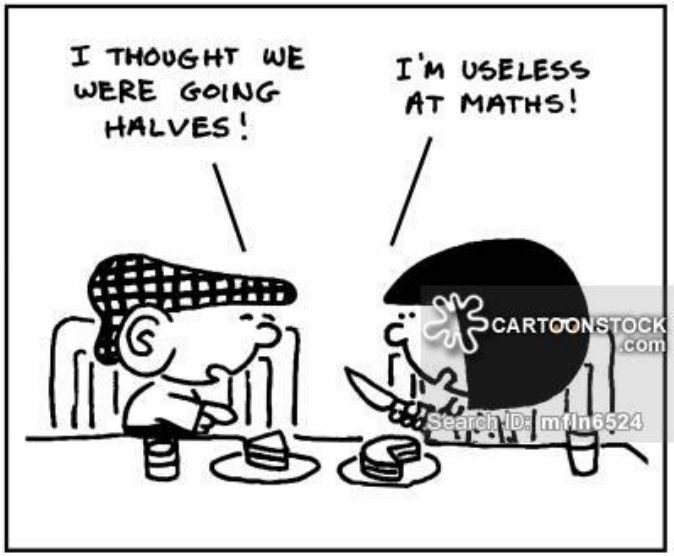
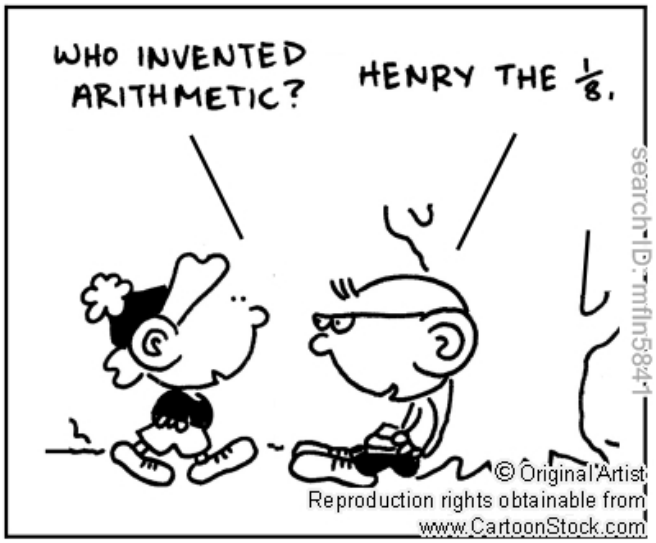
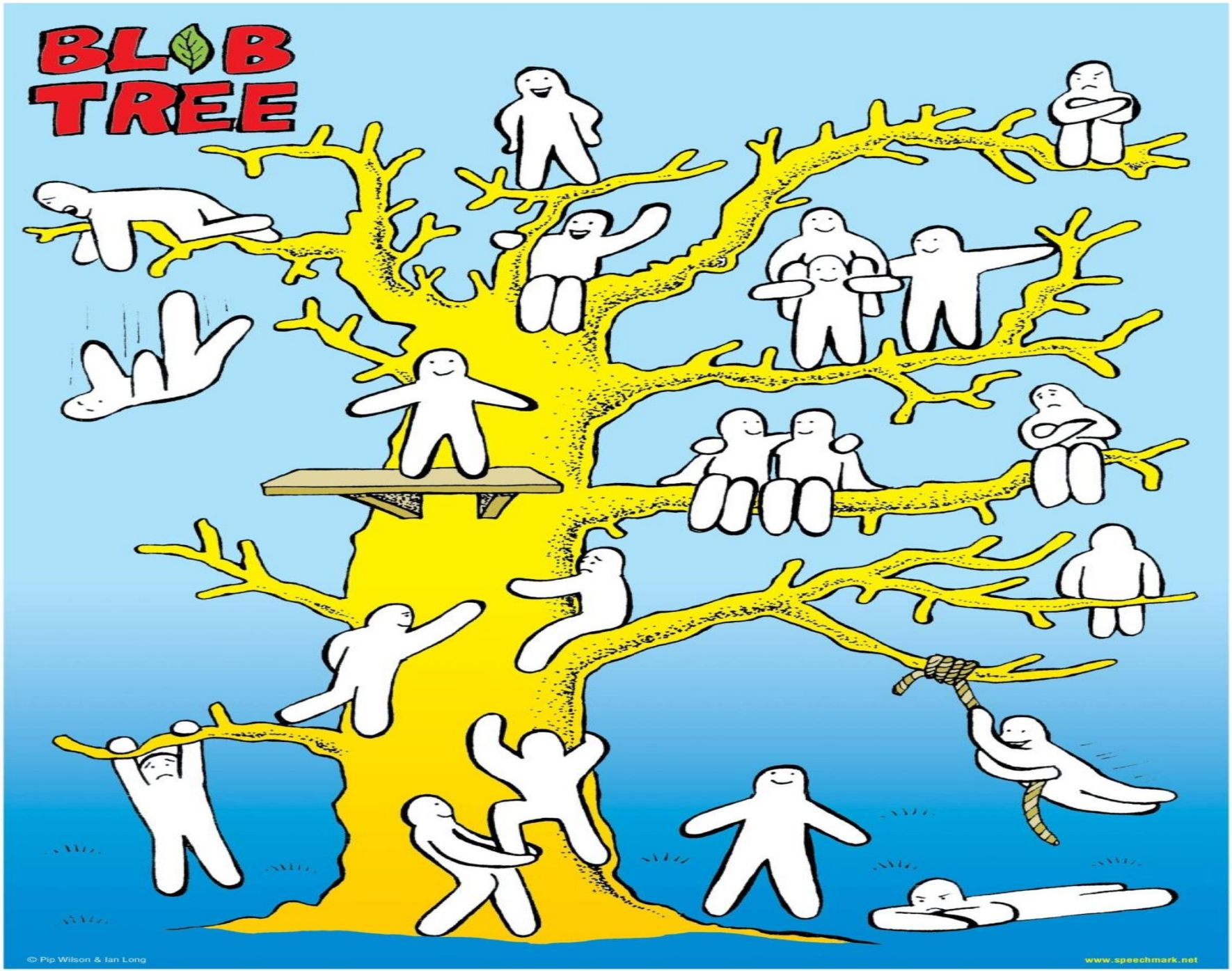
FRACTIONS

"To show you how well I understand fractions, I only did half of my homework."






BLOB TREE
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Aims for today:

- Understand the importance of **language** and the **correct vocabulary** to use.
- To get an **overview of each year.**
- To learn how we **teach fractions** at St Gregory's.
- To look at **resources** your child may be using for learning about fractions.
- Have a go!

