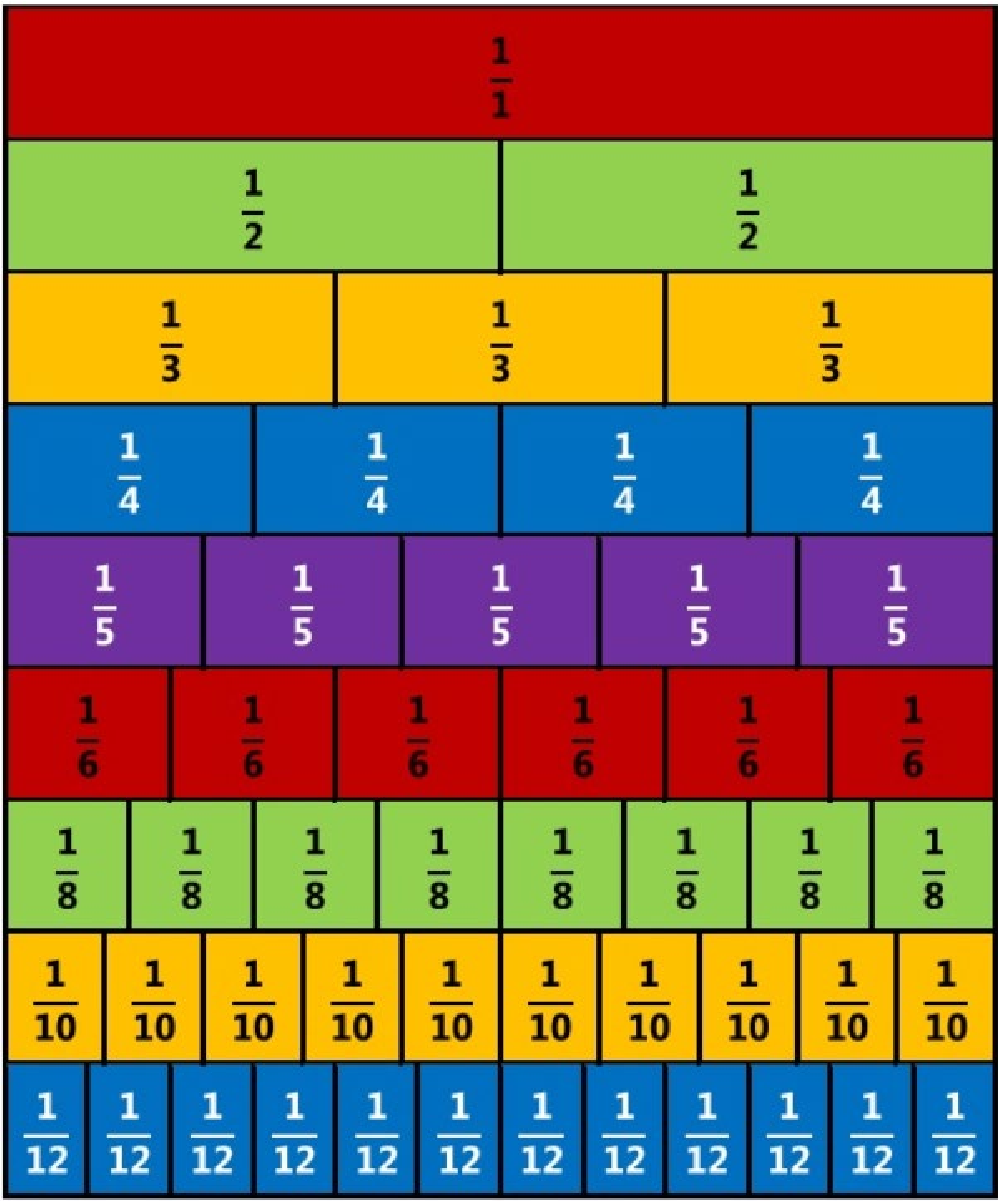
Calculation Policy

Fractions



Counting:

Year 3

- count up and down in 10ths, 1/4s and 1/2s - recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.

Year 4

- count up and down in 10ths, 100ths, 1/4s, and 1/2s - recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten.

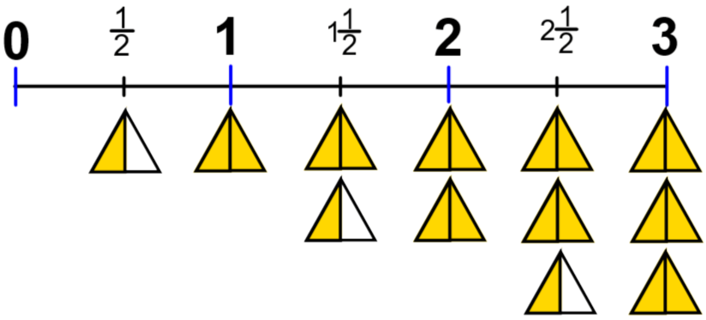
Year 5

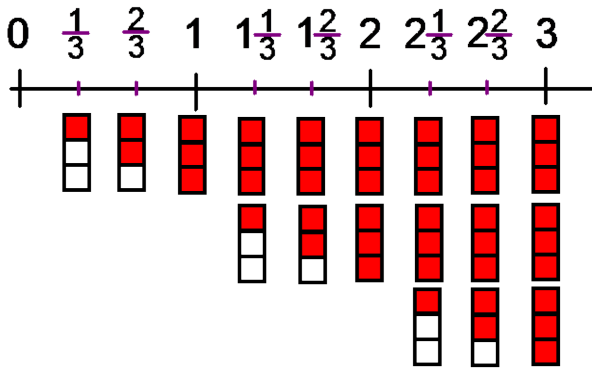
- Count in 10ths, 100ths, 1/4s and 1/2s.

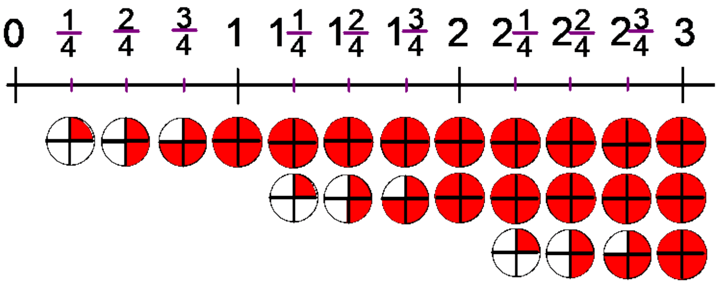
Year 6

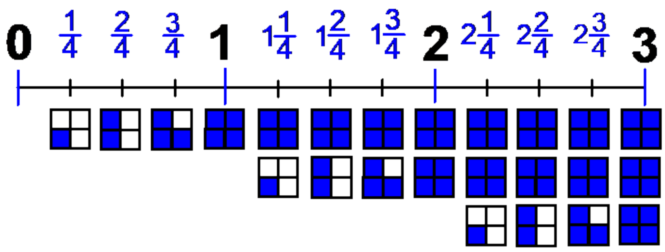
- Count in 10ths, 100ths, 1/4s, 1/2s and in decimals such as 0.1s, 0.01s, 0.2s, 0.25s, 0.5s.

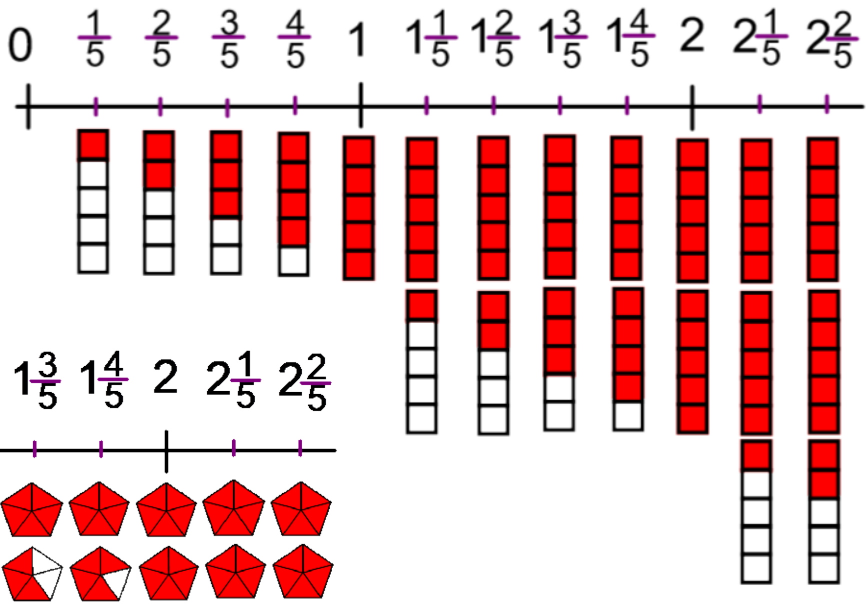
Use variation to represent fractions on a number line as children count.

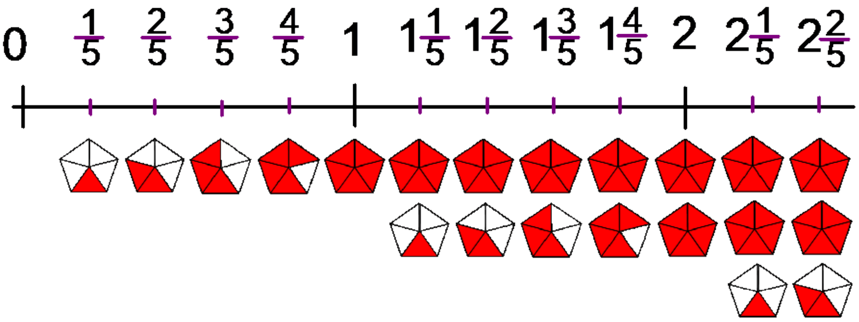




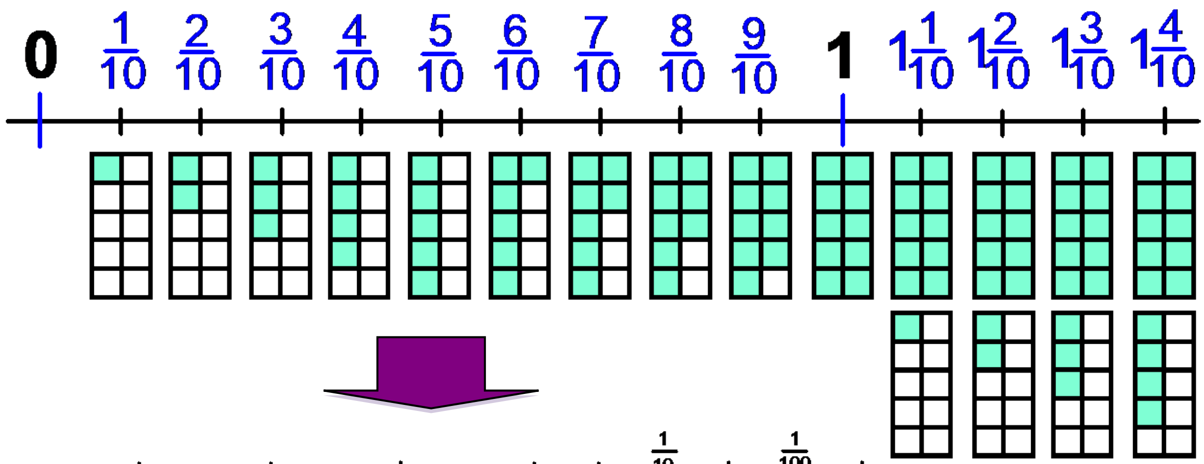




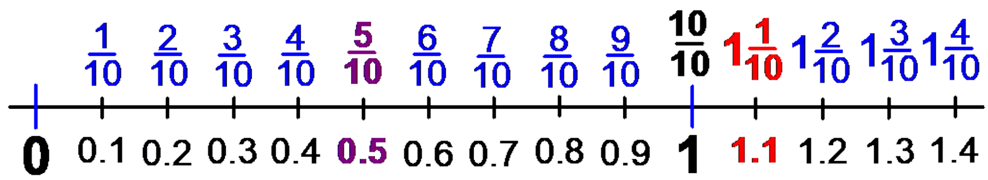




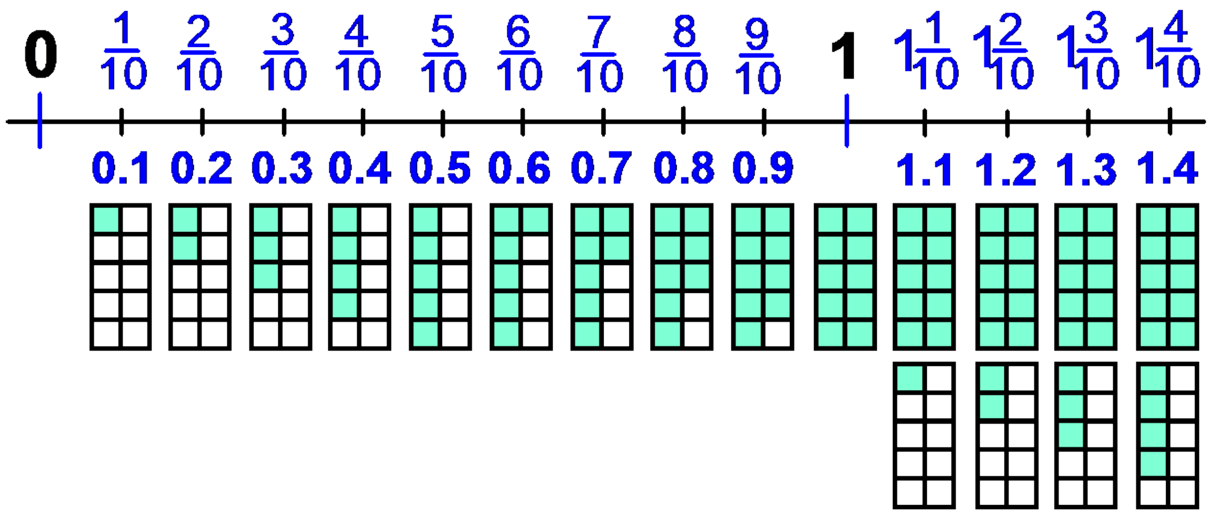
Make links between tenths, hundredths as a fraction and its decimal equivalence when counting:

