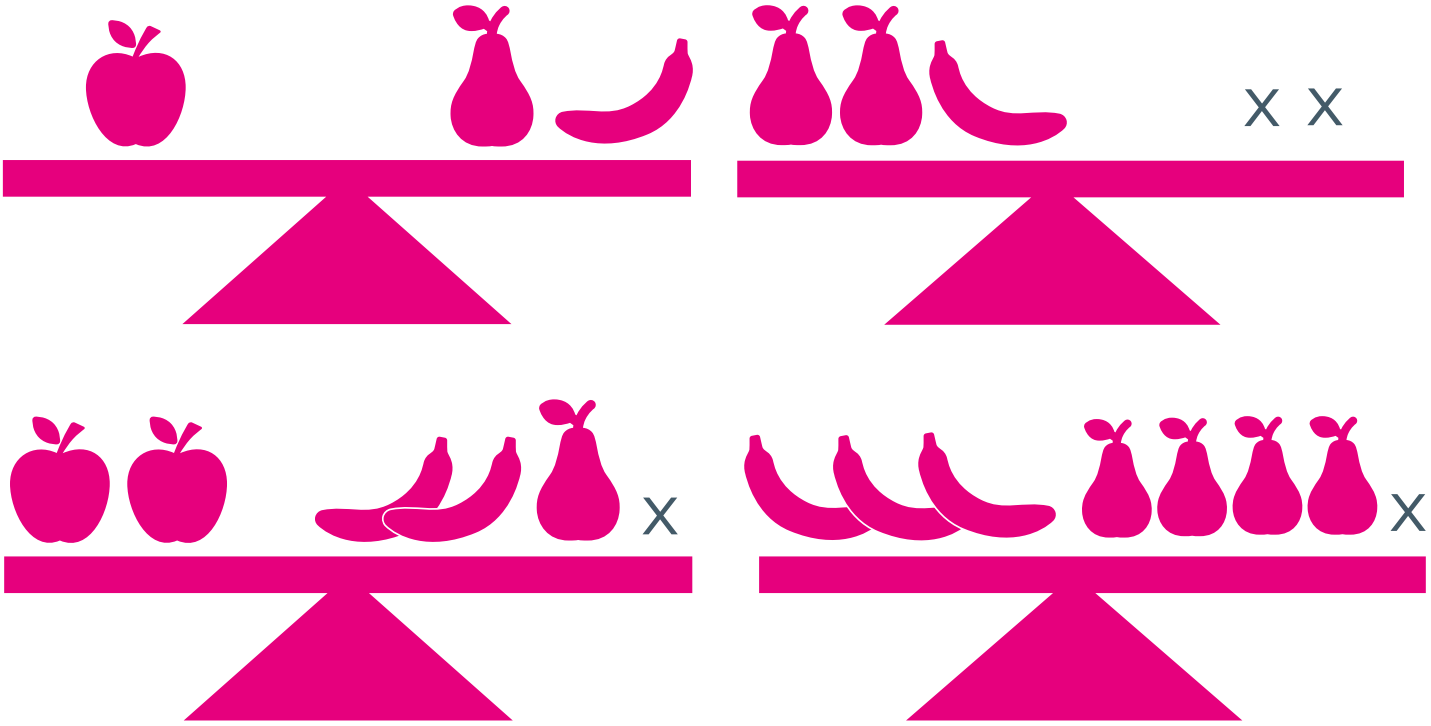
= 100 g

= 200 g

(3 x 100) = 200 + 100
Balanced equation

Can you work out these balanced equations of fruit?

You will need to find out the value of an apple and then the missing fruit shown by an 'x'.



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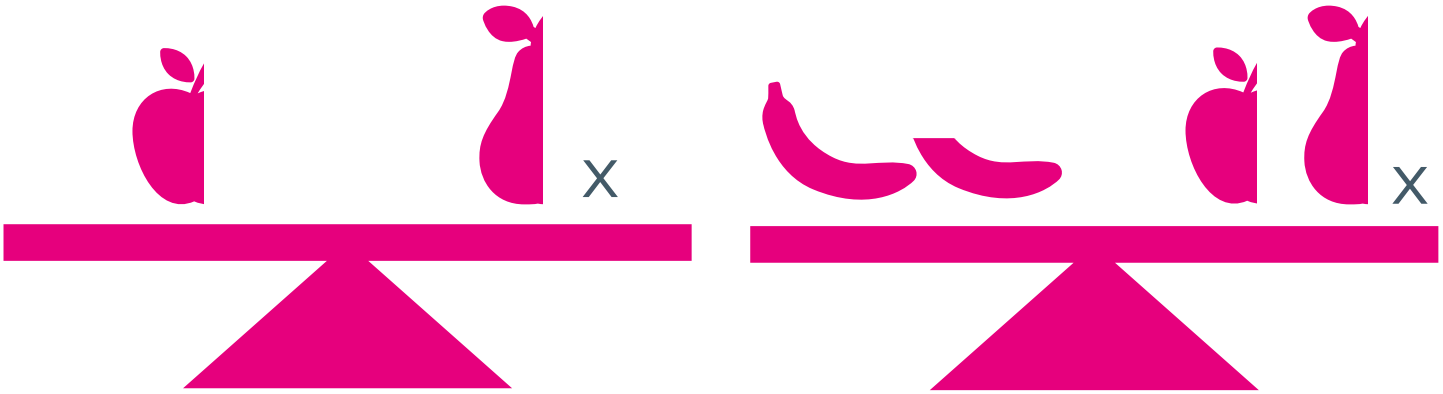

Can you make some other balanced scales using fruit measured in grams? Ask the rest of your family to work them out.

