**Fractions**

Children in the Foundation Stage should be introduced to the concept of halves and quarters through play and practical activities in preparation for calculation at Key Stage One.

Y1

Understand that a fraction can describe part of a whole.
Understand that a unit fraction represents one <u>EQUAL</u> part of a whole.
Recognise, find and name a half as one of two <u>EQUAL</u> parts of an object, shape or quantity (including measure).
Recognise, find and name a quarter as one of four <u>EQUAL</u> parts on a object, shape or quantity (including measure).
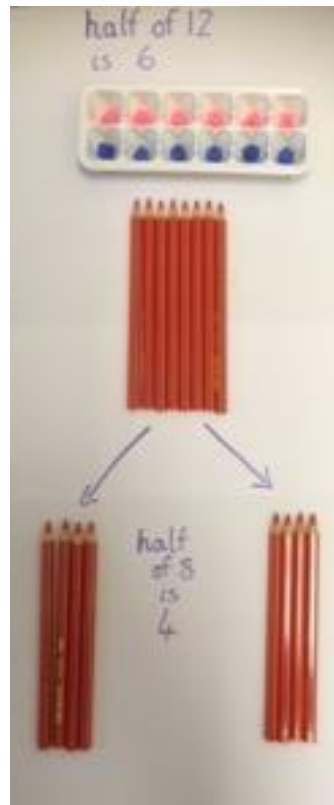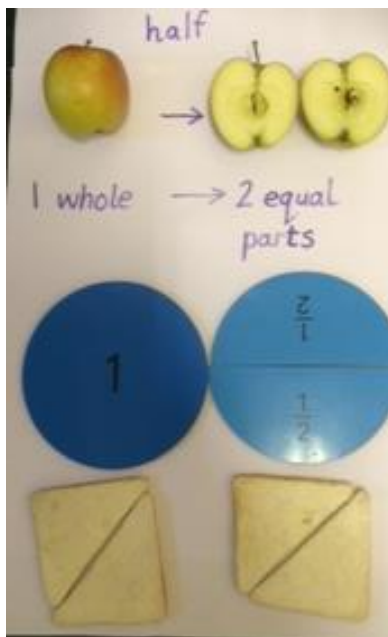
This can be formally recorded like this:
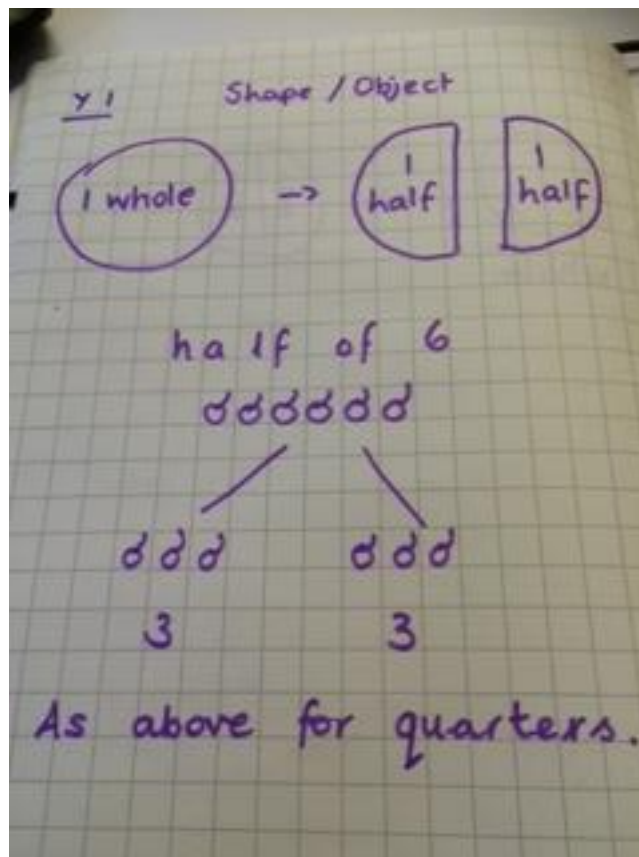
The above image is an example of how the children may record. Any images presented to the children should always have EQUAL parts exactly.

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Y2

Understand and use the terms numerator and denominator.