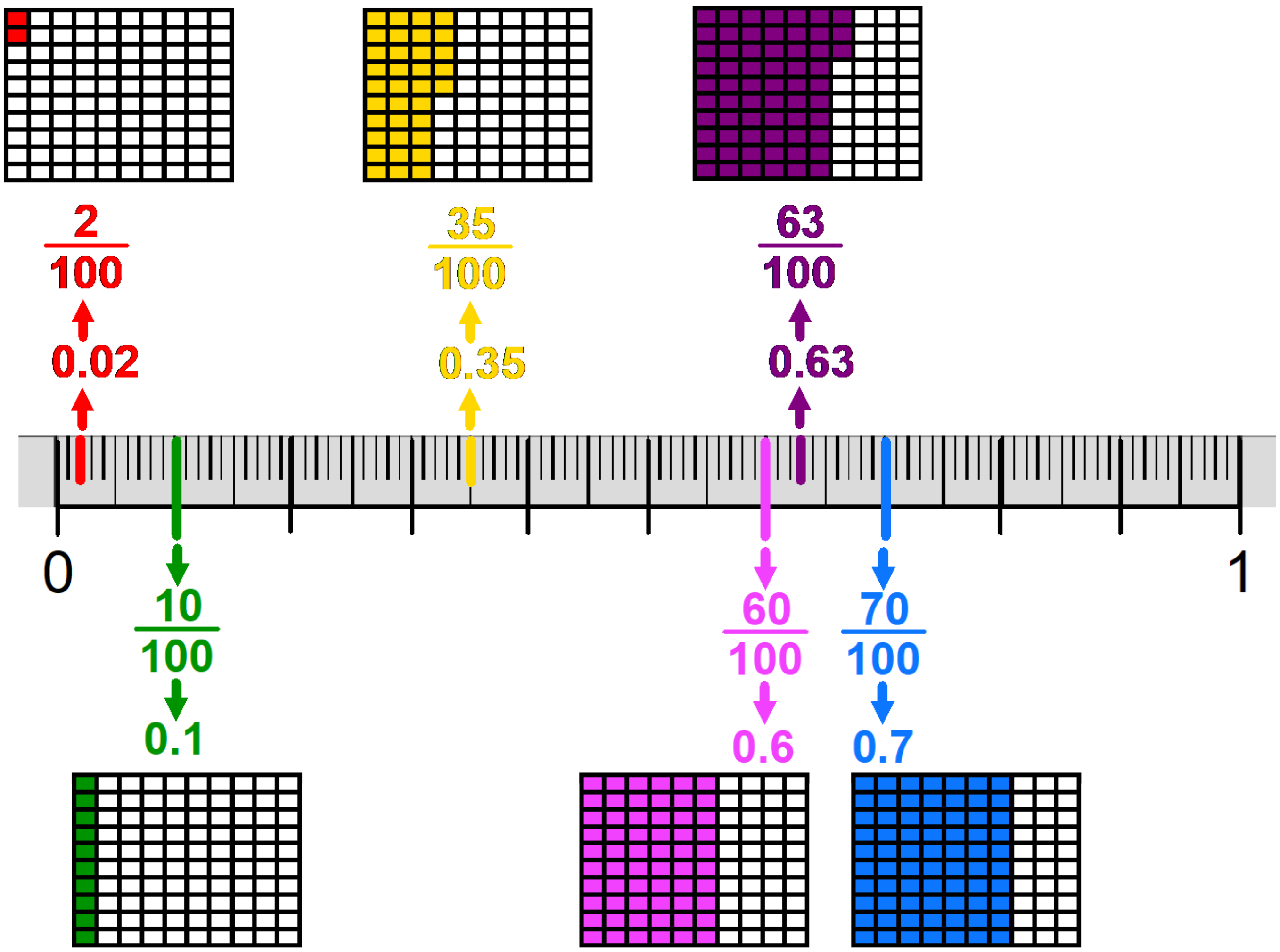


H	T	O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
		0	.	5	



H	T	O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
		1	.	1	





H	T	O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
		0	.	0	2
		0	.	1	
		0	.	3	5
		0	.	6	
		0	.	6	3
		0	.	7	

0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3
3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4
4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5
5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6
6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7
7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8
8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9
9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10

0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.3
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.6
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.7
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.8
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.9
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1

Year 1: Understanding Fractions

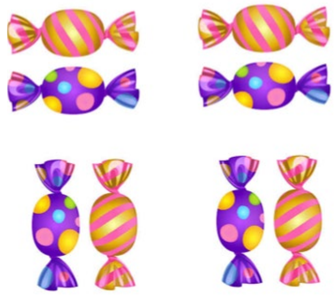
Children begin to make sense of fractions as part of a whole through exploring the halving of objects, shapes and quantities.

1. Objects



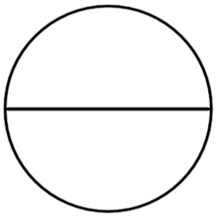
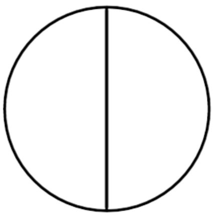
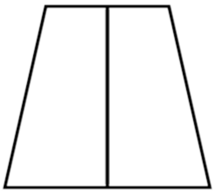
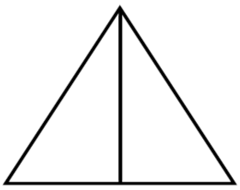
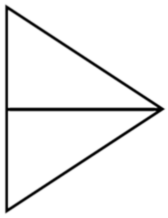
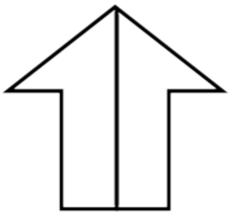


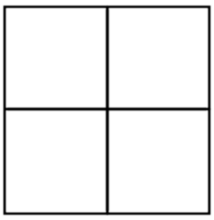
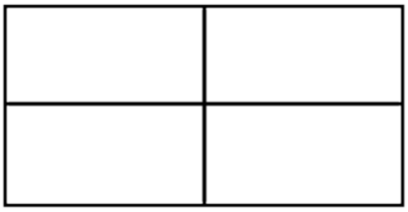
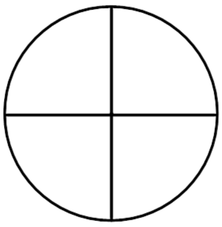

Children explore the outcome of halving and halving again through play.

2. Shapes

Links are made between the halving and quartering of real objects and children begin to recognise half and quarter shapes in different orientation and they explain why some shapes can be halved but not quartered.

Children explore the outcome of halving and halving again using shapes.

Stem sentence:

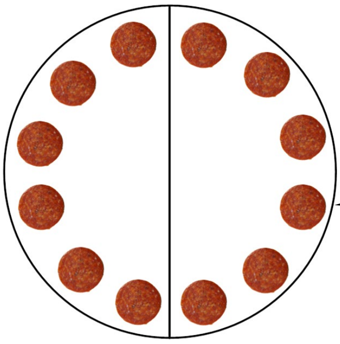
The [whole; circle; square; rectangle etc] is divided into (2 / 4) parts equally. Each part is (half / quarter) of the whole.

3. **Quantities**
Children begin to make links between fractions of shapes and quantities through the sharing of items as part of problem solving in varied contexts.

Mum is making a pizza for Amy and Peter.
She puts 12 pepperoni slices on the pizza. Each child gets half of the pizza.
How many pepperoni slices will they each get?

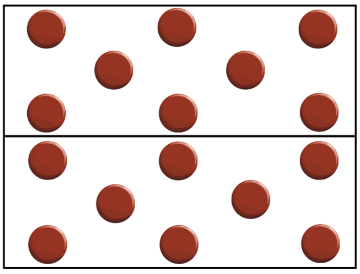
Half of 12 = 6

$\frac{1}{2}$ of 12 = 6



…'I know that they will get 6 pepperonis each because I shared the 12 pepperonis between the two halves equally. Half of 12 is 6!'

Mum is baking a chocolate cake.
She puts 16 chocolate buttons on the cake.
How many chocolate buttons are on half of the cake?

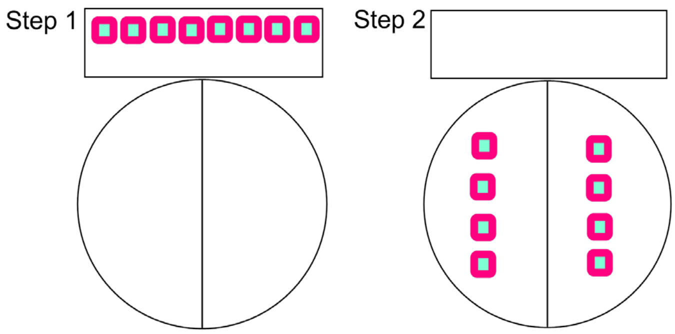


Half of 16 = 8

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

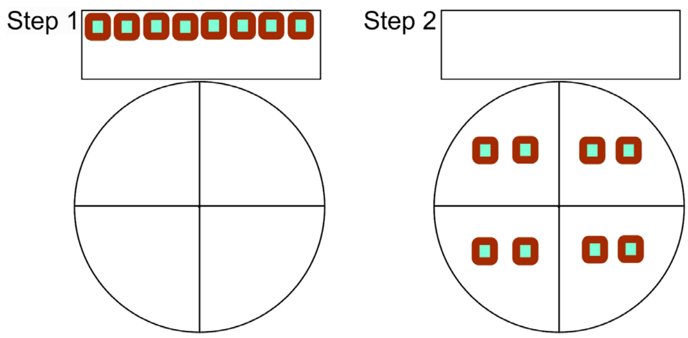
…'I know that there will be 8 chocolate buttons on half of the cake because I shared the 16 chocolate buttons between the two halves equally.
Half of 16 is 8!'

4. **Children practice using practical apparatus to find half and quarter of quantities using the following mats to help them make links between fraction of a whole in shapes and quantities.**



Half of 8 = 4

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



Quarter of 8 = 4

$\frac{1}{4}$ of 8 = 4

<u>Please note:</u>

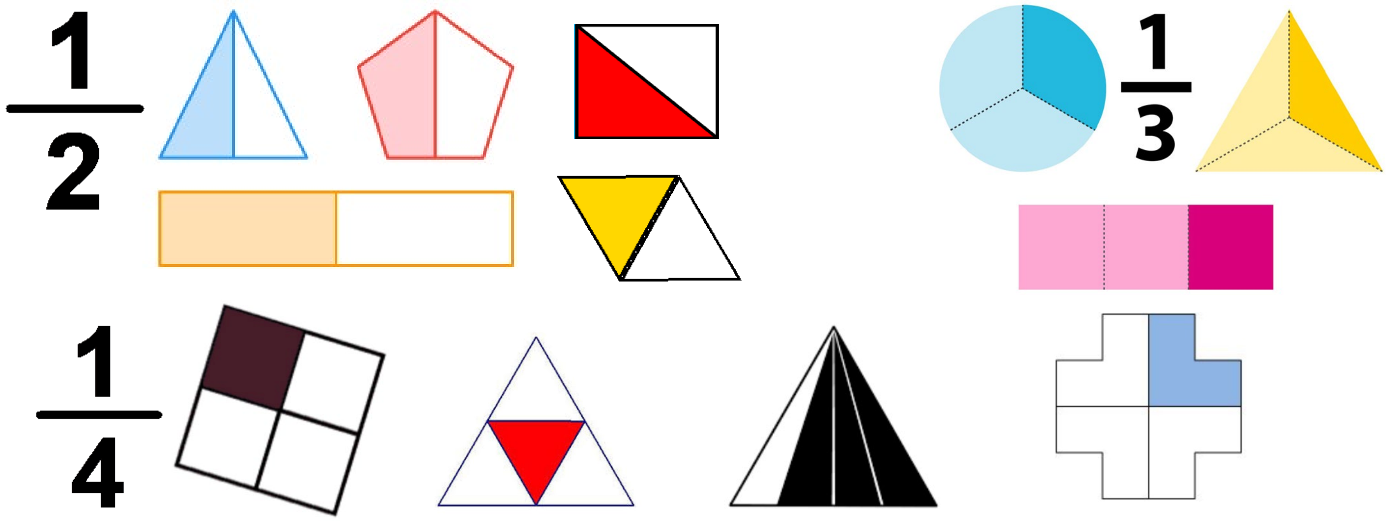
In these examples circles are used to make links between fraction of shape and quantity however in order for children to master this skill they need to be exposed to other shapes such as squares and rectangles too.