NB: The last two equations are:
half an apple balanced by half a pear and x.

Whole banana and half a banana balanced by half a pear, half an apple and x.

Family comments:

Child comments:

Curriculum Link

Use simple formula, express missing number problems algebraically.

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Squash a box

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Find a cardboard box (for example a cereal box) and undo it so that you have a flat net shape of the box.

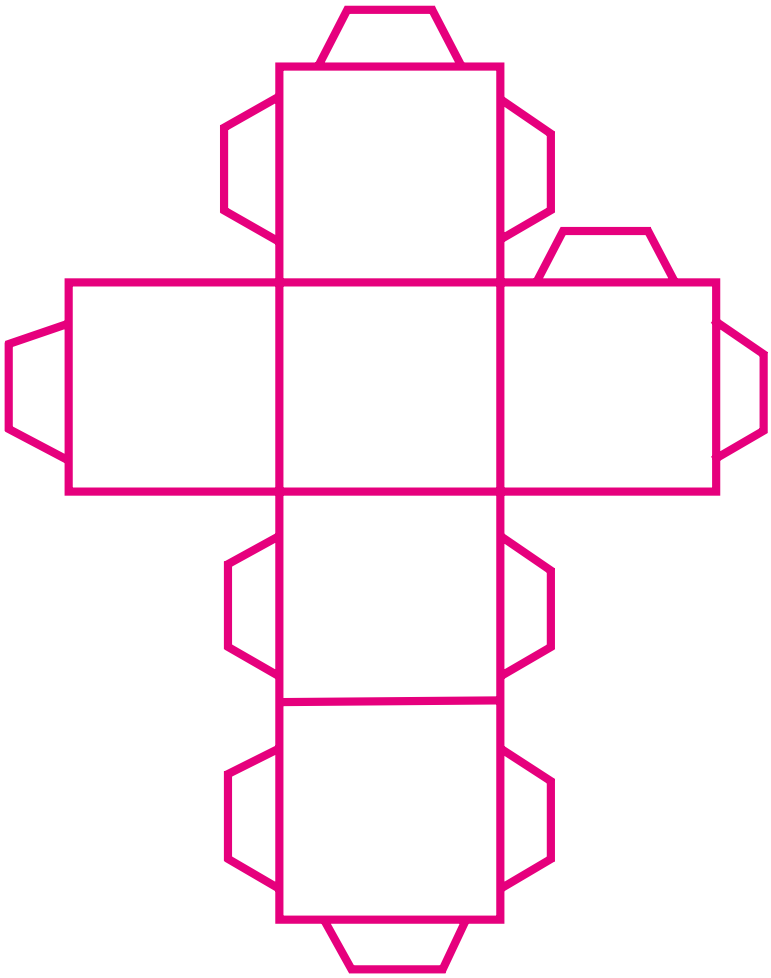
What shape do you have?

Can you find a cardboard tube (for example, from a kitchen roll)? What 3D shape is it? If you cut it lengthwise, what shape do you think you will have?

Now cut it – are you surprised?

Can you find any unusual shapes and show the net shape?

Can you design a net which will make up to a 3D shape?



Family comments:

Child comments:

Curriculum Link

Recognise, describe and build simple 3D shapes, including making nets.

Desert trek

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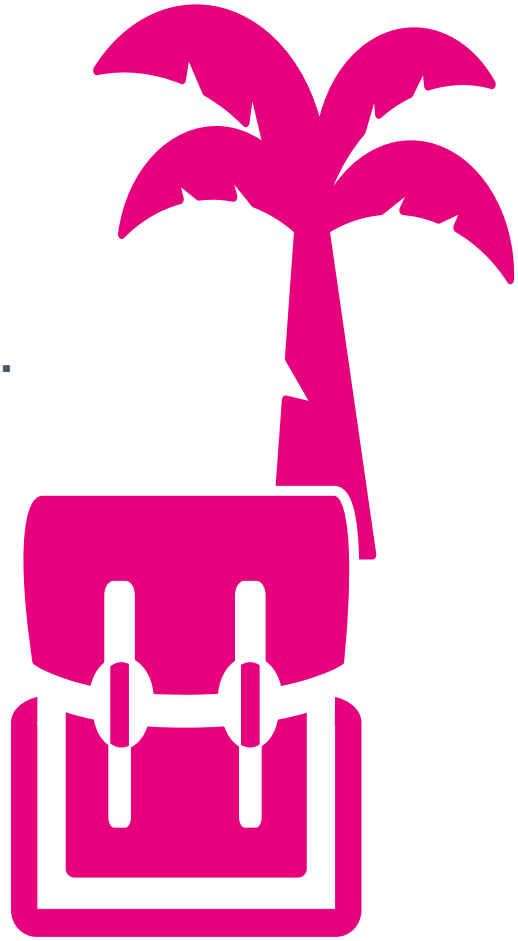
Imagine you are an army officer or a Star Wars general, and you have to make an expedition across a desert on a secret mission.