Understand that a fraction can describe part of a set.

Understand that the larger the denominator is, the more pieces it is split into and therefore the smaller each part will be.
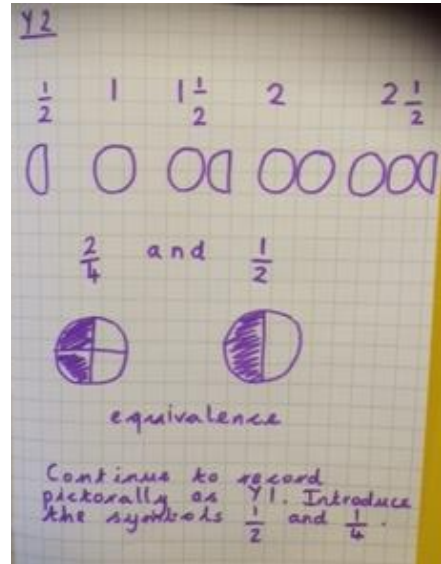
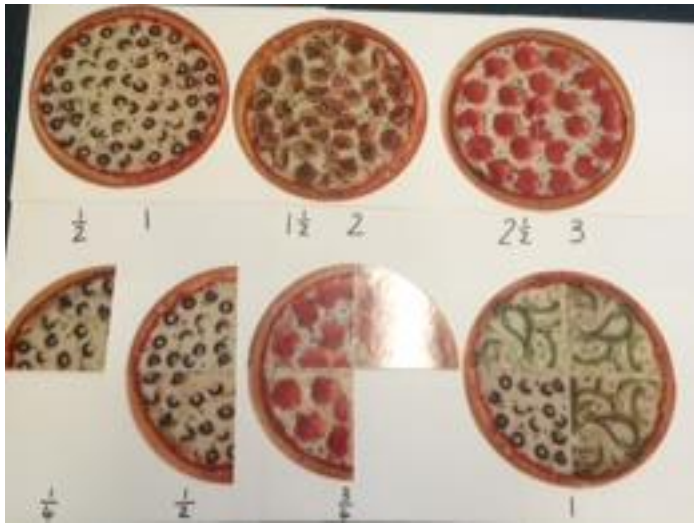Recognise, find, name and write fractions: $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity.

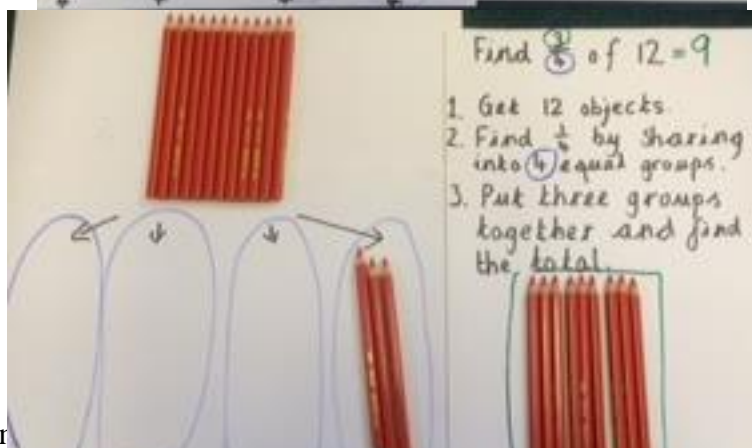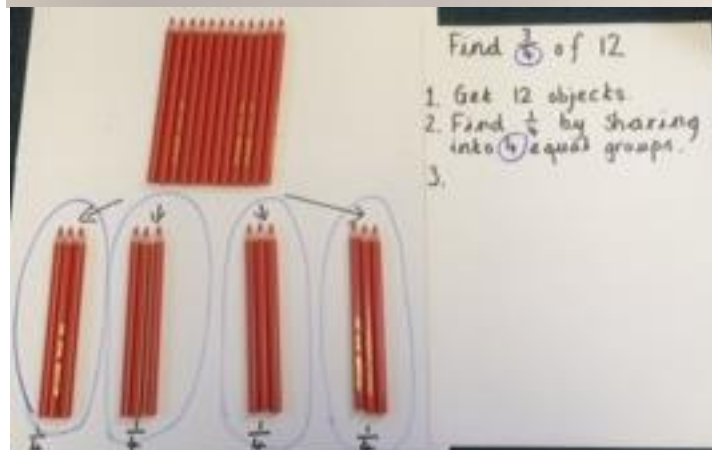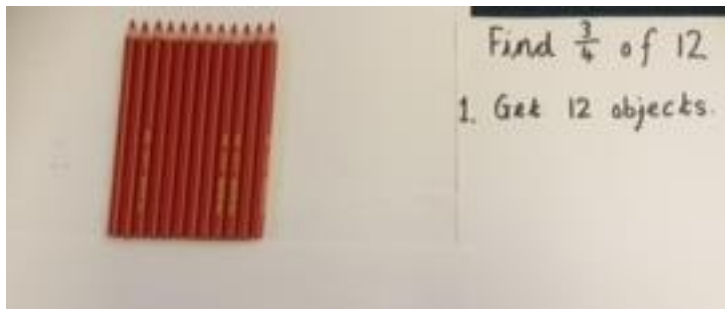Count on and back in steps of $\frac{1}{2}$ and $\frac{1}{4}$

Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.
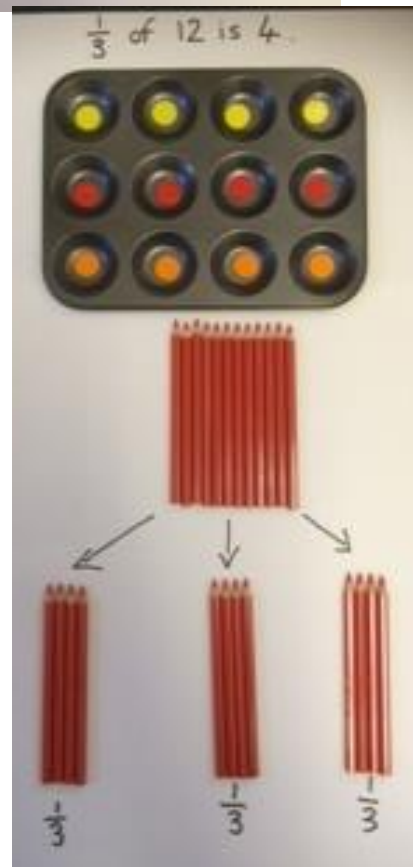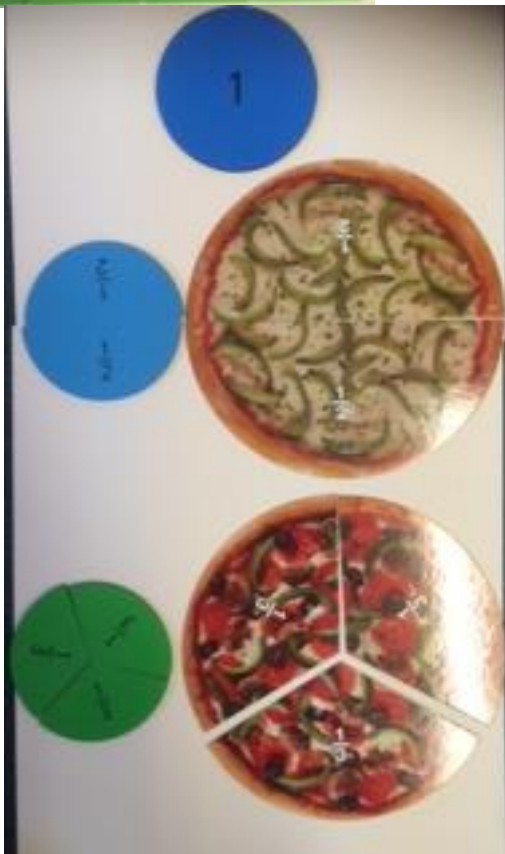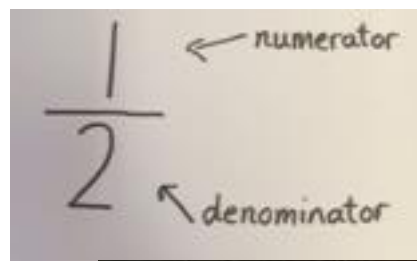
This can be formally recorded with the symbols but it must be pictorially represented.