Year 2: Understanding Fractions

1. As children are introduced to 1/3, they continue to make links between the denominator and the number of equal parts the whole is divided into.

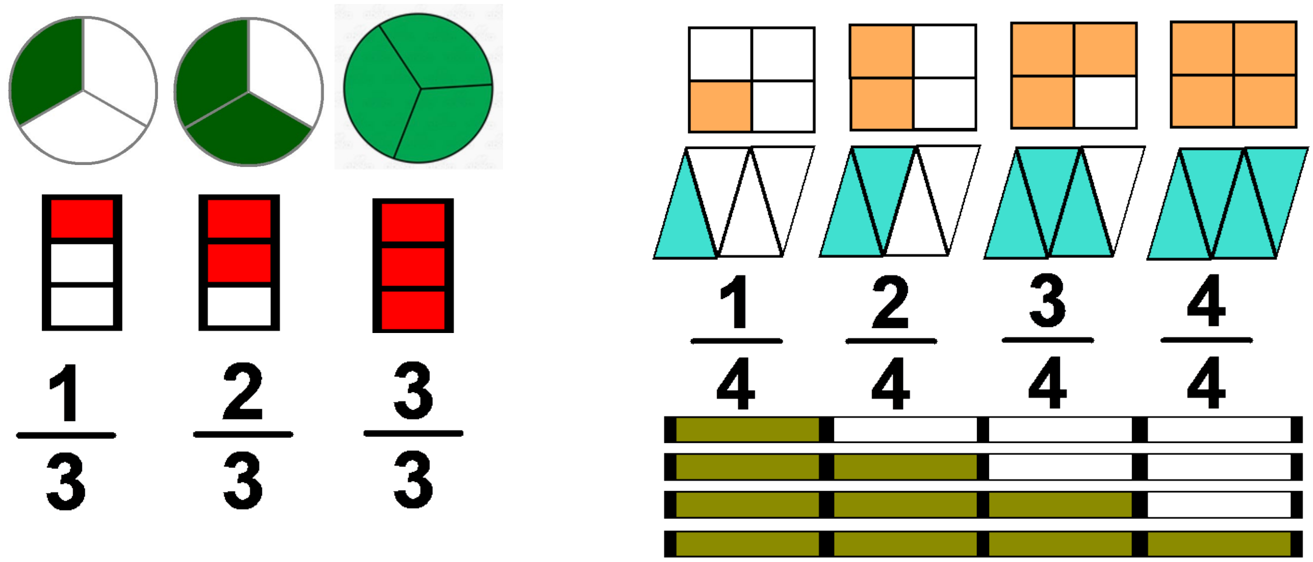
Stem sentence: The [whole; circle; square; rectangle etc.] is divided into (2 / 4 / 3) parts equally. Each part is (1/2 / 1/4 / 1/3) of the whole.

Each fraction is represented using varied shapes in different orientation.

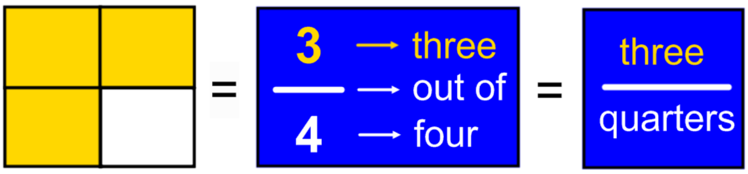


2. Children are given the opportunity to explore the meaning of the numerator by making links between the number of parts are shaded and the numerator.

Stem sentence: The [whole; circle; square; rectangle etc.] is divided into (2 / 4 / 3) parts equally. Each part is (1/2 / 1/4 / 1/3) of the whole.
The shaded parts are made up of (1 / 2 / 3 / 4) lots of (1/2 / 1/3 / 1/4) so the fraction this picture is showing is (   ).



Practice counting each fractional part with the whole class in unison such as: ***'one lot of one quarter; two lots of one quarters; three lots of one quarters; four lots of one quarters'.*** This will embed understanding further.

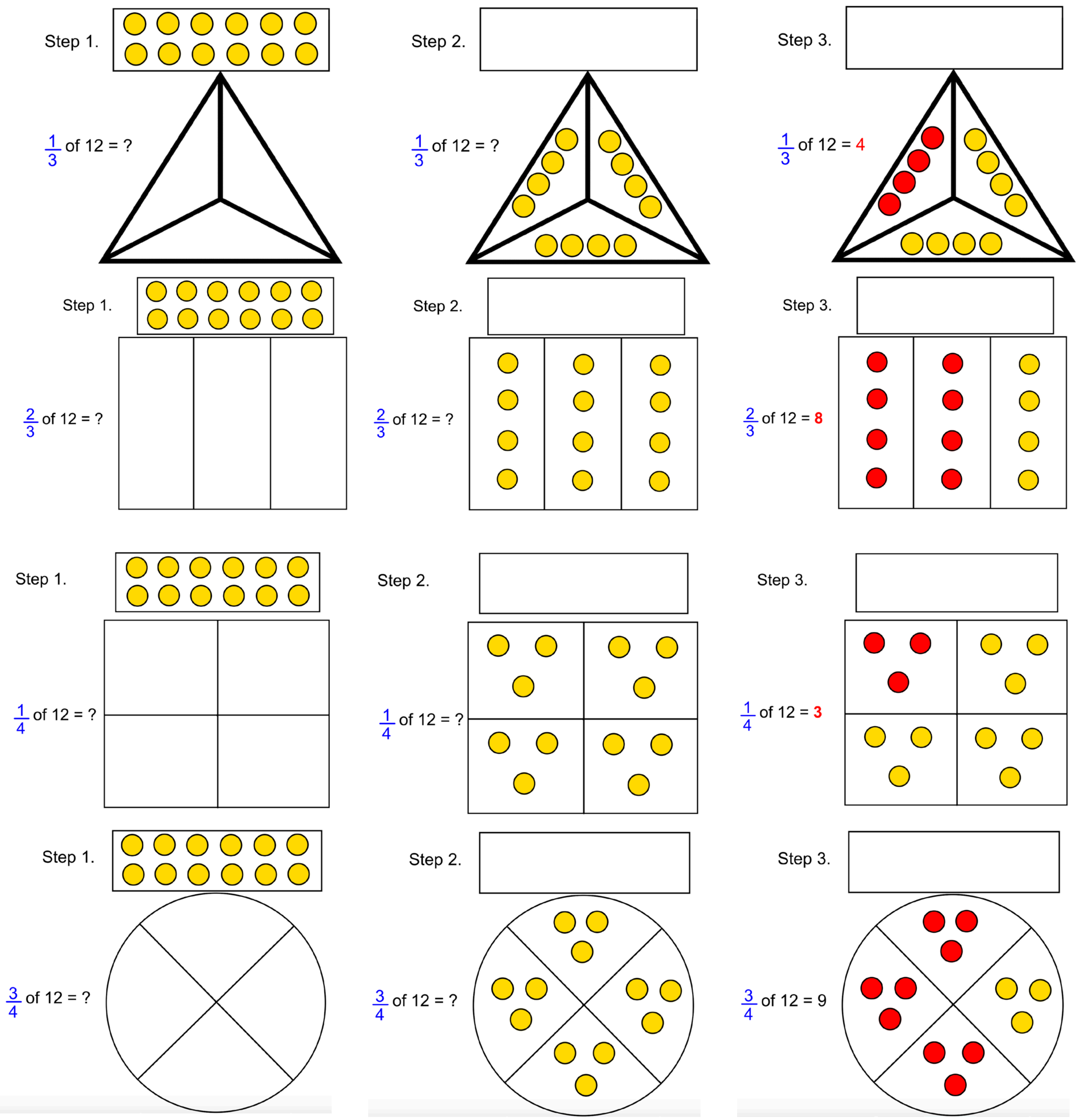


To further clarify the meaning of the notation for fractions, use the following language interchangeably with the above stem-sentence:
½ = 1 out of two

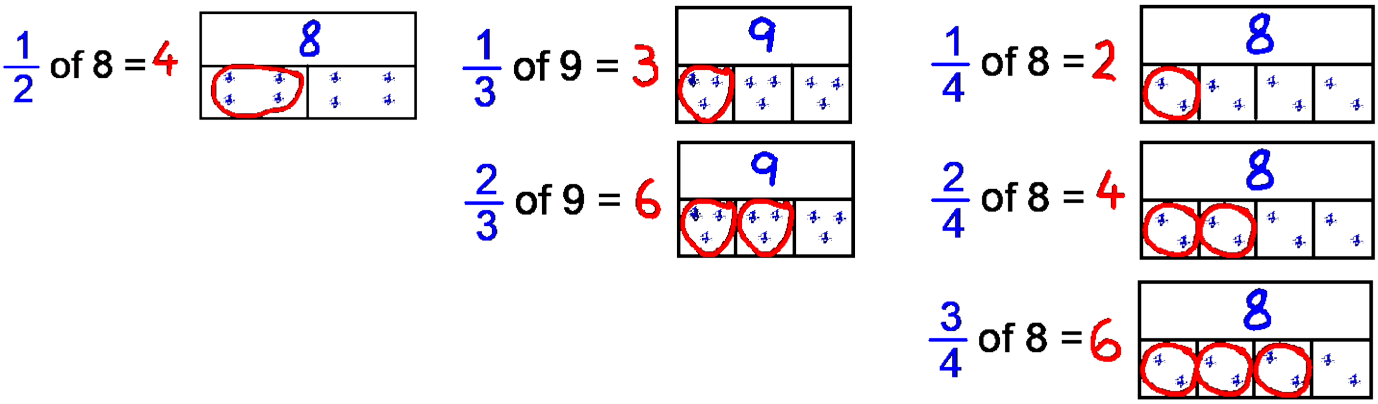
Objects

3. **Children explore finding fractions of quantities using objects by drawing on their knowledge and understanding of fraction of shape.**

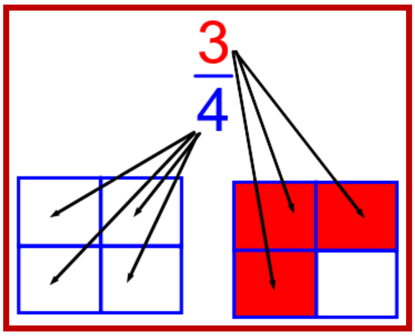
Children choose from a selection of fraction frames and use double-sided counters to share out equally. They then turn over the correct number of counters to show the required fraction.

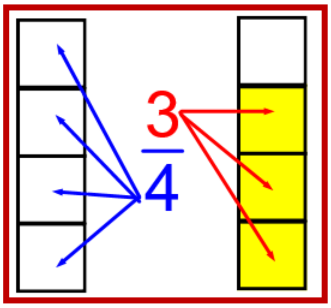


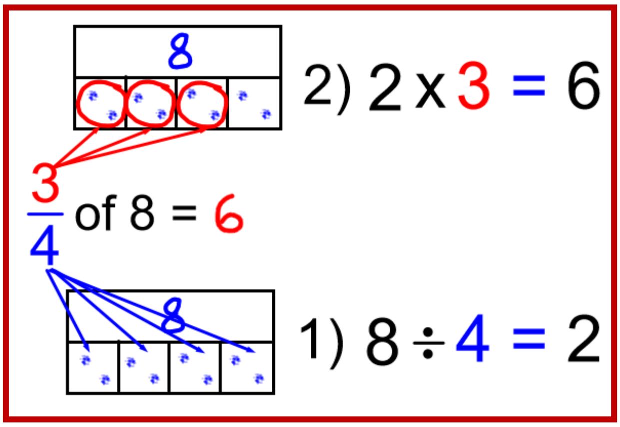
4. **Pupils are taught to find simple fractions of quantities using jottings and bar-modelling and through their understanding of the meaning of the numerator and the denominator.**



5. **Pupils establish the meaning of the denominator and the numerator based on the above examples.**

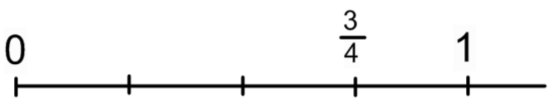


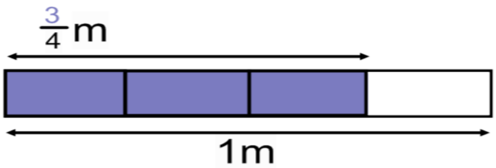




Stem sentence for the meaning of the denominator and the numerator:
The denominator shows how many equal parts the whole is divided into.
The numerator shows how many parts of the whole we shade, circle or take.