You will be travelling across the desert for two days and must carry all you need on your back. Rucksacks are measured in litres. A 15 litre rucksack equals 150 kilograms.



You must choose what you will take with you – remember you must have enough to drink in the desert so what you choose will be a mix of liquid (litres or millilitres) and food or clothes (kilograms or grams) or anything else you think you may need (such as toilet roll or equipment).

Measure things around your home to decide what to take and make a list. Remember you cannot go over 15 litres or 150 kilograms.

Real army officers often carry 65 litre rucksacks – do you think you could lift this or carry it a long distance?

Family comments:

Child comments:

Curriculum Link

Solve problems involving the calculation and conversion of units of measure of mass and volume; identify the value of each digit in numbers up to 3 decimal places.

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Hogwart's Olympics

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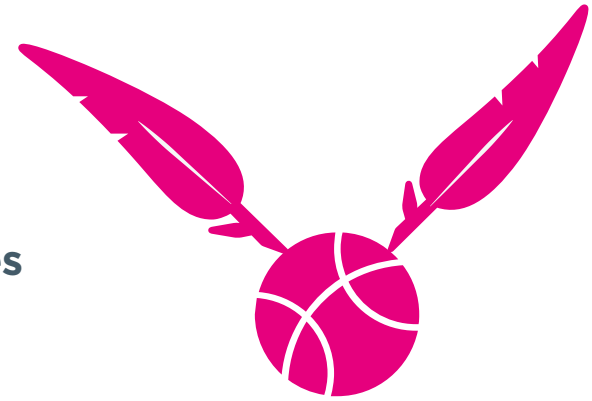
Hogwart's are holding an Olympics in their own style. Here are some clues to the events:

- **The ratio of swimming races to Snitch games is 2:1**
- **¼ of all events are swimming races**
- **Half the events involve running**
- **The events which are not swimming, running, broomstick races or Snitch games are dragon fighting**
- **In total there are 120 events**
- **There are more Snitch games than Broomstick races**
- **66% of the dragon fighting competitors are boys**
- **10% of the events are broomstick races**



Can you work out which the events are and how many of each there are?

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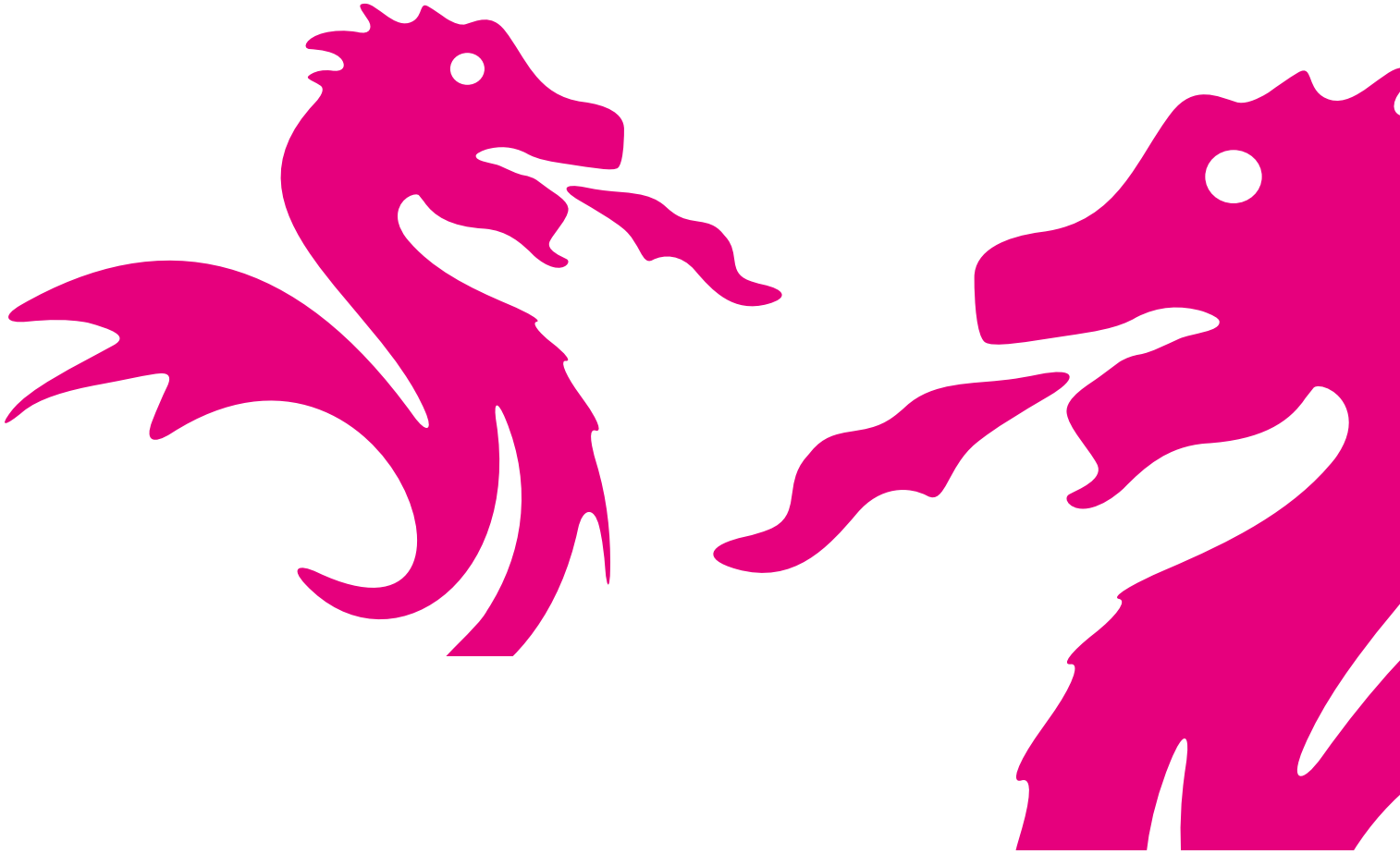
One day, 20% of the swimming races are cancelled. You can replace them with a race of your choice – what would it be?