Why Fractions?

A massive part of the **curriculum**!

Taught in **every year** group and builds from the year before.

Makes use of all **other** areas of **arithmetic** including times tables.

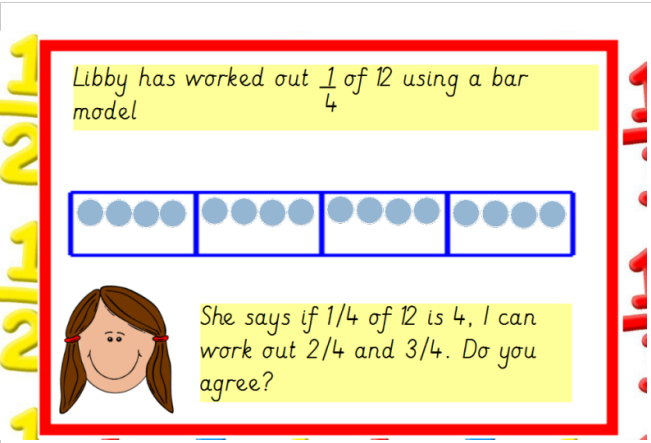
Can apply to **everyday life**.

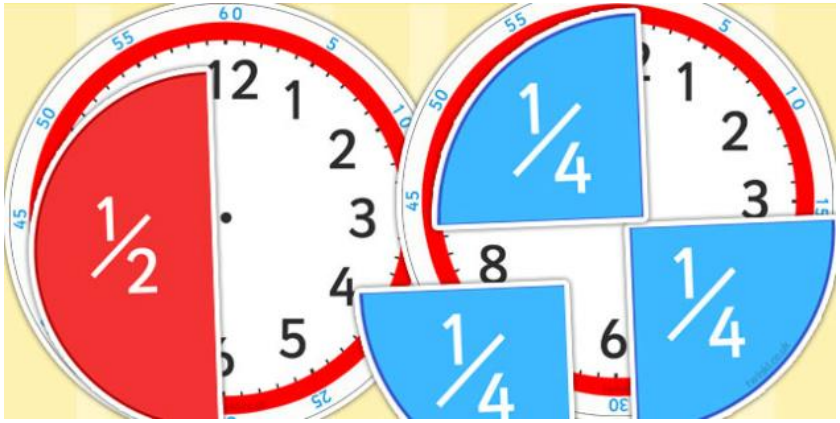
3 Most important:

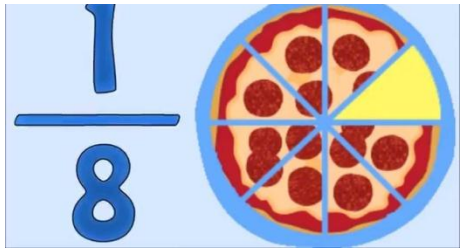
- **Vocabulary.**
- **Main image we use in teaching (bar model).**
- **Appreciate the importance of times tables.**

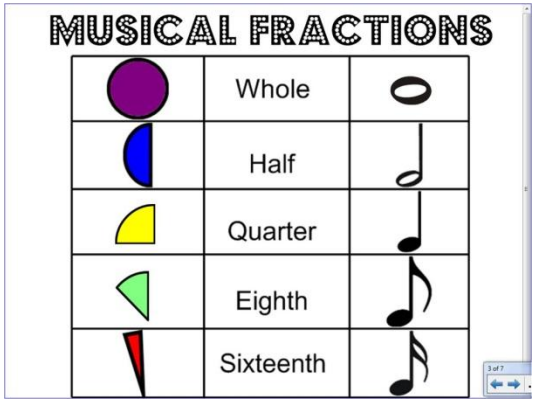
What is a fraction?

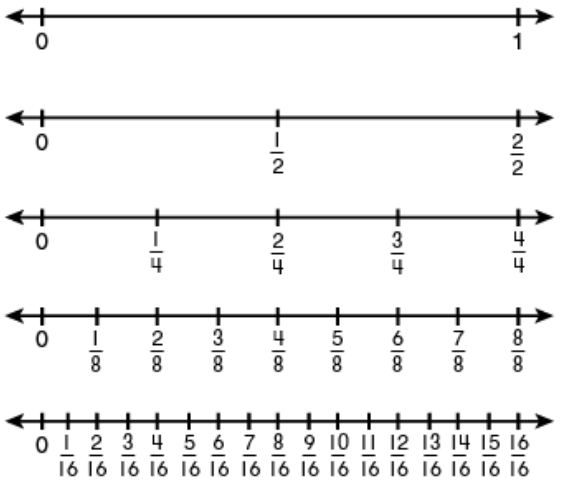
A part of something…

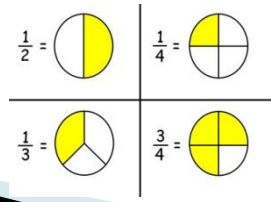


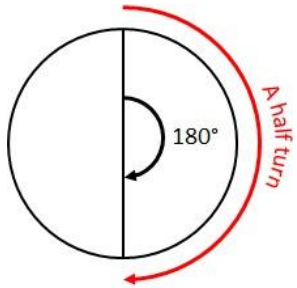












Match the red meanings and yellow symbols to the correct blue word.

FRACTION

How many parts we're interested in

FRACTION LINE

How many equal parts the whole has been split into

DENOMINATOR

Any part of a group, number or whole

NUMERATOR

Separates the denominator and numerator and means divided by

$\frac{2}{}$ $\frac{1}{2}$ $\frac{1}{}$ $\frac{}{}$

Language match… answers!

FRACTION — Any part of a group, number or whole — $\frac{1}{2}$

FRACTION LINE — Separates the denominator and numerator and means divided by — $-$

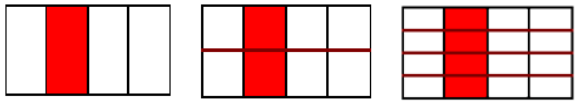
DENOMINATOR — How many equal parts the whole has been split into — $\frac{1}{2}$

NUMERATOR — How many parts we're interested in — $\frac{1}{1}$

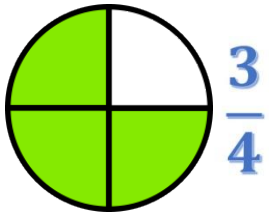
Match the red meanings and coloured images to the correct blue word.

PROPER FRACTION

Whole number and a fraction.