Lengths:
Children find fractions of the lengths of a piece of string, strip of paper, ribbon, shoelace, etc. by folding. Children should be encouraged to discover the strategy of halving and then halving again. They transfer this knowledge to finding fractions of the length of objects that they can mark with a marker pen by first marking out the half and quarter lines.
Finally, children should find fractions of the lengths of drawn lines using rulers. Link this knowledge to measurement.



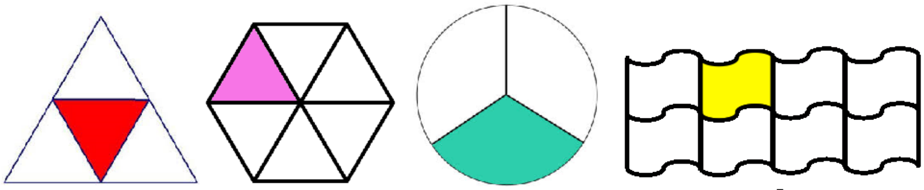


Quantities:
Children solve problems involving finding fractions of a jug or container full of water, flour, sand etc. They are to explore the best possible way to be accurate using a range of containers.

Year 3: Understanding Fractions

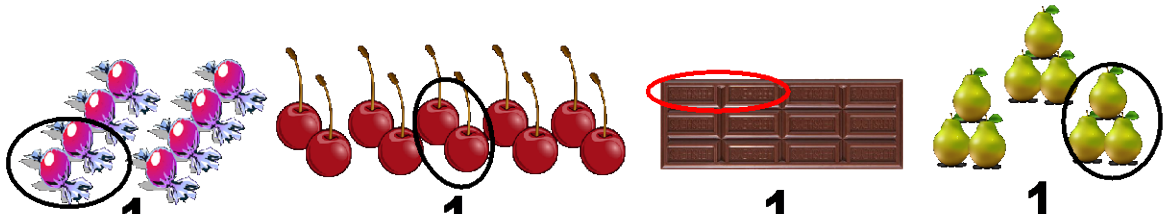
Children continue to explore finding various unit or non-unit fractions of shapes, objects, lengths and quantities and they know the difference between unit and non-unit fractions.

1. **Pupils define the meaning of a unit fraction through the use of varied examples.**



$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{3}$ $\frac{1}{8}$

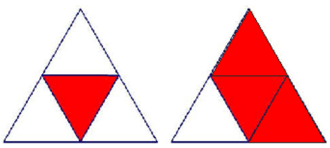
Stem sentence: The __________is divided into (   ) parts equally. Each part is (   ) of the whole.
This means that (   ) of the whole is shaded.



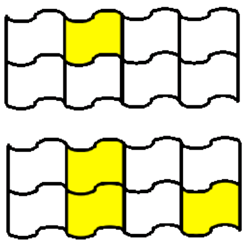
$\frac{1}{4}$ $\frac{1}{5}$ $\frac{1}{6}$ $\frac{1}{3}$

Stem sentence: The __________are divided into (   ) parts equally. Each part is (   ) of the whole.
This means that (   ) of the whole is circled.

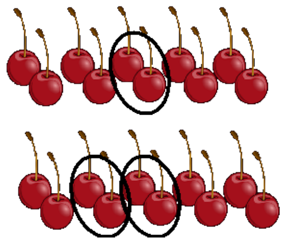
2. **Pupils explore the difference between unit and non-unit fractions and describe these using stem sentences**



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



$\frac{1}{8}$ $\frac{3}{8}$



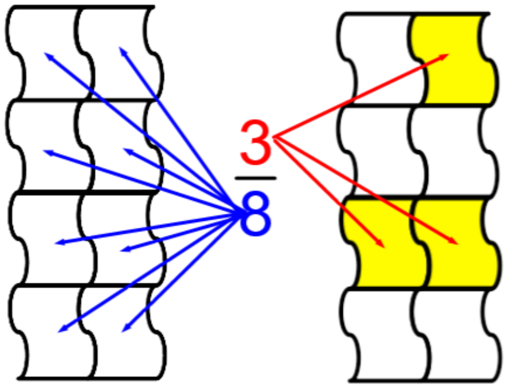
$\frac{1}{5}$ $\frac{2}{5}$

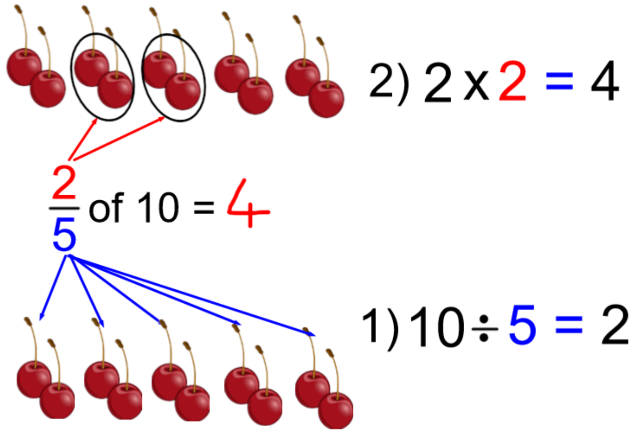
$\frac{1}{6}$ $\frac{4}{6}$

Stem sentence: The __________is divided into (   ) parts equally. Each part is (   ) of the whole.
The shaded parts are made up of (   ) lots of (   ) so (   ) of the shape is shaded.

Stem sentence: The __________are divided into (   ) parts equally. Each part is (   ) of the whole.
The circled parts are made up of (   ) lots of (   ) so (   ) of the __________ are circled.

3. Pupils re-establish the meaning of the denominator and the numerator based on the above examples.





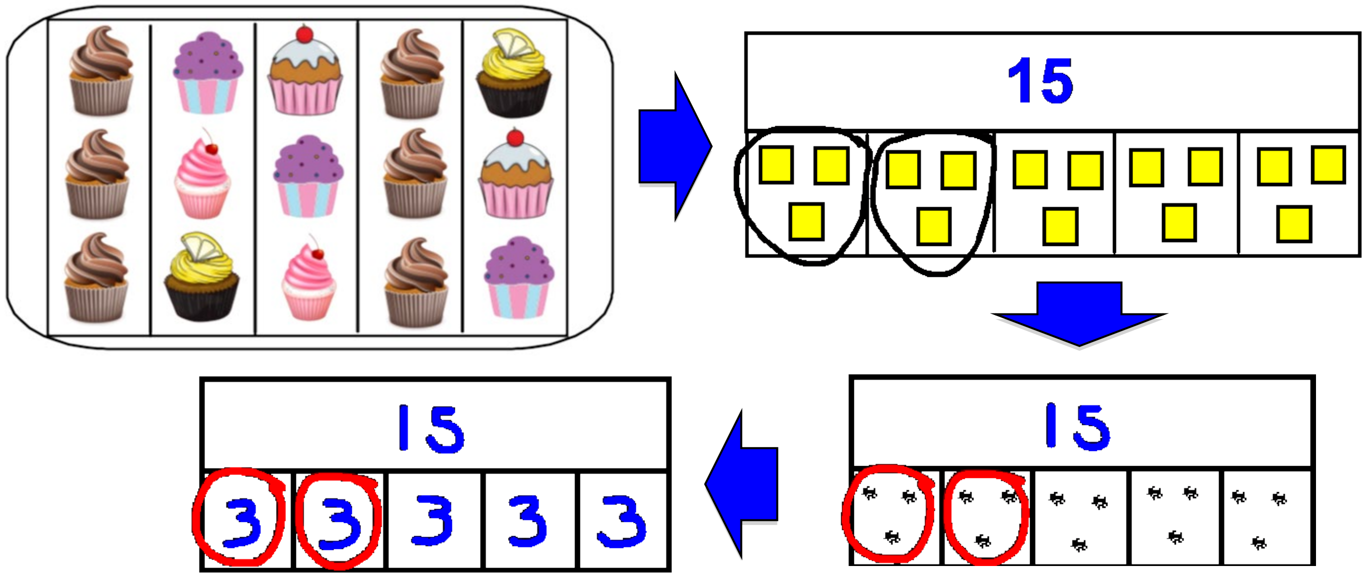
Stem sentence for the meaning of the denominator and the numerator:
The denominator shows how many equal parts the whole is divided into.
The numerator shows how many parts of the whole we shade, circle or take.

4. Pupils define unit and non-unit fractions based on the above examples.

The meaning of a unit fraction:
A unit fraction is when the numerator is always 1.
The meaning of a non-unit fraction:
A non-unit fraction is when the numerator is 2 or greater.

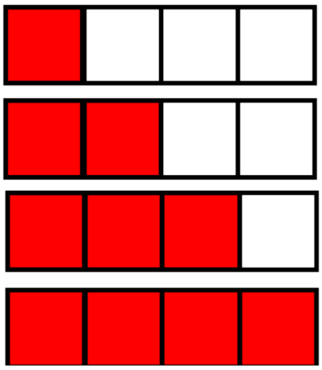
5. Pupils continue solving problems, which involve finding fractions of discrete set of objects using jottings and bar-modelling.

There are 15 cup cakes in a box. 2/5 of them are chocolate. How many cup cakes are chocolate?



'There are 6 chocolate cup cakes in the box because 2/5 of 15 is 6.

6. **Pupils compare and order fractions with the same denominators and come to a conclusion to generalise.**

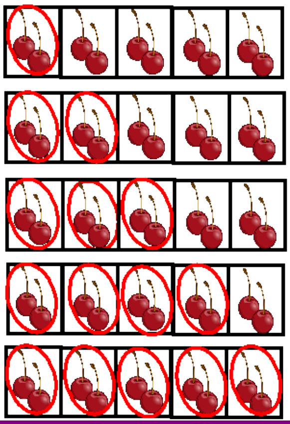


$\frac{1}{4}$

$\frac{2}{4}$

$\frac{3}{4}$

$\frac{4}{4}$



$\frac{1}{5}$ of 10 = 2

$\frac{2}{5}$ of 10 = 4

$\frac{3}{5}$ of 10 = 6

$\frac{4}{5}$ of 10 = 8

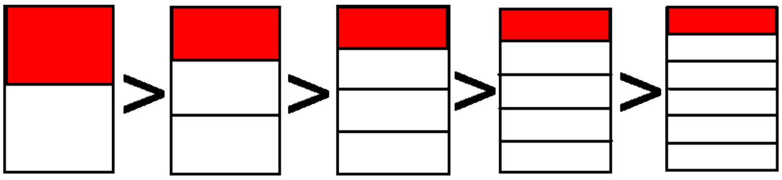
$\frac{5}{5}$ of 10 = 10

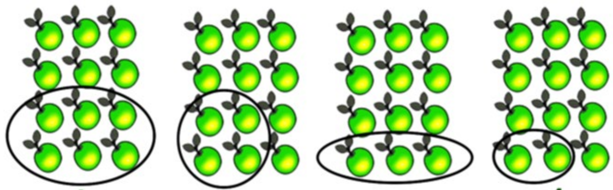
Stem sentence:

When the denominators are the same, the greater the numerator the greater the fraction.
When the denominators are the same, the smaller the numerator the smaller the fraction.

7. **Pupils compare and order unit fractions and come to a conclusion to generalise.**

$\frac{1}{2} > \frac{1}{3} > \frac{1}{4} > \frac{1}{5} > \frac{1}{6}$





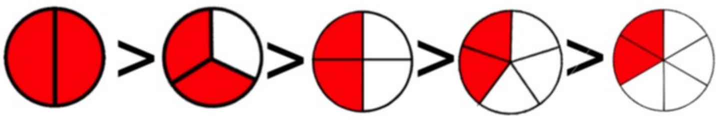
$\frac{1}{2} > \frac{1}{3} > \frac{1}{4} > \frac{1}{6}$

6 > 4 > 3 > 2

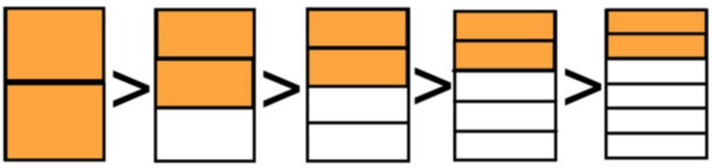
Stem sentence:

When comparing unit-fractions;
the greater the denominator, the _smaller_ the fraction;
the smaller the denominator, the _greater_ the fraction.

8. **Pupils compare and order fractions with the same numerators and come to a conclusion to generalise.**



$\frac{2}{2} > \frac{2}{3} > \frac{2}{4} > \frac{2}{5} > \frac{2}{6}$



$\frac{2}{2} > \frac{2}{3} > \frac{2}{4} > \frac{2}{6}$

24 > 16 > 12 > 8

Stem sentence:

When comparing fractions with the same numerator:

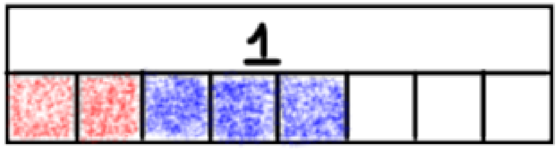
the greater the denominator, the smaller the fraction;

the smaller the denominator, the greater the fraction.