Challenge: Once children are secure with finding one quarter and one half of numbers and shapes children can find three quarters. This must be represented pictorially. **The above image on the right is an example of how the children may record. Any images presented to the children (image on the left) should always have EQUAL** parts exactly.

Find $\frac{3}{4}$ of 12

1. Get 12 objects.

Find $\frac{3}{4}$ of 12

1. Get 12 objects.
2. Find $\frac{1}{4}$ by sharing into ④ equal groups.
3.

Find $\frac{3}{4}$ of 12 = 9

1. Get 12 objects.
2. Find $\frac{1}{4}$ by sharing into ④ equal groups.
3. Put three groups together and find the total.

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Show practically and pictorially that a fraction is one whole number divided by another e.g. $\frac{3}{4}$ is 3 ÷ 4

Understand that finding a fraction relates to division

Recognise, find and write fractions of a discrete set of objects with small denominators
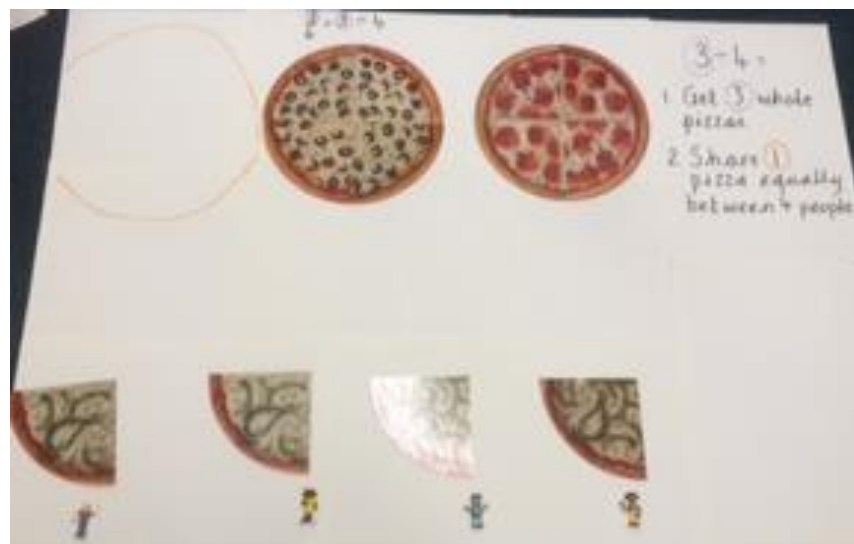
Recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
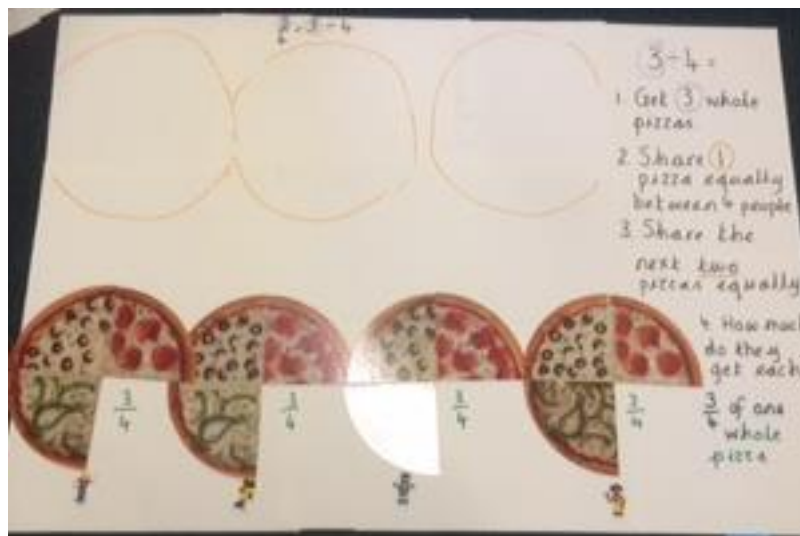
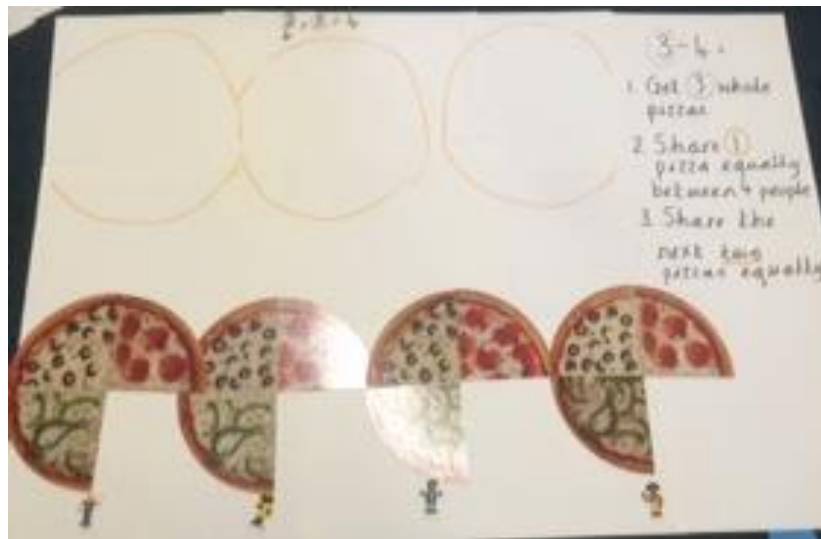Continue to count in steps of $\frac{1}{2}$ and $\frac{1}{4}$ and also count in steps of $\frac{1}{3}$