$\frac{1}{4} = \frac{2}{8} = \frac{4}{16}$

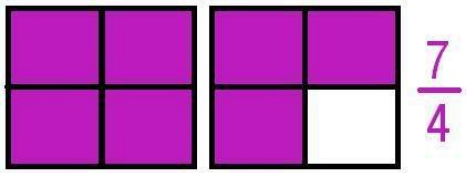


$\frac{3}{4}$

IMPROPER FRACTION

Fractions that represent the same value; they are equal / the same.

MIXED NUMBER

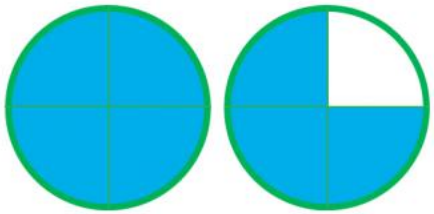


$\frac{7}{4}$

Numerator is equal to or greater than the denominator.

EQUIVALENT FRACTION

Numerator is less than the denominator; we are interested in less than the whole.

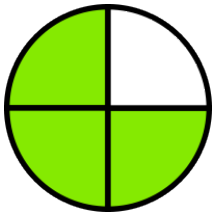


$1\frac{3}{4}$

Language match… answers!

PROPER FRACTION

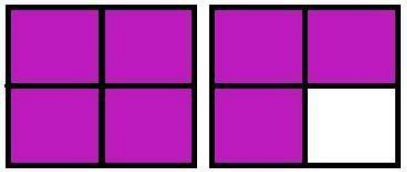
Numerator is less than the denominator; we are interested in less than the whole.



$\frac{3}{4}$

IMPROPER FRACTION

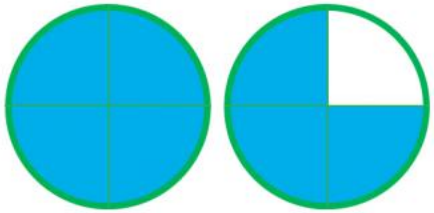
Numerator is equal to or greater than the denominator.



$\frac{7}{4}$

MIXED NUMBER

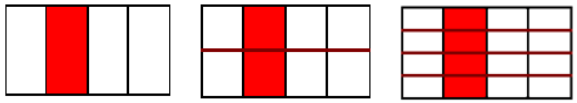
Whole number and a fraction.



$1\frac{3}{4}$

EQUIVALENT FRACTION

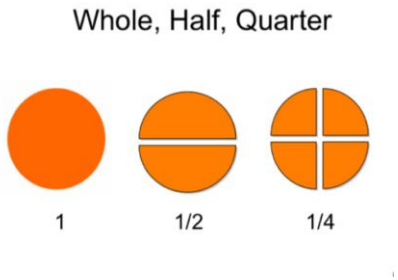
Fractions that represent the same value; they are equal / the same.

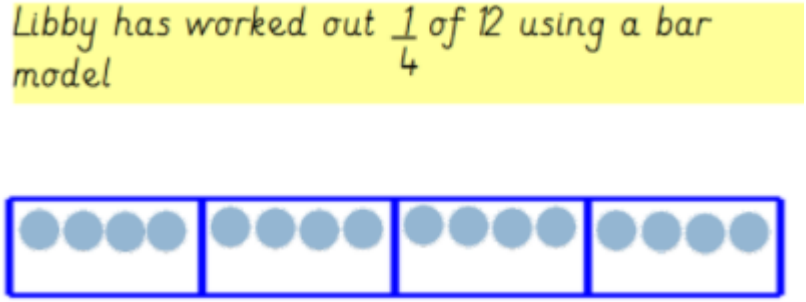


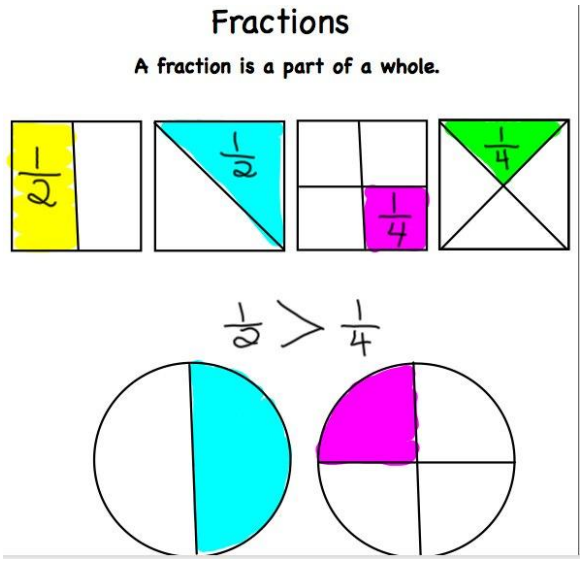
$\frac{1}{4} = \frac{2}{8} = \frac{4}{16}$

Year One

Recognise, find, name a **half** as 1 of 2 equal parts of a shape, object or quantity.
Recognise, find, name a **quarter** as 1 of 4 equal parts of a shape, object or quantity.