9. **Pupils explore what happens when they add fractions with the same denominator within one whole.**

Anna eats $\frac{2}{8}$ of the pizza and Mark eats $\frac{3}{8}$.

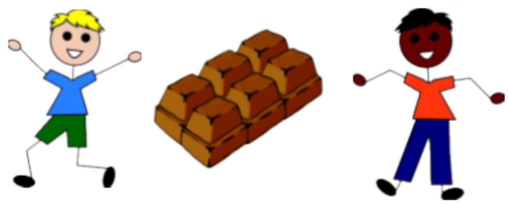
What fraction of the pizza do they eat altogether?

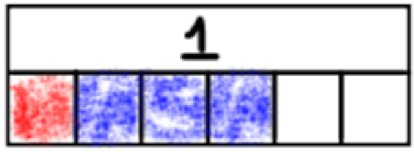


$$\frac{2}{8} + \frac{3}{8} = \frac{5}{8}$$

Darren eats $\frac{1}{6}$ of the chocolate bar and Mark eats $\frac{3}{6}$.

What fraction of the chocolate bar do they eat altogether?





$$\frac{1}{6} + \frac{3}{6} = \frac{4}{6}$$

Stem sentence:

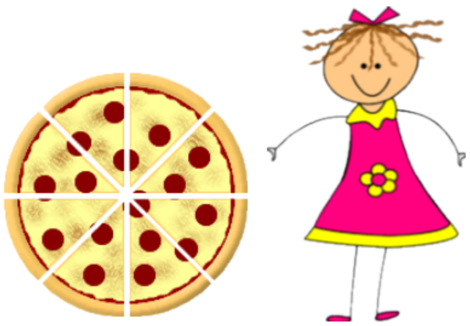
When adding fractions with the same denominator;

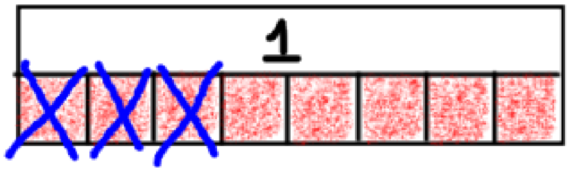
the denominator stays the same but we must add the numerators.

10. **Pupils explore what happens when they subtract fractions with the same denominator within one whole.**

Maxine eats $\frac{3}{8}$ of the pizza.

What fraction of the pizza is left?

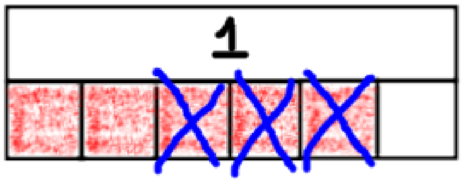




$$\frac{8}{8} - \frac{3}{8} = \frac{5}{8}$$

Lucinda buys $\frac{5}{6}$ of the pie and gives $\frac{3}{6}$ to Anna.

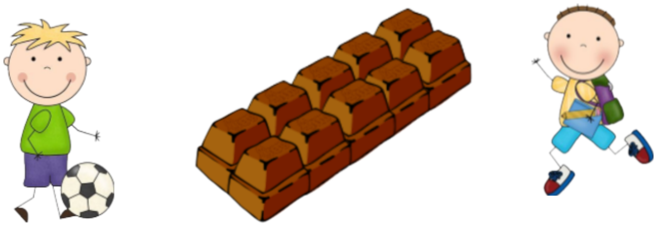
What fraction of the pie has she got left?

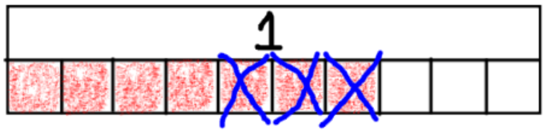


$$\frac{5}{6} - \frac{3}{6} = \frac{2}{6}$$

Aaron breaks off $\frac{7}{10}$ of the chocolate bar and gives $\frac{3}{10}$ to Abdul.

What fraction of the chocolate bar has he got left?





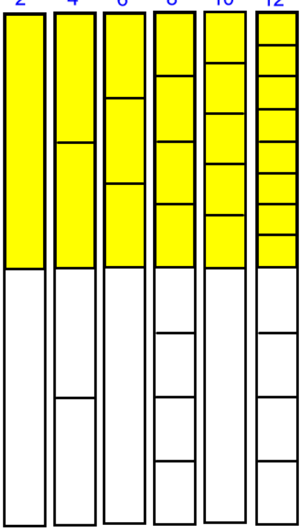
$$\frac{7}{10} - \frac{3}{10} = \frac{4}{10}$$

Stem sentence:
When subtracting fractions with the same denominator; the denominator stays the same but we must subtract the numerators.

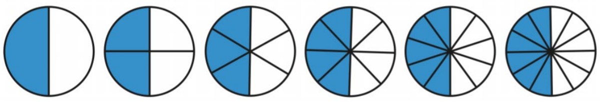
11. **Pupils recognise and show, using diagrams, equivalent fractions with small denominators.**

Children must be given the opportunity to explore equivalent fractions through varied shapes and representations and discover similarities and differences. They should recognise the relationship between the numerators and the denominators and generalise based on their observations.

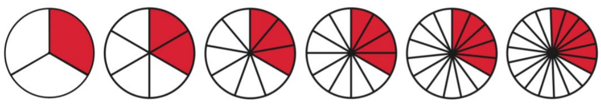
$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$$



$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$$



$$\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12} = \frac{5}{15} = \frac{6}{18}$$

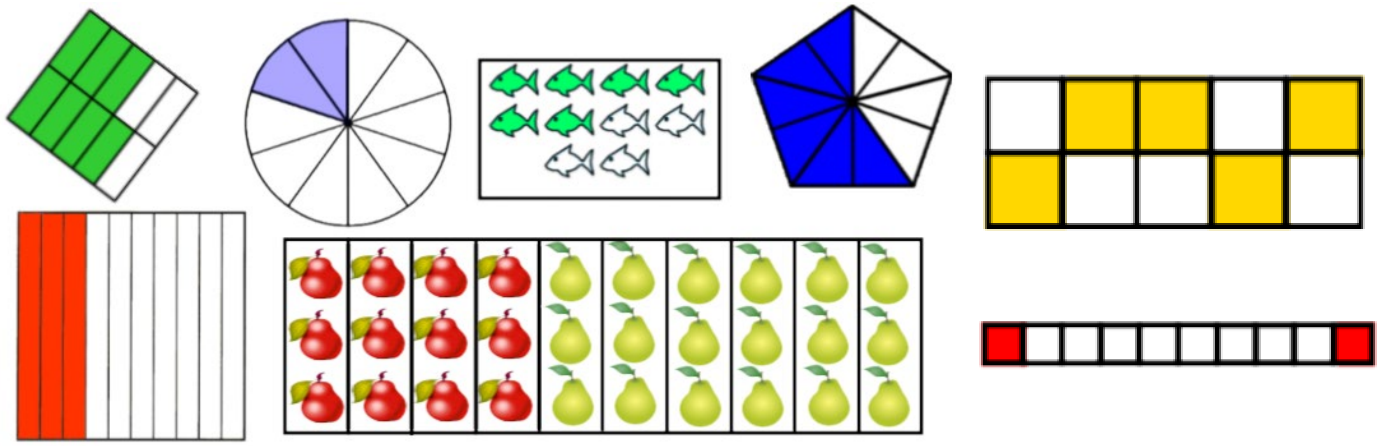


$$\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20}$$

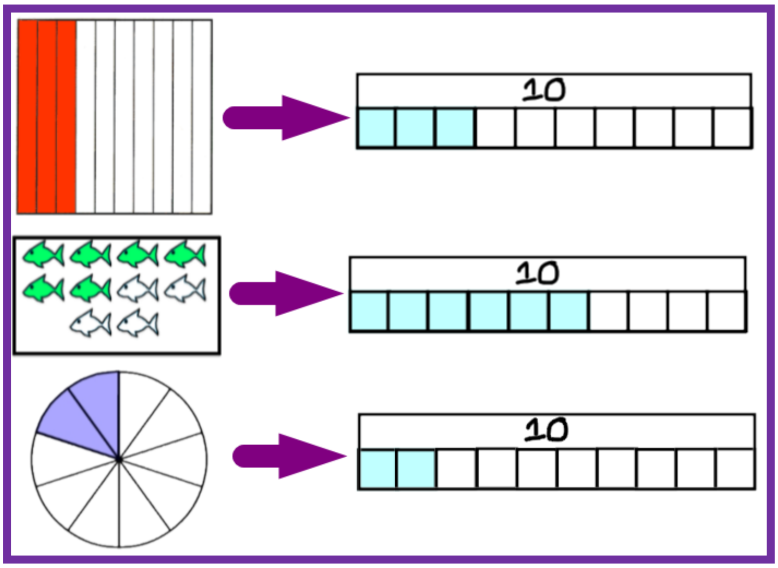
Stem sentence:
When finding equivalent fractions, both, the numerator and the denominator must be multiplied or divided by the same number.

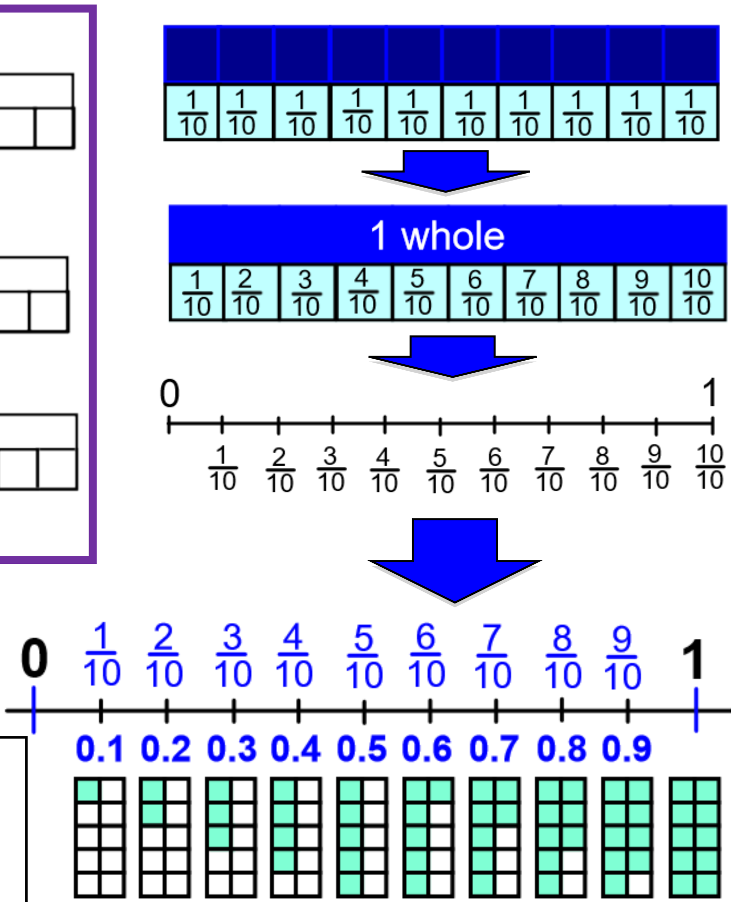
12. Pupils count up and down in tenths; **recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.**

Using varied representations, children find the commonality about each of these shapes and realise that all of them are divided into ten equal parts.



They represent these using bar modelling, which is then linked to the introduction of tenths as fractions and decimals on the number line as well as on a Place Value chart.





*Five tenths is the same as **0.5** and*

$$\frac{5}{10}$$

because one whole is divided into 10 parts equally and we take five parts. On a number line we are five equal jumps away from 0.

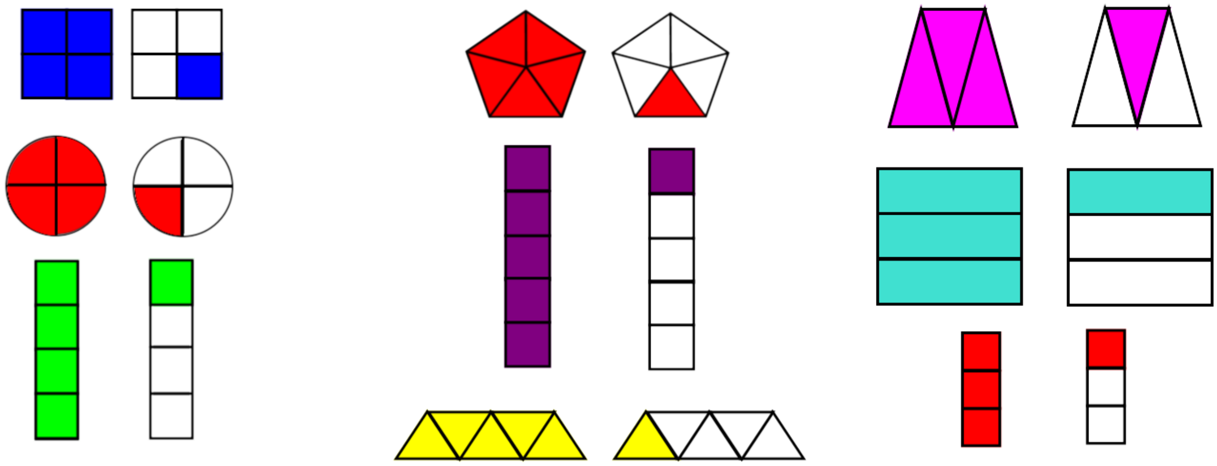
H	T	O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
		0	.	5	

Year 4: Understanding Fractions

Prior learning from Year 3 must be revisited for as long as it's necessary before moving onto introducing the Year 4 content. This is to ensure that there is sufficient links made between basic fractional understanding and skills so that new learning can be built on fully solid foundations.