What fraction of the total events are now swimming?

If $\frac{1}{3}$ of the broomstick competitors are 24 girls, how many are boys?

Can you ask another question using all this information?



Family comments:

Child comments:

Curriculum Link

Solve problems using the calculation of percentages, fractions and ratio.

Baked potatoes preparation

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For his family's lunch, Kasan uses 60% of a can of tuna on each baked potato.

He has 4 cans of tuna. How many potatoes could he cover?

He also uses tubs of grated cheese. He uses 15% of a large tub of cheese on each potato and has 3 tubs of cheese – how many potatoes could he put cheese on?

Helpful hint: Draw the cans and tubs and split them into the percentages (or convert to fractions) needed.

Family comments:

Child comments:

Curriculum Link

Solve problems involving percentages and the use of percentages for comparison.

A feather or an elephant

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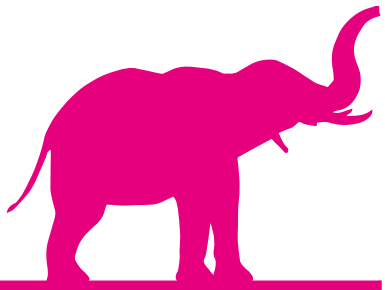
In this table, the weights (mass) are in order from heaviest to lightest. However, the objects have all been muddled up.



Weight	Object
10,000 kg	An envelope
1,000 kg	A hair
100 kg	An articulated truck
10 kg	Sack of cement
1 kg	Bag of sugar
0.1 kg	An elephant
0.01 kg	One of the bells of Big Ben
0.001 kg	A feather
0.0001 kg	A packet of spice

Which object do you think should match to each weight?

When you have sorted them out, two boxes have been left blank for you to find something at home which would fit into the order of weights.

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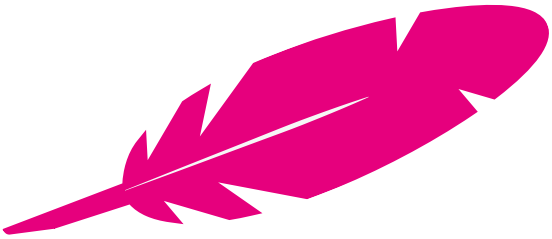
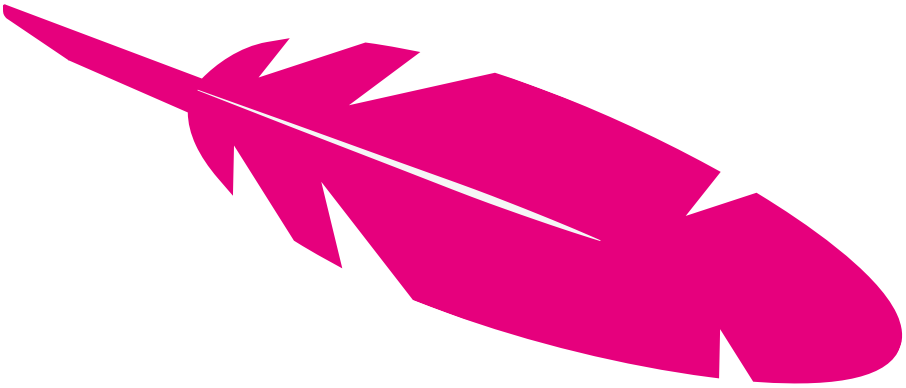
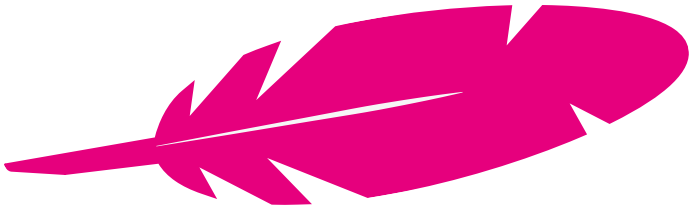
Helpful hints: Obviously some of these will be estimation – start with a 1 kg bag of sugar as a baseline. Items lighter than 1 kg may be in measured in grams and converted.

You may not agree on all the order as some things are unknown – it is the discussion and debate which is important to inform reasonable estimates.