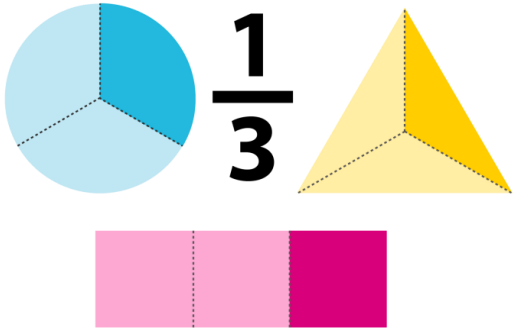


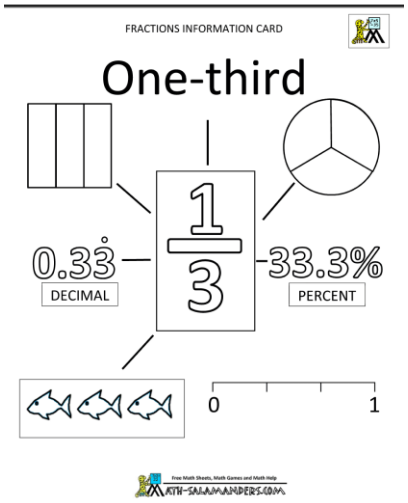


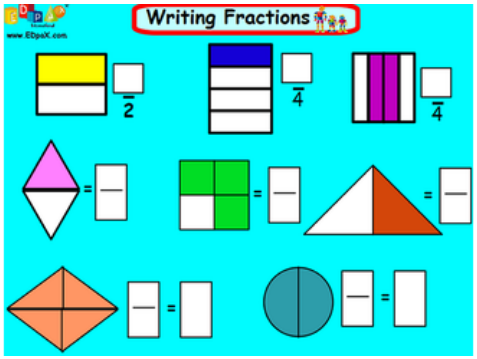


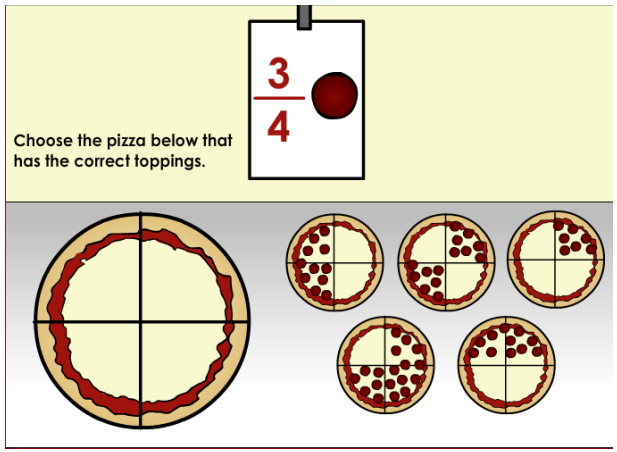
Year Two

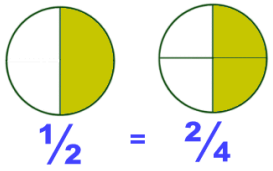
- recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$

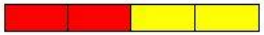










Concrete	Pictorial	Abstract
		½

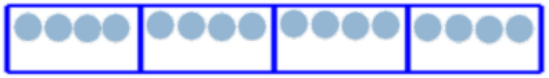
24	
12	12
6	6	6	6

½ of 24 = 12

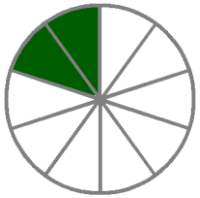
¼ of 24 = 6

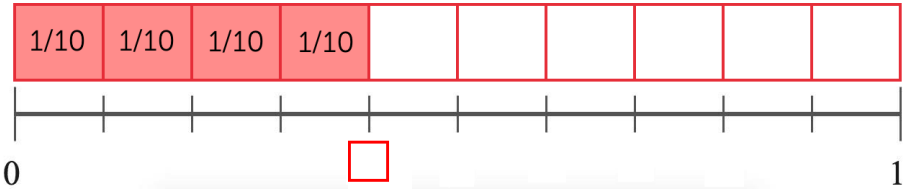
¾ of 24 = 18

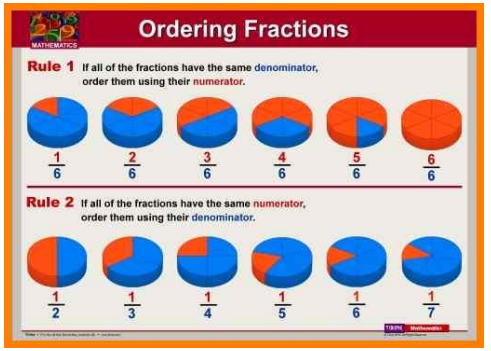
Libby has worked out $\frac{1}{4}$ of 12 using a bar model

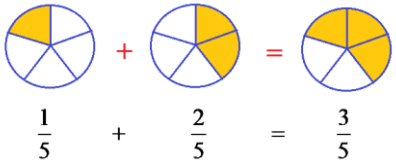


She says if 1/4 of 12 is 4, I can work out 2/4 and 3/4. Do you agree?





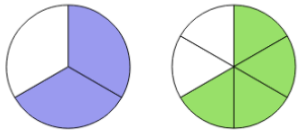




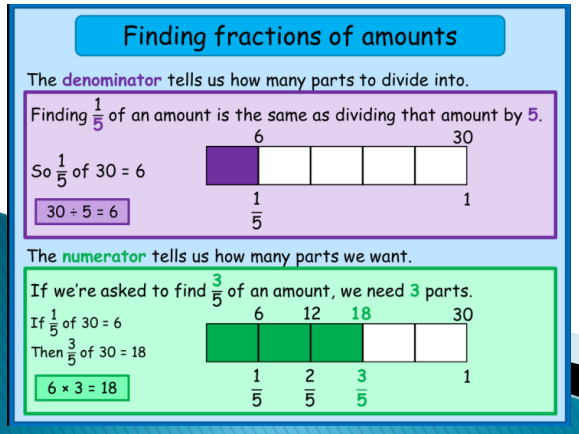
Year Three

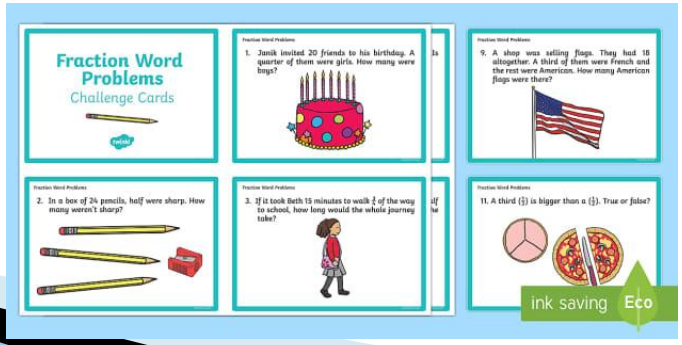
- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above

Use the models to complete the equivalent fraction sentence.



$\frac{2}{3} = \frac{\square}{6}$

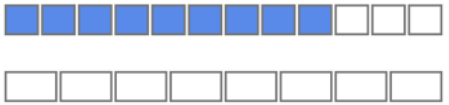


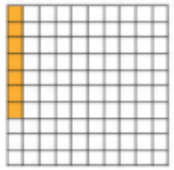
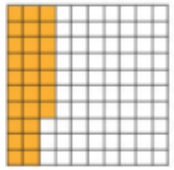
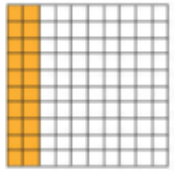


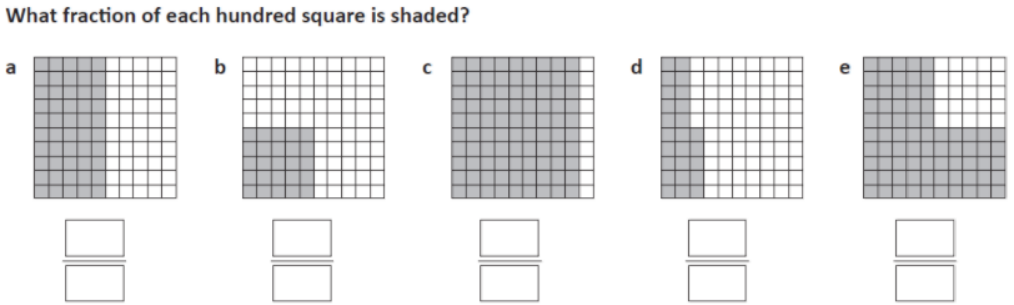
Complete the equation.