1. Add and subtract fractions with the same denominator (within and beyond one whole)

Building on their counting practice, children recognise the fractional equivalence between whole and part by expressing one whole as a fraction and vice versa through varied representations.



$$\frac{4}{4} + \frac{1}{4} = \frac{5}{4} \qquad \frac{5}{5} + \frac{1}{5} = \frac{6}{5} \qquad \frac{3}{3} + \frac{1}{3} = \frac{4}{3}$$

$$1 + \frac{1}{4} = 1\frac{1}{4} \qquad 1 + \frac{1}{5} = 1\frac{1}{5} \qquad 1 + \frac{1}{3} = 1\frac{1}{3}$$

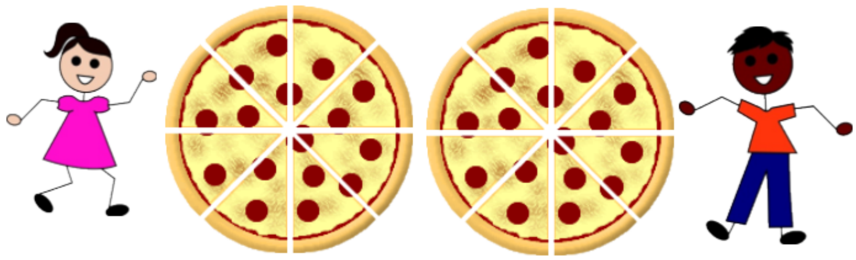
Using this understanding, children solve problems.

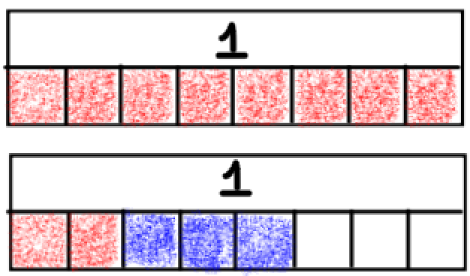
Anna and Mark orders two whole pizzas.

Anna eats $\frac{10}{8}$ of the pizzas and Mark eats $\frac{3}{8}$.

a) What fraction of the pizzas do they eat altogether?

Addition



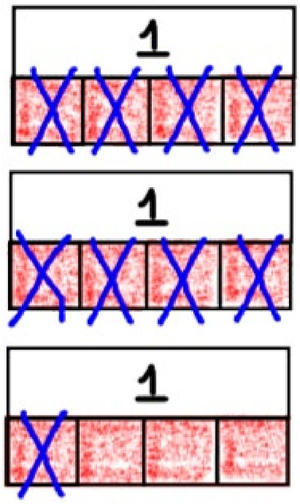


$$\frac{10}{8} + \frac{3}{8} = \frac{13}{8} = 1\frac{5}{8}$$

Subtraction

At a birthday party there are three pies cut into four equal parts. $\frac{9}{4}$ of the pies are eaten.

What fraction of the pies are left?



$$\frac{12}{4} - \frac{9}{4} = \frac{3}{4}$$

Stem sentence:

When adding / subtracting fractions with the same denominator; the denominator stays the same but we must add / subtract the numerators.

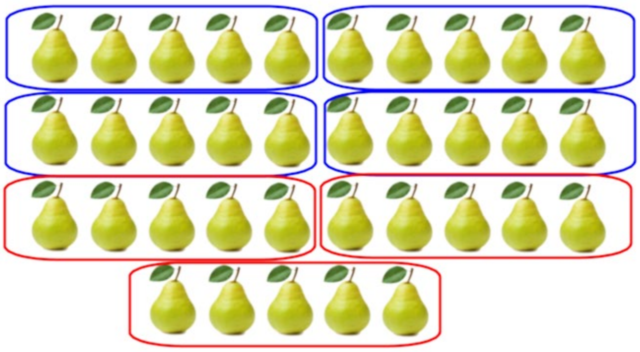
2. **Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.**

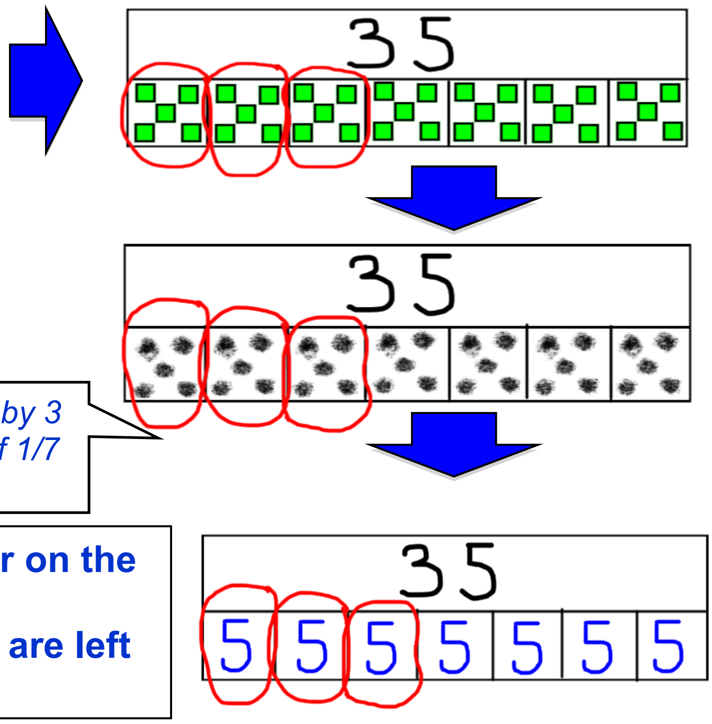
At the market, pears are sold in crates of 35. 3/7 of the pears are sold in the first hour.

a) How many pears are sold?

b) How many pears are left unsold?

35 pears put into 7 equal groups is 5





$35 \div 7 = 5$

$5 \times 3 = 15$

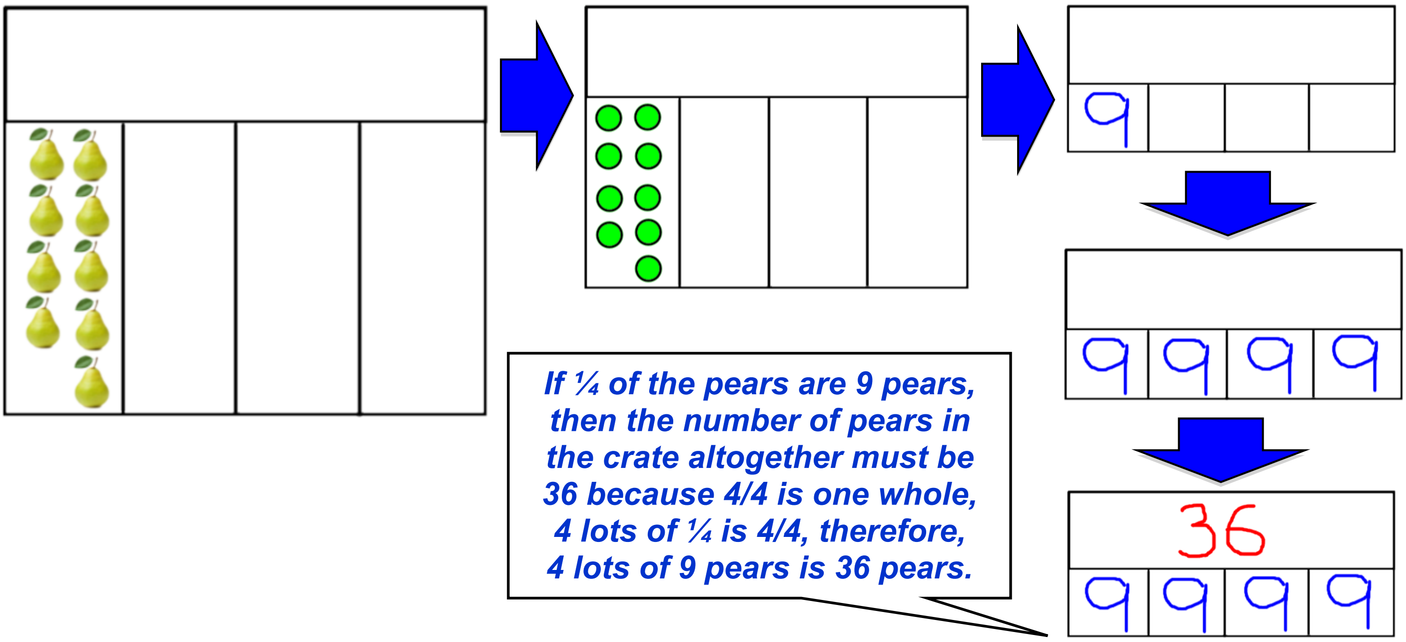
5 must be multiplied by 3 because three lots of 1/7 is sold.

a) 15 pears are sold in the first hour on the market.

b) 20 pears are unsold because 4/7 are left and 4/7 of 35 is 20.

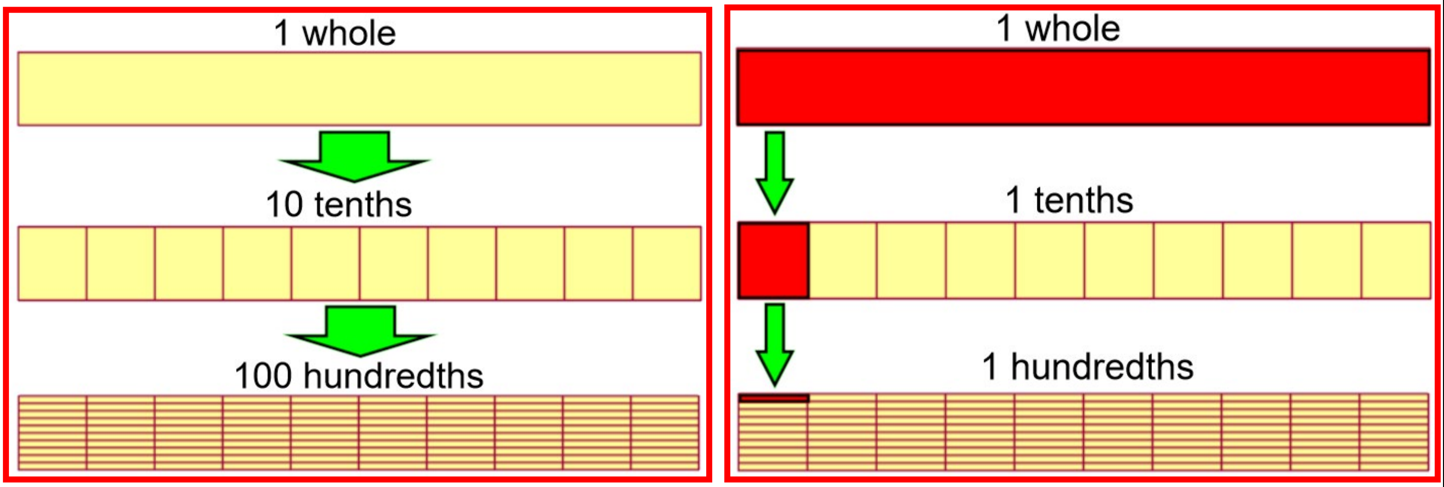
At the market, pears are sold in crates. 9 pears are sold, which is 1/4 of the crate of pears. How many pears are in a crate altogether?

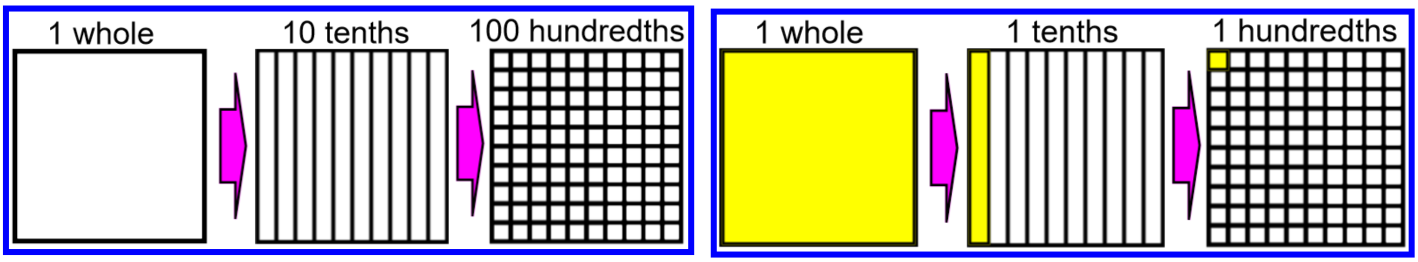
Pupils use bar modelling to gather all the information from the word-problem. They reason about why they choose a bar-model that is divided into four equal parts rather than any other number of parts and begin completing the information that is known.