Family comments:

Child comments:

Curriculum Link

Solve problems involving the calculation and conversion of units of measure (up to three decimal places where appropriate - this activity uses four decimal places).

World's longest nails

Family Maths Toolkit

A man in India got into the Guinness Book of Records by growing his nails, on one hand, to a total of 30 ft long (9.1 metres).*

To start with his nails grew 0.1 millimetres a day each. How long do you estimate each nail would be in one year?

Now work it out – were you close?

Roughly how long would it take his nails to grow 30 feet (9.1 metres) ?

How long do your nails get before you cut them?

*NB: If you'd like to see a picture of this man Google "longest nails Guinness Book of Records".

Family comments:

Child comments:

Curriculum Link

Solve problems involving the calculation and conversion of units of measure, using decimal notation, converting measurements of length.

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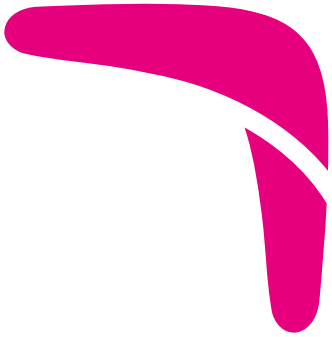
Angles all around you

Family Maths Toolkit

Angles can be different sizes depending on their purpose. A ramp forms an acute angle in relation to the ground, and a ladder forms an acute angle when leant against a building. The sharply angled, pointed shape of a slice of pizza is another common example. One famous acute angle in pop culture occurs when the character Pac-Man opens his mouth to devour the dots.

An obtuse angle may be formed when a window is open wider than a right angle. You might see the obtuse angle at many roof tops, as the two roof surfaces slope down from it. Boomerangs are flying toys which return to the thrower after moving some distance in the air: some are designed in such a way, the angle between the wings is an obtuse angle ranging from 91°C to 140°C.



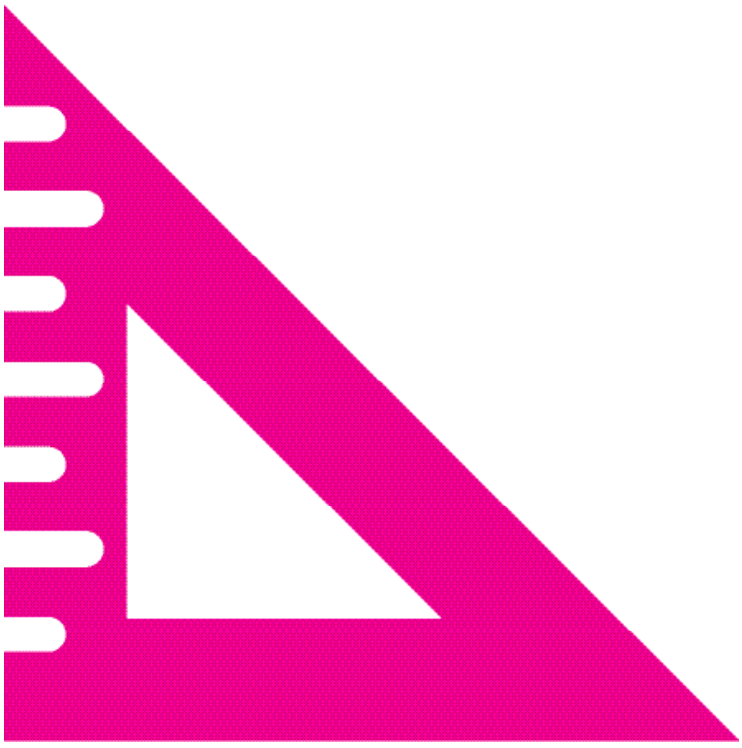
It is easy to find right angles around your home but how many examples of acute or obtuse angles can you find?

What angle is a straight line?

Make a list of the places or items you've found which have acute or obtuse angles.

Draw some of the angles you find.

Helpful hints: A right angle is 90 degrees; an acute angle is smaller than 90 degrees and an obtuse angle is larger than 90 degrees.



Family comments:

Child comments:

Curriculum Link

Recognise angles where they meet at a point or are on a straight line.

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Fast skipping

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How many skips do you think you can complete in 15 seconds? Write down your estimate.

Ask your family how many they estimate they could complete. Write these down.

Find a timer or watch and time each person – how close were your estimates?

What was the mean (average) of the estimates?

What was the mean of the actual number of skips?

How could you record this? What have you found out?

Do you think you could do four times this many in a minute? Would you slow down as you get tired?

Helpful hint: You can complete this activity with or without a skipping rope.

Family comments:

Child comments:

Curriculum Link

Calculate the mean as an average.

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Eid biscuits

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Eid al-Fitr, is an important religious holiday* celebrated by Muslims worldwide that marks the end of Ramadan, the Islamic holy month of fasting.