$\frac{9}{12} = \frac{\star}{8}$

$\star = \square$



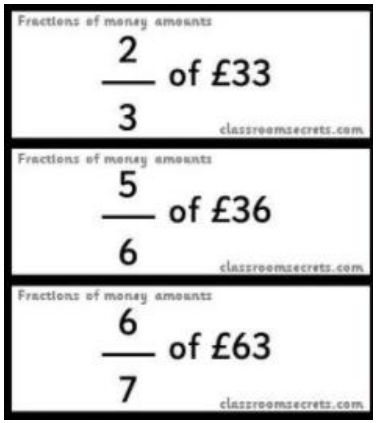
Fraction	Decimal	Representation on a Hundredths Grid
$\frac{7}{100}$	0.07	
$\frac{27}{100}$	0.27	
$\frac{20}{100}$	0.20	

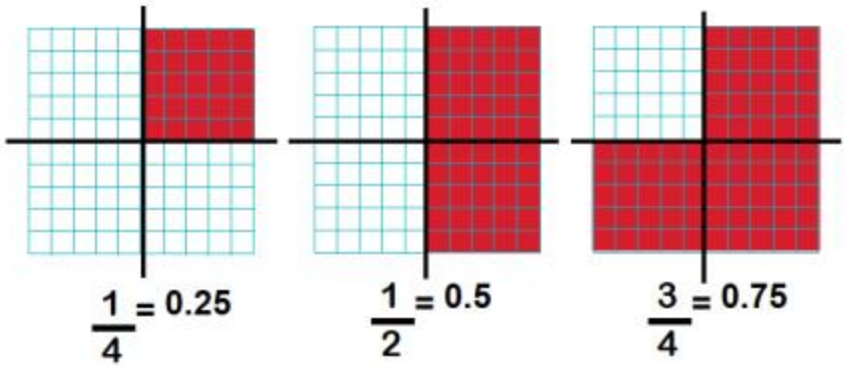


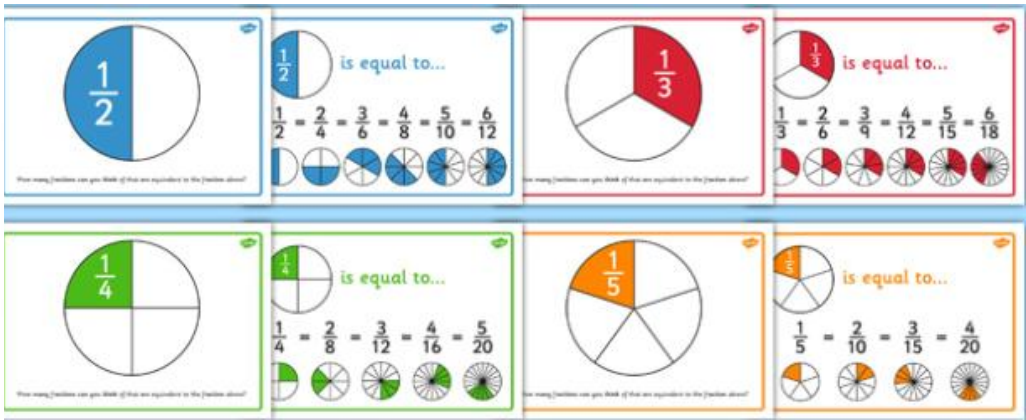
Year Four

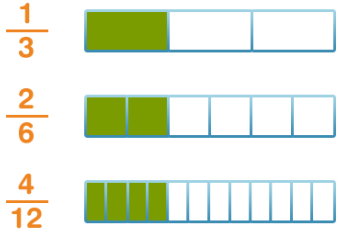
- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundreds
- recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with 1 decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to 2 decimal places
- solve simple measure and money problems involving fractions and decimals to 2 decimal places

H	T	U	t	h
	2	7 •	0	0
	(÷ 10)	2 •	7	0
	(÷100)	0 •	2	7

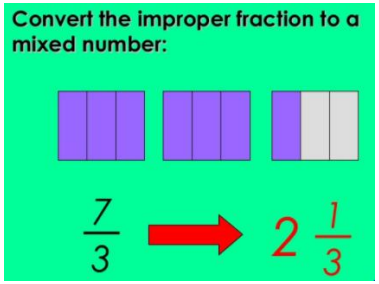








$$\frac{1}{3}\ \frac{\times 2}{\times 2} = \frac{2}{6}\ \frac{\times 2}{\times 2} = \frac{4}{12}$$



$\frac{3}{7} + \frac{2}{7} =$

$\frac{3}{7} + \frac{2}{14} =$

$\frac{4}{5} - \frac{9}{15} =$

Year Five

1) Place these fractions in ascending order:

a. $\frac{1}{3}\ \frac{3}{4}\ \frac{5}{12}\ \frac{1}{2}\ \frac{5}{6}$

b. $\frac{1}{15}\ \frac{2}{3}\ \frac{4}{5}\ \frac{1}{3}\ \frac{7}{15}$

- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$]
- add and subtract fractions with the same denominator, and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example, 0.71 = $\frac{71}{100}$]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with 2 decimal places to the nearest whole number and to 1 decimal place
- read, write, order and compare numbers with up to 3 decimal places
- solve problems involving number up to 3 decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction
- solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25

Find the missing fraction

$\frac{11}{7} + \_\_ = \frac{18}{7}$

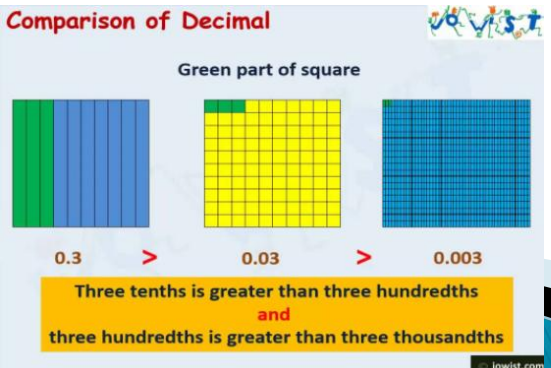
$\frac{18}{5} - \_\_ = \frac{9}{10}$

$\_\_ + \frac{4}{6} = \frac{1}{6}$

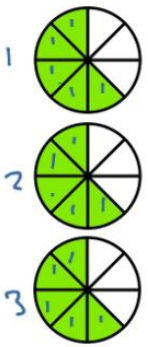
Compare & Order Decimals

Steps:
1. Stack your decimals.
2. Put placeholders (zeroes) in empty spaces, if needed.
3. Compare/Order decimals.
4. Rewrite in original form.