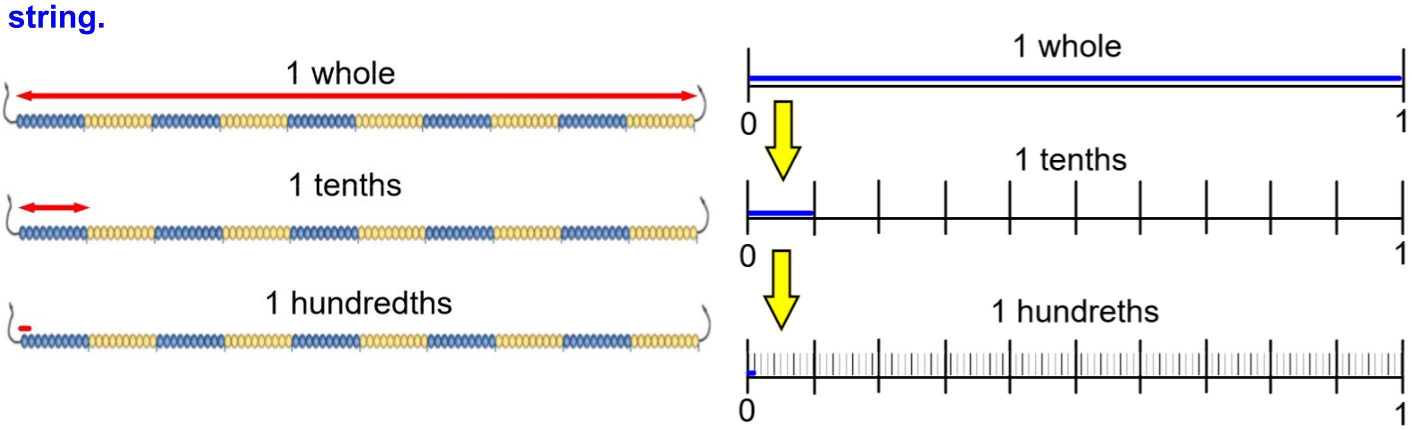
3. **Pupils** count up and down in hundredths; **recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.**

Children explore relationships between 1 whole, 10 tenths, 100 hundredths using shapes and the number line and identify how this changes when they compare 1 whole, 1 tenths and 1 hundredths.



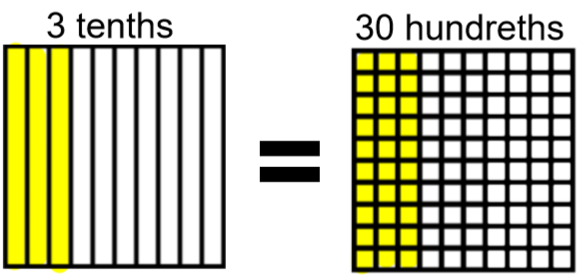


Further explore relationships between 1 whole, 10 tenths, 100 hundredths using a 100 bead-string.



4. **Pupils recognise and write decimal equivalents of any number of tenths or hundredths**

Pupils recognise that any number of tenths can also be expressed as hundredths using the following diagrams and PV chart.



O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
0	.	3	

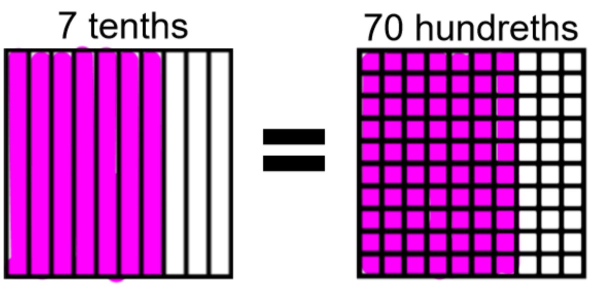
3 tenths is the same as 30 hundredths because there are ten hundredths in one tenth. This can also be expressed as a fraction:

$$\frac{7}{10} \text{ or } \frac{70}{100}$$

7 tenths is the same as 70 hundredths because there are ten hundredths in one tenth. This can also be expressed as a fraction:

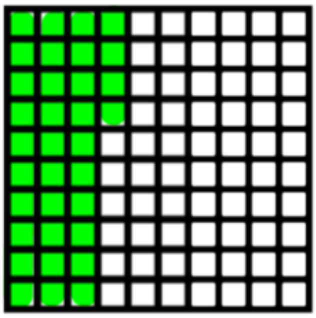
$$\frac{3}{10} \text{ or } \frac{30}{100}$$

O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
0	.	7	



Pupils use PV chart and diagrams to help understand how to write the decimal equivalence to tenths and hundredths and use reasoning to explain their thinking.

$$\frac{34}{100}$$



O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
0	.	3	4

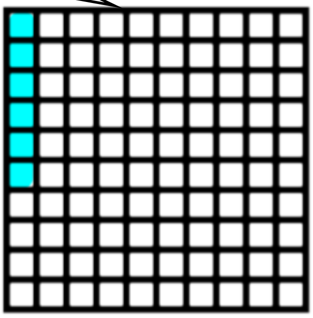
34 hundredths is the same as 3 tenths and 4 hundredths put together or 30 hundredths and 4 more hundredths. This can be expressed as:

$$\frac{34}{100} = 0.34$$

6 hundredths has no tenths therefore we must put a 0 as a place holder in the tenths place when we express it as a decimal number.

$$\frac{34}{100} = 0.34$$

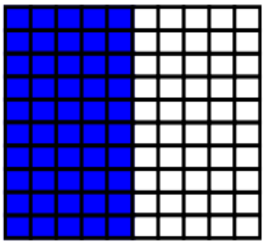
$$\frac{6}{100} = 0.06$$



O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
0	.	0	6

5. **Children explore with the use of diagrams how 1/4, 1⁄2 and 3⁄4 are expressed as decimal equivalents.**

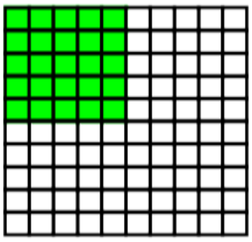
$$\frac{1}{2}$$



O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
0	.	5	

$$\frac{1}{2} = \frac{50}{100} = 0.5$$

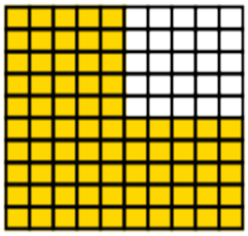
$$\frac{1}{4}$$



O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
0	.	2	5

$$\frac{1}{4} = \frac{25}{100} = 0.25$$

$$\frac{3}{4}$$

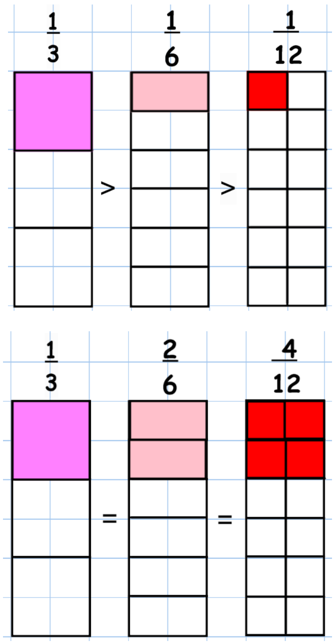


O	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
0	.	7	5

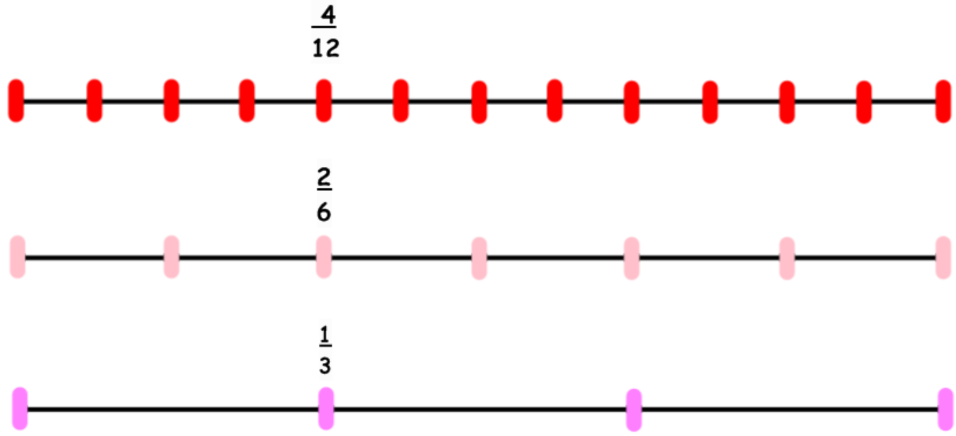
$$\frac{3}{4} = \frac{75}{100} = 0.75$$

Year 5: Understanding Fractions

1. **Compare and order fractions whose denominators are all multiples of the same number.**

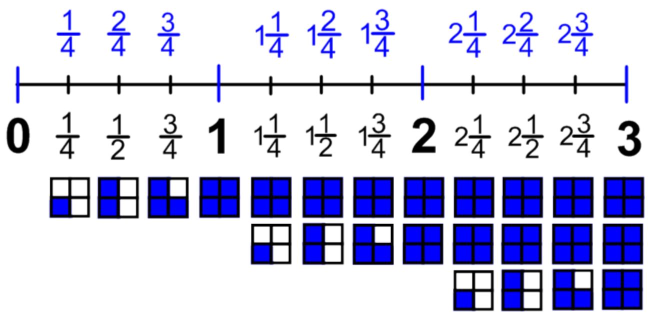


Provide plenty opportunities for children to place these fractions on marked, then unmarked number lines where they have to visualise splitting the length of the line into equal sections dependent on the denominator.

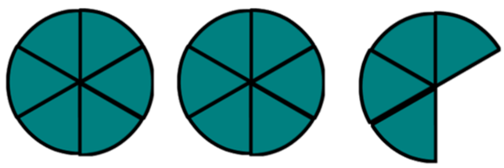


2. **Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example,2/5 + 4/5 = 6/5 = 11/5]**

Pupils continue counting in 1/2s, 1/4s, 1/3s, 1/5s, 1/10s with the help of visual representations to enable them to make links between fractions, improper fractions and mixed numbers.



$$1 + 1 + \frac{4}{6} = 2\frac{4}{6}$$



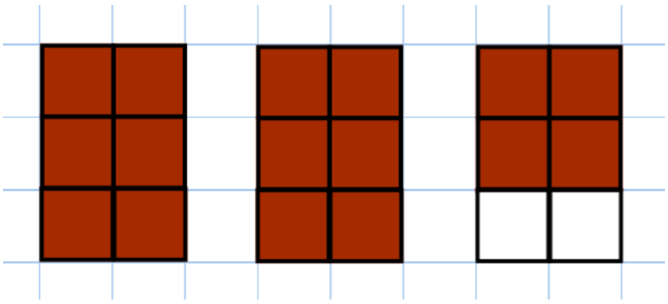
$$\frac{6}{6} + \frac{6}{6} + \frac{4}{6} = \frac{16}{6}$$

$\frac{16}{6}$ $16 \div 6 = 2 \text{ r}4 = 2\frac{4}{6}$

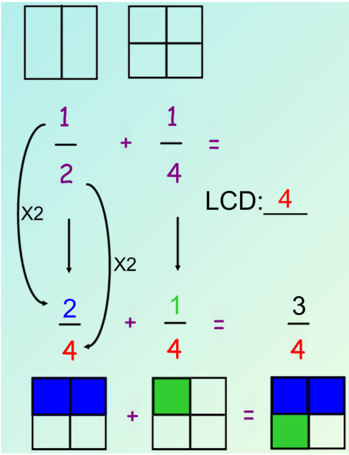
$2\frac{4}{6}$ $(2 \times 6) + 4 = \frac{16}{6}$

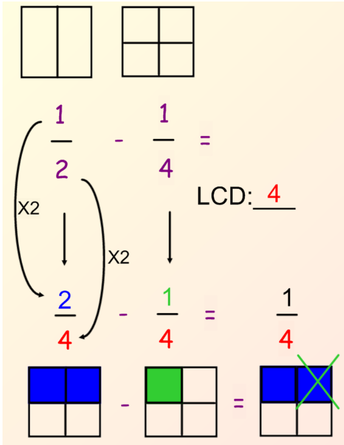
Children convert mixed number fractions into improper fractions and vice versa using visual representation to embed understanding.

Children use their squared books to draw and shade the fractions.



3. **Add and subtract fractions with the same denominator and denominators that are multiples of the same number.**





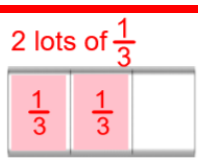
When adding and subtracting fractions children should be asked to prove that they are correct through the drawing of shapes.

Provide plenty of practice opportunities with simpler fractions so that children can visualise and embed understanding.

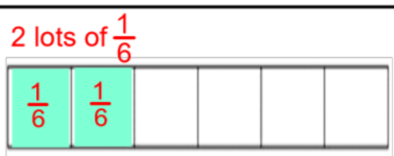
4. **Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.**

Pupils to investigate through bar modelling what happens when multiplying unit-fractions with a whole number and generalise.