To celebrate, these biscuits could be made:

Ingredients

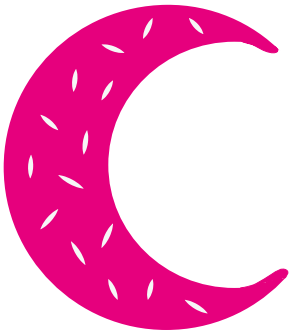
- 250 g soft butter
- 140 g caster sugar
- 300 g plain flour
- 1 egg yolk
- 2 tsps vanilla essence

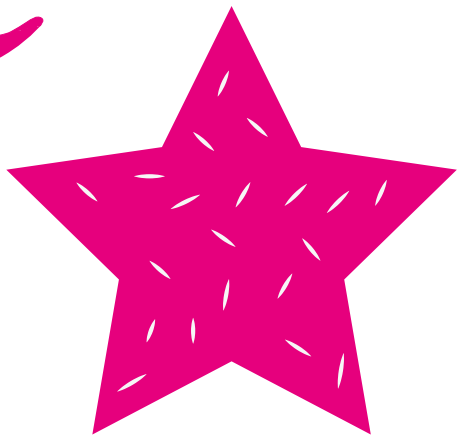
Method

1. Mix the butter and sugar together
2. Sift in the flour
3. Add 1 egg yolk and vanilla and mix together to make a dough
4. Roll out and, using a cutter or knife, cut out shapes of a star or a crescent
5. Bake 160 °C for 11 minutes
6. Cool and enjoy!

The ingredients are priced as :

- £2.00 for 500 g of soft butter
- 99p for 500 g caster sugar
- 80p for 1.5 kg plain flour
- £1.25 for 6 eggs
- £1.30 for a 60 ml bottle vanilla essence





Estimate how much **this batch** of biscuits would cost to make. You will need to round some numbers.

*Note: Eid falls in the summer months in 2016-2022.

If you wanted to make four times this much for a large family, how much would the ingredients cost?

The local shop sells the same recipe for a large family and would charge 30% more; what would the price be in the shop?

Helpful hint: Approximately 5 ml in a teaspoon.

Family comments:

Child comments:

Curriculum Link

Solve problems which require answers to be rounded to specified degrees of accuracy (in the context of money to 2 decimal places).

Algebra Is Fun!

Family Maths Toolkit

Algebra **I**s **F**un.

A = 6 **I** = 12 and **F** = 3

Write down as many equations as you can find using AIF

Here are some to get you going –

A + I = 18 12 / A = 2

7 x S = 21 I – 5 = 7

Try to make different equations using addition, subtraction, multiplication and division.

Challenge: use all of the letters AIF in one equation. For example:

A + I + F = 21

Try to make a more complicated equation using these letters.

Family comments:

Child comments:

Curriculum Link

Generate and express missing number problems algebraically; enumerate possibilities of combinations of two variables.

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Largest ever cake

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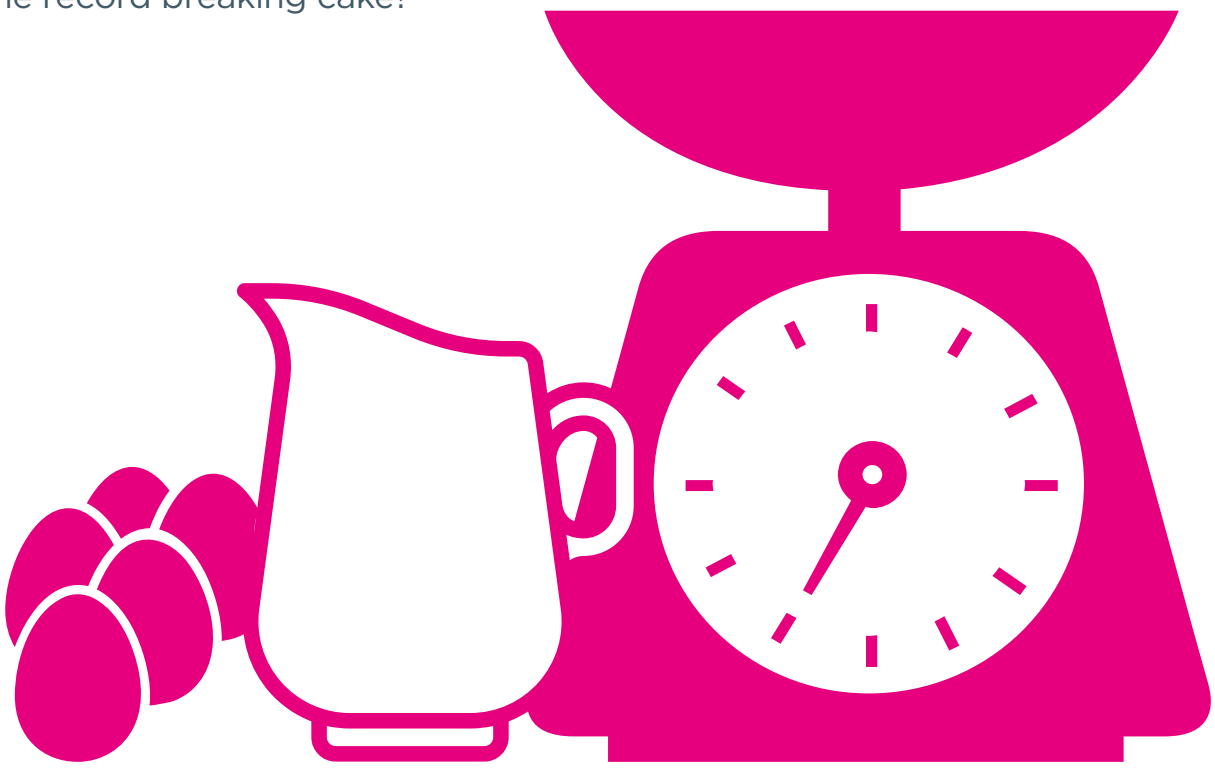
The largest ever cake made measured 16.46 m by 13.94 m by 0.54 m (54 ft by 45 ft 7 in by 1 ft 9 in) (2015 Guinness Book of Records). Can you imagine what the ingredients for this would look like? This cake is longer than a school bus!