least to greatest
34.567
36.340
39.938
39.902
32.397

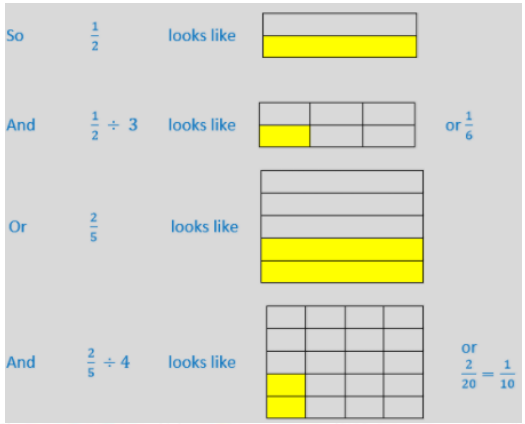


Fractions	Decimals	Diagram	Out of 100	Percentages
1/10	0.1		10/100	10%
2/10	0.2		20/100	20%
3/10	0.3		30/100	30%
4/10	0.4		40/100	40%
5/10	0.5		50/100	50%



$\frac{5}{8} \times 3 = \frac{15}{8} = 1\frac{7}{8}$

$8\overline{)15}$ -8 7



GCF of 12 and 18 = 6

$$\frac{12 \div 6}{18 \div 6} = \frac{2}{3}$$

This is 1!

Compare $\frac{3}{4}$ & $\frac{2}{3}$

The LCM of 3 and 4 is 12

$\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$ $\frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

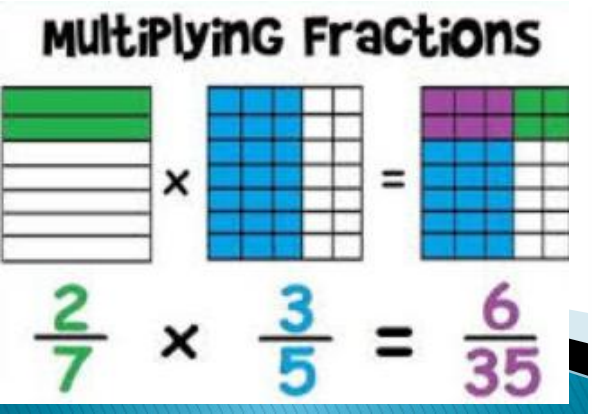
$\frac{9}{12} > \frac{8}{12}$

Year Six

Example 2		
Problem	Write $\frac{3}{8}$ as a decimal and as a percent.	
Write as a decimal.	$\frac{3}{8} = 3 \div 8$ $8\overline{)3.000}$ 0.375	Divide the numerator by the denominator. $3 \div 8 = 0.375$.
Write as a percent.	$0.375 = 37.5\%$	To write the decimal as a percent, move the decimal point two places to the *right*.
Answer	$\frac{3}{8} = 0.375 = 37.5\%$	

Fraction	Percent	Decimal
1	100%	1.0
1/2	50%	0.5
1/3	33.3%	0.33
1/4	25%	0.25
1/5	20%	0.2
1/6	16.6%	0.166
1/8	12.5%	0.125
1/10	10%	0.1

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions >1
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]
- divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]
- identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places
- multiply one-digit numbers with up to 2 decimal places by whole numbers
- use written division methods in cases where the answer has up to 2 decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts



Multiplying and Dividing by 10, 100 and 1000

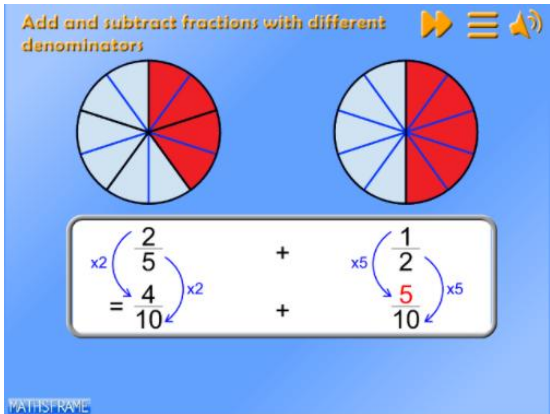
10 000	1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

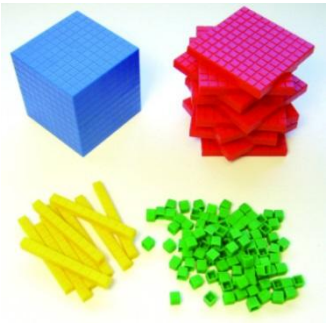
Multiplying

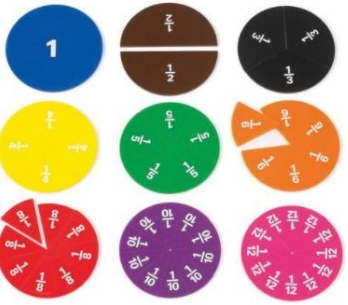
X 10 digits move LEFT **1** space
X 100 digits move LEFT **2** spaces
X 1000 digits move LEFT **3** spaces

Dividing

÷ 10 digits move RIGHT **1** space
÷ 100 digits move RIGHT **2** spaces
÷ 1000 digits move RIGHT **3** spaces