Compare and order unit fractions and fractions with the same denominator
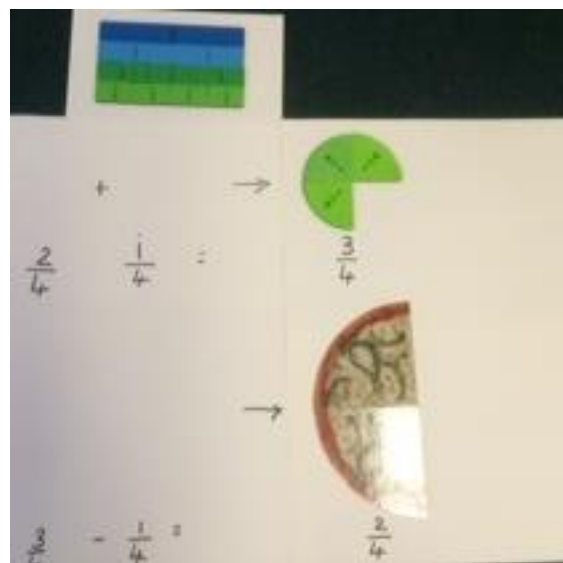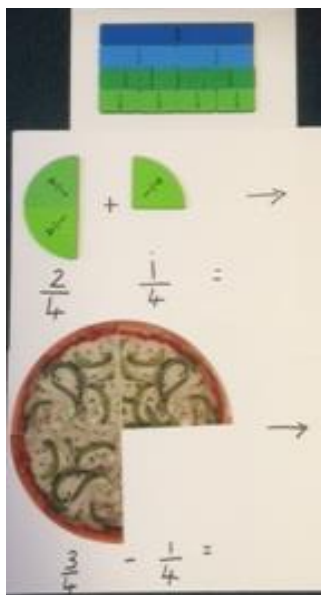
Recognise and show, using diagrams, equivalent fractions with small denominators

Add and subtract fractions with the same denominator within one whole using diagrams

Adding and subtracting fractions

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Y4

> Show practically and pictorially that a fraction is one whole number divided by another e.g. $\frac{3}{4}$ is 3 ÷ 4
>
> Recognise, find and write fractions of a discrete set of objects with small denominators
>
> Recognise that hundredths arise from dividing an object into 100 equal parts and in dividing tenths by 10
>
> Continue to count in steps of unit fractions
>
> Recognise and write decimal equivalents to quarter, half and three-quarters
>
> Add and subtract fractions with the same denominator within one whole using diagrams

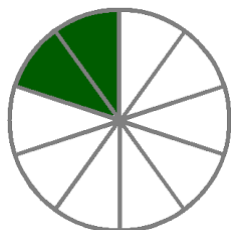<u>Continue to reinforce steps from Y3 throughout Y4</u>.