A recipe for a 20 cm by 20 cm by 10 cm cake is:

- 340 g (12 oz) self-raising flour
- 280 g (10 oz) caster sugar
- 280 g (10 oz) butter/margarine
- 5 eggs
- 3 tablespoons milk

Can you estimate what the recipe would look like for the record breaking cake?



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Now use a calculator to help you work it out.

- Remember to convert the original recipe to metres before you start
- When you know how much bigger the large cake is, round it to a whole number to work out the ingredients

Helpful hints: Round up or down the exact measurements; volume = **l** x **w** x **h** (length x width x height).

Family comments:

Child comments:

Curriculum Link

Use and convert between units of measurement of length and volume using decimal notation; calculate, estimate and compare volume of cuboids using standard units including cm^3 and m^3.

The weight of bears

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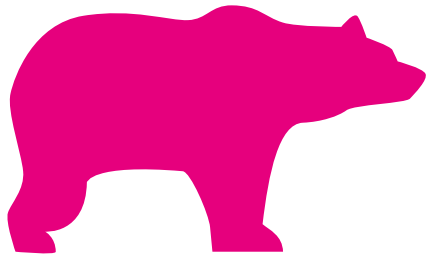
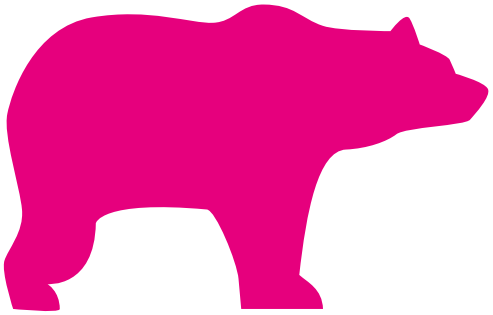
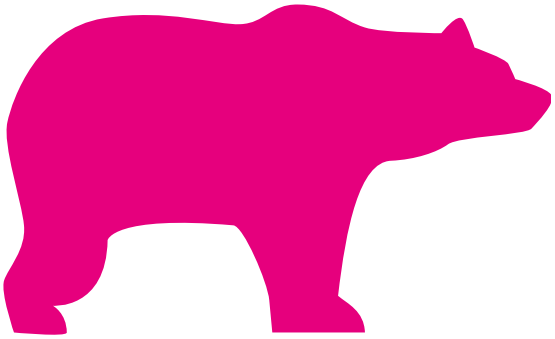
Goldilocks and the Three Bears is a famous traditional tale involving a small bear, a middle sized bear and a large bear.







Invent weights for each of the bears and find the average.

Find out the weights of the members of your family and find out the average weight. Do you think you will be below or above the average weight?

Were you correct?

Helpful hints: Encourage estimation skills based on the last measure, for example do you think you will weigh more or less than..., how much more/less, how close were you?

If the family has babies or younger children, the average will be lower, if the family is mostly older children or adults, the average will of course be higher. Talk about why this will be the outcome.

Family comments:

Child comments:

Curriculum Link

Calculate the mean as an average, solve problems using units of measure (mass) using decimal notation up to three decimal places.

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Going in circles

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Find a piece of string (or similar such as cotton or wool) and cut a length of 50 cm. Imagine it curled into a circle shape – what do you think would fit in it? Would a can of beans stand inside?

Now make the circle – were you surprised at the size?

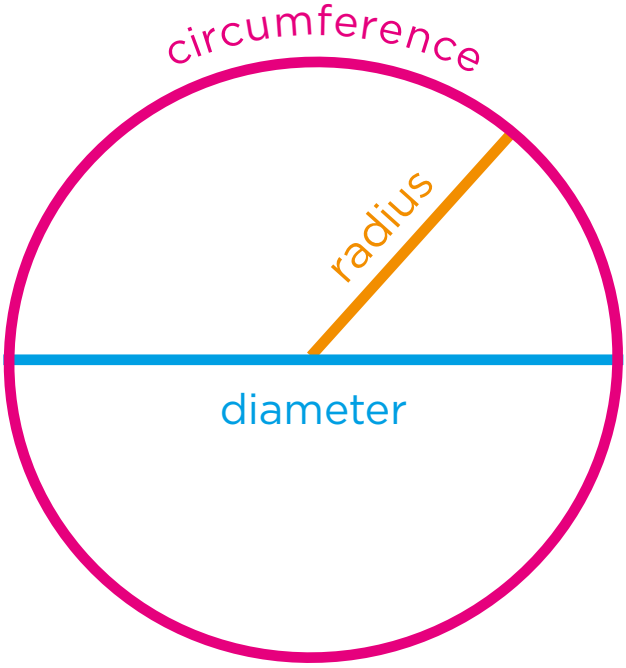
Can you find 3 things that have a diameter longer than your circle?