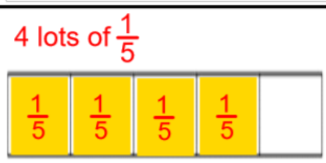
$2 \times \frac{1}{3} = \frac{2}{3}$ or $\frac{1}{3} \times 2 = \frac{2}{3}$



$2 \times \frac{1}{6} = \frac{2}{6}$ or $\frac{1}{6} \times 2 = \frac{2}{6}$



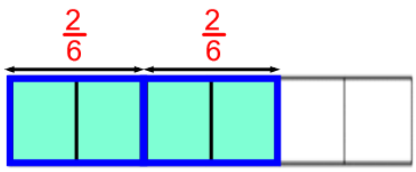
$4 \times \frac{1}{5} = \frac{4}{5}$ or $\frac{1}{5} \times 4 = \frac{4}{5}$



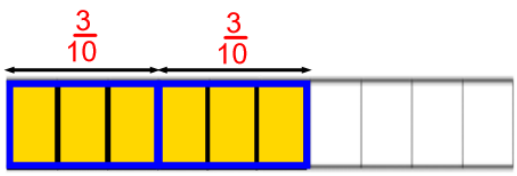
Unit fraction x whole number

Non-unit fraction x whole

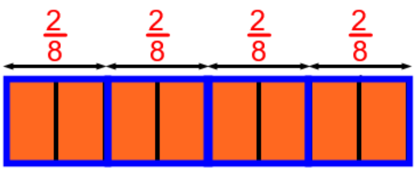
$2 \times \frac{2}{6} =$ 2 lots of $\frac{2}{6} = \frac{4}{6}$



$2 \times \frac{3}{10} =$ 2 lots of $\frac{3}{10} = \frac{6}{10}$

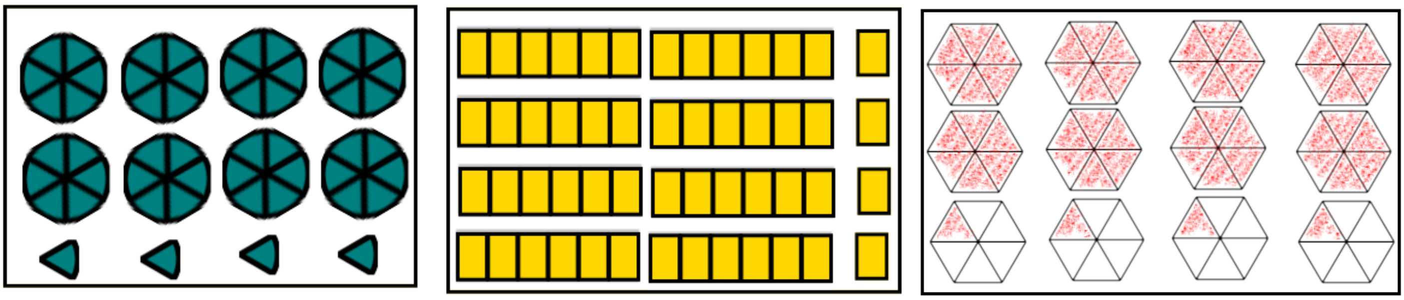


$4 \times \frac{2}{8} =$ 2 lots of $\frac{2}{8} = \frac{8}{8} = 1$

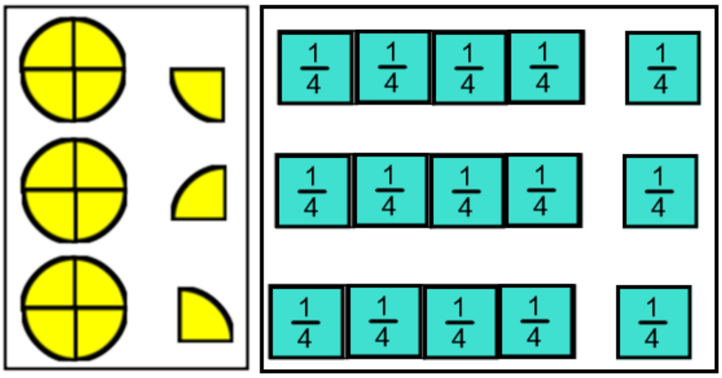


Stem sentence:
When you multiply a proper fraction by a whole number, you multiply the whole number by the numerator and the denominator stays the same.

Using varied representations and the concept of grouping pupils investigate what happens when a mixed fraction is multiplied by a whole number. They come to a conclusion to generalise.



$$4 \text{ lots of } 2\frac{1}{6} = 4 \times 2\frac{1}{6} = 8\frac{4}{6}$$

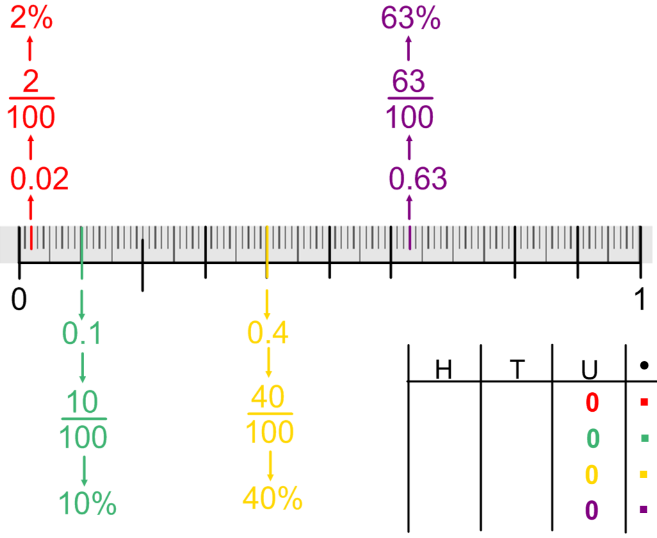


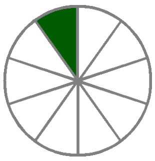
$$3 \text{ lots of } 1\frac{1}{4} = 3 \times 1\frac{1}{4} = 3\frac{3}{4}$$

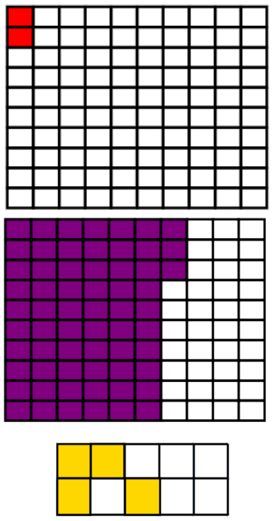
Stem sentence: When you multiply a mixed number fraction by a whole number:
you must multiply the whole numbers first
and then
you multiply the whole number by the numerator.
The denominator stays the same.

5. **Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.**

Children link their prior understanding about decimal numbers of tenths and hundredths to percentages with the help of varied diagrams.







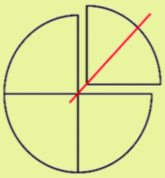
H	T	U	•	$\frac{1}{10}$ Tths	$\frac{1}{100}$ Hths
		0	•	0	2
		0	•	1	
		0	•	4	
		0	•	6	3

Year 6: Understanding Fractions

1. **Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 1⁄4 × 1⁄2 =1/8]**

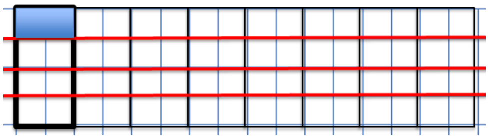
Children must learn that the symbol x also means 'of'

$\frac{1}{2} \times \frac{1}{4} = \frac{1}{2}$ of $\frac{1}{4} = \frac{1}{8}$



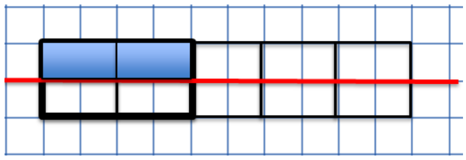
Multiply the numerators
Multiply the denominators

Half of one quarter is one eights



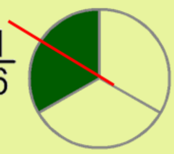
$$\frac{1}{4} \times \frac{1}{8} = \frac{1}{32}$$

2. **Divide proper fractions by whole numbers [for example, 1/3 ÷ 2 =1/6]**



$$\frac{2}{5} \div 2 = \frac{2}{10} \text{ or } \frac{1}{5}$$

$\frac{1}{3} \div 2 = \frac{1}{6}$



Procedural method:

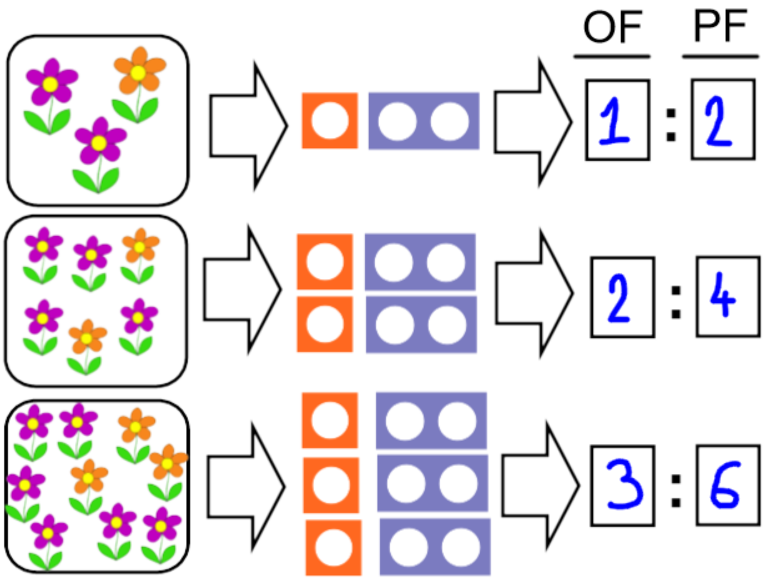
$\frac{1}{3} \div \frac{2}{1} =$

turn 2nd fraction round $\frac{1}{3} \times \frac{1}{2} =$

In other words: split a third into two equal halves $\frac{1}{3}$ of $\frac{1}{2} = \frac{1}{6}$
Or split a half into three equal sections

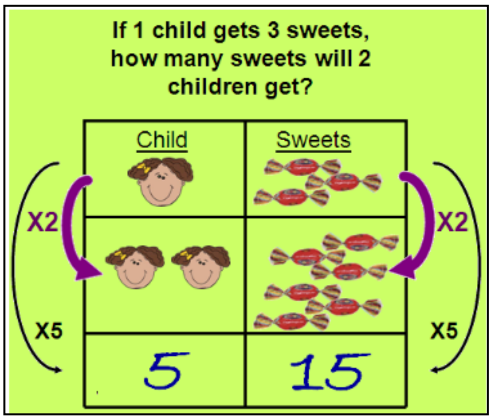
Year 6: Ratio

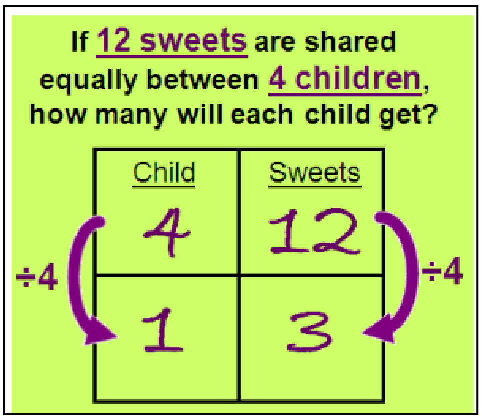
1. **Pupils use numicon to represent ratio and understand it's concept.**



Stem sentence:
For every **1 orange flower** there are **2 purple flowers**.
The number of **purple** flowers is **2** times the number of orange flower.
The ratio of **orange flower** to **purple flower** is one to two **(1 : 2).**

2. **Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.**



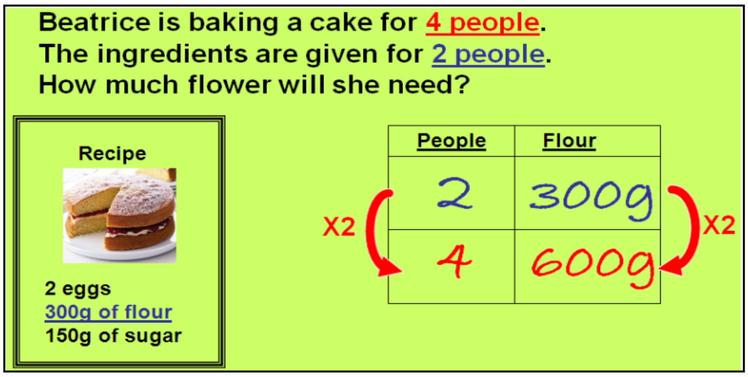


Pre-requisite skill to scaling problems:

$3 \times \boxed{} = 12$

$20 \div \boxed{} = 5$

3. **The comparison of measures includes simple scaling by integers (for example, a given quantity or measure is twice as long or five times as high) and this connects to multiplication.**



4. **Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.**