Y5

Add and subtract fractions with the same denominator and denominators that are multiples of the same number (using diagrams). Children should have had lots of practical experience of equivalence prior to this stage.

Adding

<u>Unlike Fractions</u>
These have different denominators. Work out the sum below.

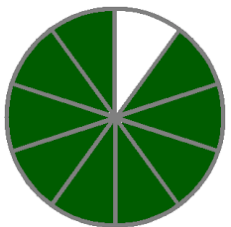$$\frac{1}{5} + \frac{7}{10} =$$

Shade in one fifth of this shape.
Now shade in another seven tenths.

What have you got altogether?

$$\frac{1}{5} + \frac{7}{10} = \frac{9}{10}.$$

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Subtracting

Step 1. The bottom numbers are different. See how the slices are different sizes? We need to make them the same before we can continue, because we can't subtract them like this:

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

Step 2. Using our knowledge of equivalence, convert one half into sixths. So now we Have 3 sixths minus 1 sixth.

$$\frac{3}{6} - \frac{1}{6} = \frac{2}{6}$$
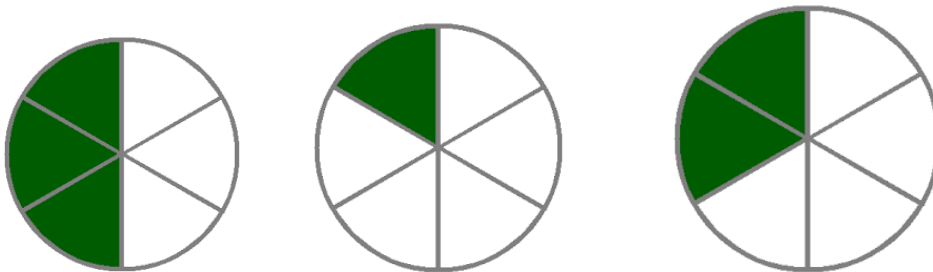
Step 3. Simplify the fraction.
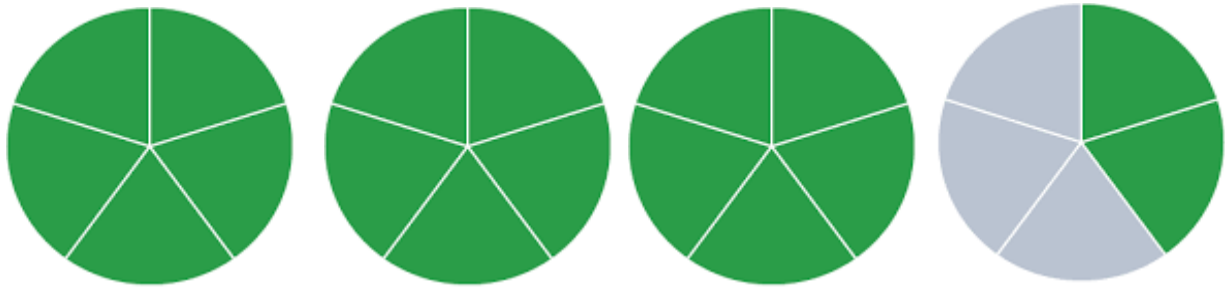
$$\frac{2}{6} = \frac{1}{3}$$

Write mathematical statements >1 as a mixed number.
A mixed number is made up of a whole number and a fraction.
Eg.

$3\frac{2}{5}$ We say "3 and two fifths". This means $3 + \frac{2}{5}$

As a picture this is 3 whole ones and $\frac{2}{5}$ of one.

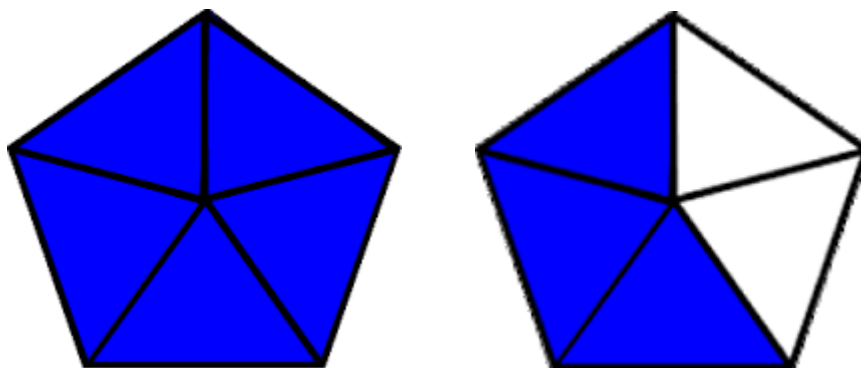
$$\frac{5}{5} + \frac{5}{5} + \frac{5}{5} + \frac{2}{5} = \frac{17}{5}$$