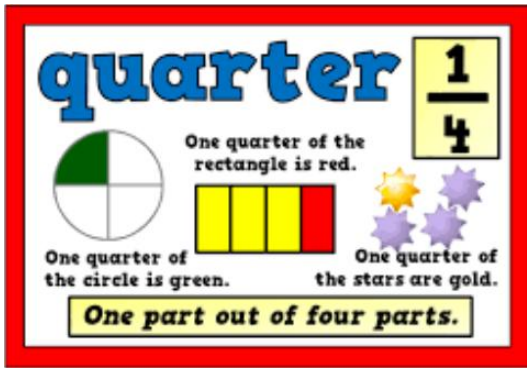


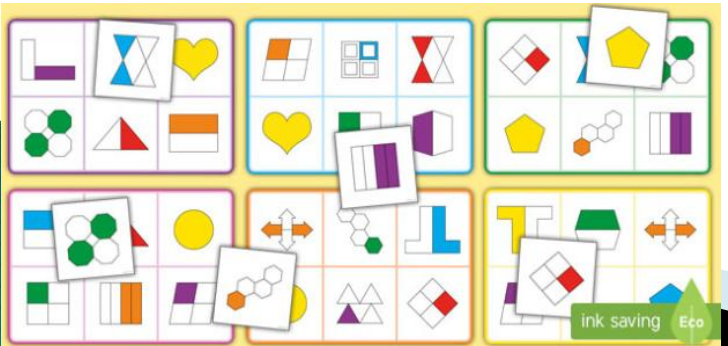


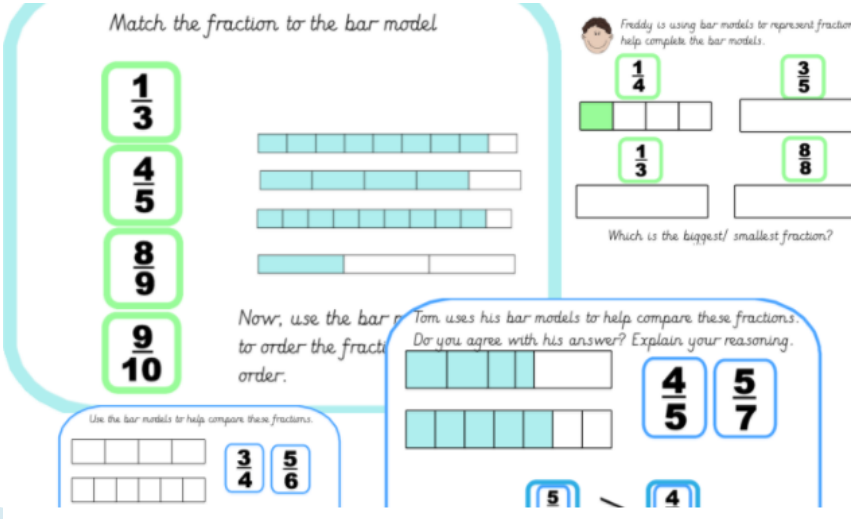


How do we teach fractions at St Gregory's?

- Use concrete resources
- Use images
- Use games
- Use consistent language







Bar Model

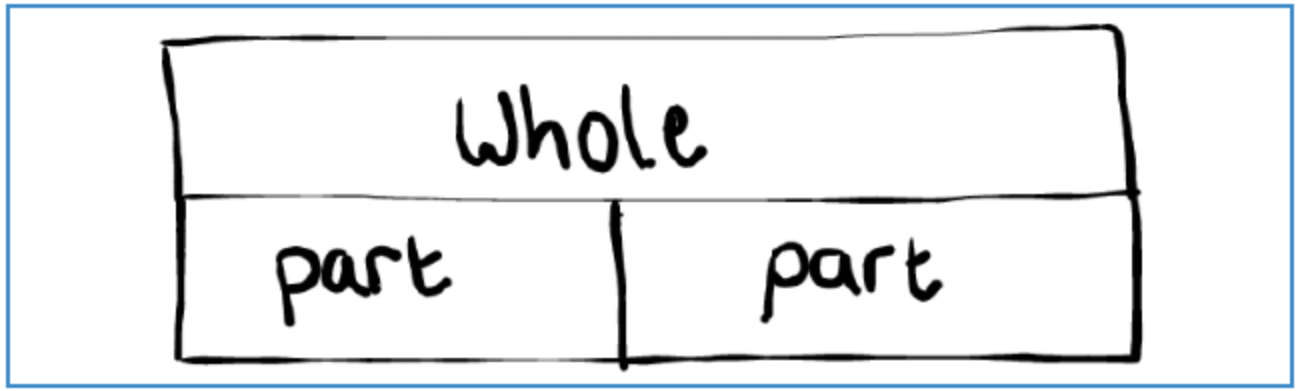
One of the main pictorial images we use across the school is the **bar model**.

But why do we use it?

- This model really helps children **see the mathematical relationships**.
- It avoids memorising methods or ‘tricks’ which don’t make clear how or why the maths works.
- All that’s needed is a pencil and paper – **very versatile** – can use in tests.
- Can be used for pretty much **any area of maths**.

Bar Model

Part/whole bar models are made up of parts and wholes, where the whole represents the sum of the parts.



Bar Model

Fractions problems

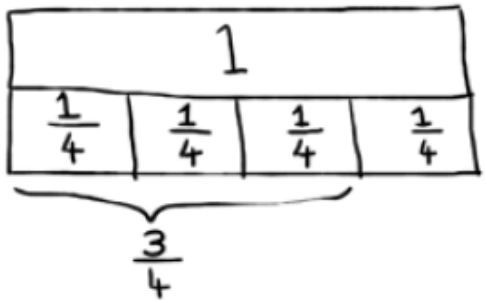
Fractions are mentioned 104 times in the National Curriculum so they're quite a big deal.

Modelling fractions using bar models is one of the most intuitive ways of showing fractions pictorially. It might even be that children will gain a greater understanding of bar modelling in general, giving them skills which are transferable to other areas of the Maths curriculum.

As such, there are a wide range of contexts that a bar model can be used to represent fractions problems.

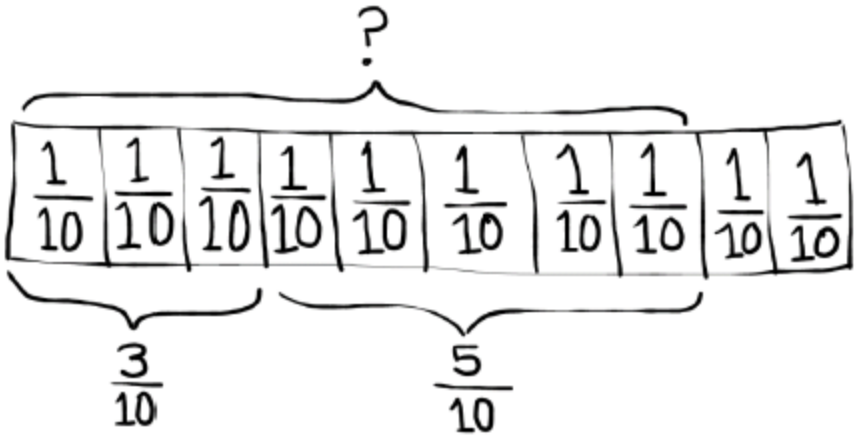
In Year 2 children have to recognise, find, name and write fractions, such as $\frac{3}{4}$ which can be represented as below:

A bar model representing three quarters



Bar Modelling: Adding Fractions

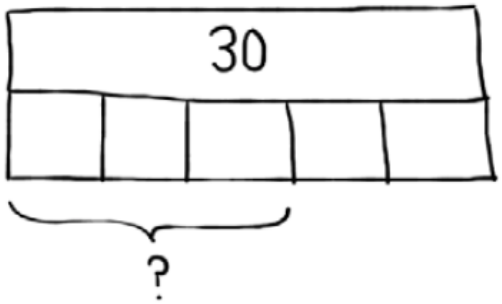
In Year 3, children start adding fractions with the same denominator such as $\frac{3}{10} + \frac{5}{10} = ?$



Bar Model

Also, bar models can support pupils to find fractions of amounts, as in the equation below:

A bar model representing the equation: What is $\frac{3}{5}$ of 30?

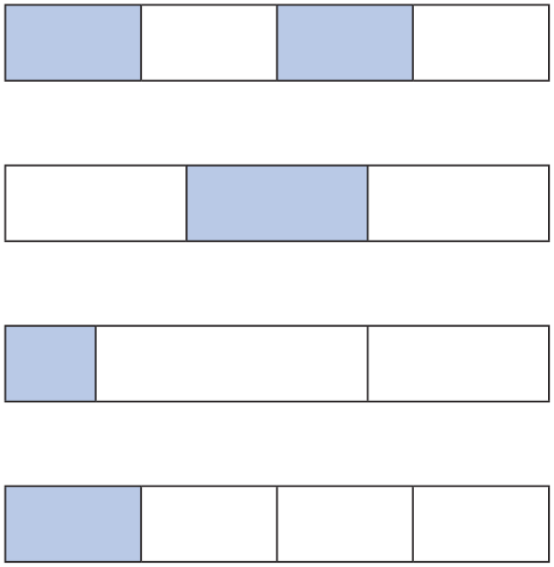


Language to support the building of the model:

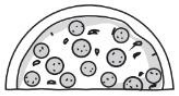
1. What is the whole ? (30 - So write 30 in the top box.)
2. How do we know how many **EQUAL** parts we are **splitting** the **WHOLE** into? (look at the **denominator** = 5)
3. So we are **splitting** 30 into **how many** equal parts? (5)
4. So how many boxes do we need to draw? (draw 5 boxes)
5. Which of the 4 operations (+ - x ÷) does **split** mean? Hint = share …. (÷ divide)
6. So what are we splitting or dividing up? (30) Into how many equal parts (5) so the calculation must be ….? (30 ÷ 5)
7. How do we solve that? (Draw marks / Count in 5s till you get to 30/write down multiples/know times tables! …. 6)
8. So what goes in each box? (6)
9. How do we know how many boxes we are **interested** in? (look at the **numerator** .. So 3 boxes of 6)
10. How can we solve that? (6+6+6 or 3 x 6 = 18…. Count on in 6s / know times tables!)

TIMES TABLES ARE REALLY USEFUL!!!

24 Tick the shape that has exactly $\frac{1}{3}$ shaded.



17 Ben ate half a pizza.



Which fraction shows the amount he ate?

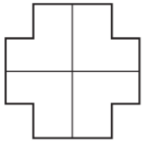
Circle it.

$\frac{1}{4}$ $\frac{1}{3}$ $\frac{2}{4}$ $\frac{3}{4}$

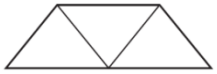
27 Shade the fractions of the shapes.

Shade $\frac{1}{2}$

Shade $\frac{3}{4}$

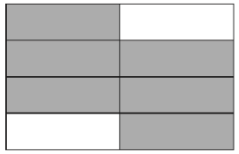


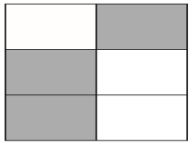
Shade $\frac{1}{3}$

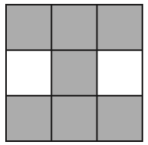


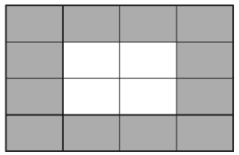
$\frac{1}{3}$ of 12 =

Tick two shapes that have $\frac{3}{4}$ shaded.

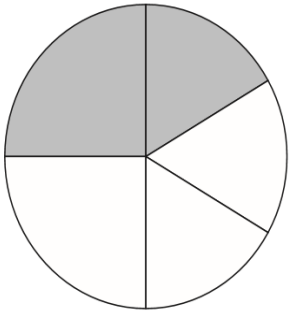








In this circle, $\frac{1}{4}$ and $\frac{1}{6}$ are shaded.



What fraction of the whole circle is **not** shaded?

The numbers in this sequence increase by the same amount each time.

Write the missing numbers.

	1	$1\frac{5}{8}$	$2\frac{1}{4}$	

$$\frac{4}{6} + \frac{3}{6} =$$

$$\frac{2}{6} - \frac{1}{8} =$$

Great websites for fractions

- https://www.mathplayground.com/math_manipulatives.html
- https://www.khanacademy.org/math/arithmetic/fraction-arithmetic

Fractions – have a go!

Y1: Twelve people are split into two groups. How many are in each group?

Y2: Last week Ellie got £1.00 pocket money. She spent half of it. How much has she got left?

Y2: Charlotte-May had to find a half of a number. Her answer was 4. What number did she start with?

Y3: Which is the larger amount, one third of £60 or one quarter of £88?

Y3: A computer game is £24 in the sale. This is one quarter off its original price. How much did it cost before the sale?

Y4: Sally has 40 football cards. She gives 3/5 of them away. How many does she give away?

Y4: Sally has 30 football cards. She gives 2/5 of them to her friend. How many does she have left?

Y5: Rita worked out that 1/6 of a number was 12. What was the number she started with?

Y5: Robert calculated 25% of 600. What answer does he get?

Y6: Three quarters of a number is 54. What is the number?

Y6: Which is more; 5/9 of 252 or 4/7 of 238?

Y6: . There are 36 packets of biscuits. One half are chocolate, a ninth are digestive and a third are wafer biscuits. The rest are ginger nuts. How many biscuits are ginger nuts?

The 3 most important things to go away with:

- Knowledge of the **vocabulary** so we can use consistent language at school / home.
- Knowledge of how we use the **bar model** to solve fractions problems.
- Appreciation of how useful **times tables** are!
- https://www.timestables.co.uk/