Can you find 3 things with a radius smaller than your circle?

Using your string, estimate the diameter of a car wheel. Draw it and label the diameter.

Can you use your string to find something with a radius the same or nearly the same length? Draw this and label the radius.

Helpful hints: The diameter is the measurement across the middle of the circle and the radius is half the diameter (from the centre to the edge of the circle).



Family comments:

Child comments:

Curriculum Link

Illustrate and name parts of circles, including radius, diameter and circumference.

What is happening?

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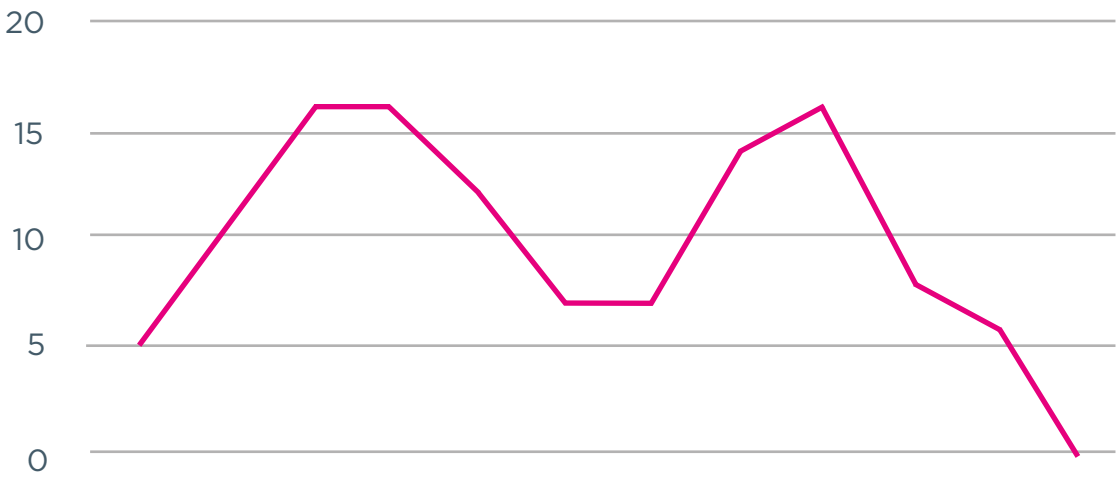
Look at this line graph. What do you think it could represent?



Could you label the 'y' axis? What could the numbers 0-20 on the x axis represent?

Can you make up a story which this line graph would represent? You should fill in the information on the 'x' axis to match your story.

Family comments:

Child comments:

Curriculum Link

Interpret and construct line graphs and use these to solve problems.

Y6/Ages 10-11 Activities answers

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Multiplication pyramid puzzle

4 different ways of arranging digits to give each of the totals 96; 384; 864; 1536, 3456.

Balanced fruit equations

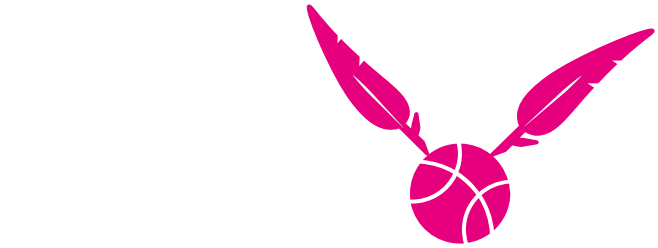
- Apple = 300 g
- 3 pears = 1 banana and 1 pear = 300 g
- 1 apple = 1 pear and 1 banana = 300 g
- 2 pears + 1 banana = 2 bananas = 400 g, x = 1 banana
- 2 apples = 2 bananas + 1 pear + 1 pear = 600 g, x = 1 pear
- 3 bananas = 4 pears + 1 banana = 600 g, x = 1 banana
- ½ apple = ½ pear + 1 pear = 150 g, x = 1 pear
- 1 banana + ½ banana = ½ pear + ½ apple + 1 pear = 300 g, x = 1 pear

How much?

- Burger = $6.67
- Pizza = 4.62 euros
- Strawberries = 3.43 euros
- Disney tickets = £299.24 for 5 days

Hogwart's Olympics

- 30 swimming races
- 12 broomstick races
- 15 Snitch games
- 60 running
- 3 dragon fighting (2 are boys - unnecessary information)
- ⅕ of total races are swimming after the cancellation
- 48 boys are in the broomstick races



National Numeracy
for everyone, for life

Registered charity no: 1145669

World's longest nails

- 35.2 mm in a year = 3.52 cm per year
- 5 nails would be a total of 17.6 cm
- 900 cm divided by 17.6 = approximately 51 years

Baked potatoes

6 potatoes and 20 potatoes

Eid biscuits

Costs:

- butter £1; sugar 27.72 (28p); flour 16p; egg 0.208 (21p); vanilla 0.216 (22p) = total of £1.87
- For large family x 4 = £7.48
- With 30% added the cost is £9.72

Largest ever cake

- 10,531.84 kg flour
- 8,673.28 kg sugar and butter
- 154,880 eggs; 92,928 spoons milk

(based on: times by 30,976)