The mixed number $3\frac{2}{5}$ is the same as the improper fraction $\frac{17}{5}$

What is eight fifths as a mixed number?

$$\frac{8}{5} = \boxed{1\frac{3}{5}}$$

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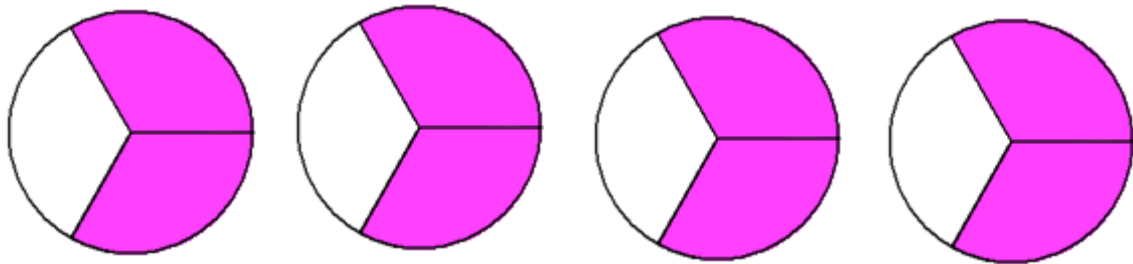**Multiply proper fractions and mixed numbers by whole numbers, supported by <u>materials and diagrams</u>.**

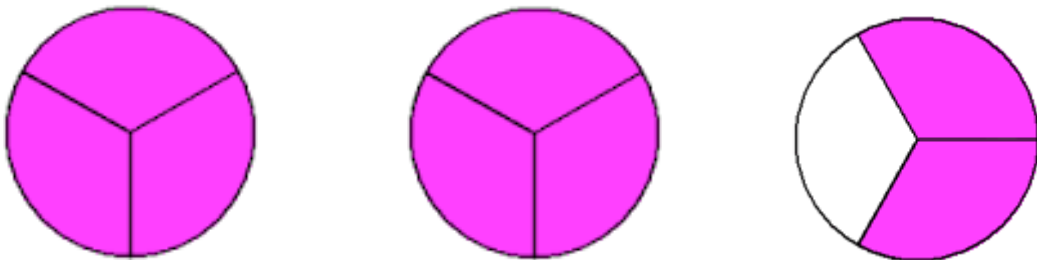Multiplying a Fraction by a Whole Number

We know that multiply means `lots of` so......

What is $4 \times \frac{2}{3}$?

$$4 \times \frac{2}{3} \text{ means 4 lots of } \frac{2}{3}$$

There are 8 thirds. $\frac{8}{3}$ Now write this as a mixed number.

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

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Y6

Adding and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions building on from Y5.

What is $4\frac{1}{2} + 1\frac{2}{3}$?

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

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

$5 + \frac{1}{2} + \frac{2}{3}$

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

$6 + \frac{1}{6}$

1. Write down the number statement.
2. Add together the whole numbers, leaving the fractions at the end.
3. Write fractions with the same denominators so we can add them (using knowledge of equivalence).
4. Add the fractions.
5. If your fraction is improper, write it as a mixed number.

What is $4\frac{1}{4} - 1\frac{3}{5}$?

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

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

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

$\frac{13}{4} - \frac{3}{5}$

$\frac{65}{20} - \frac{12}{20}$

$\frac{53}{20}$

$2\frac{13}{20}$

1. Write down the number statement.
2. Split the second fraction into a whole number and a fraction. Subtract them in turn.
3. First subtract the whole number.
4. Write the first fraction as an improper fraction so you can do it.
5. Write a common denominator.
6. Subtract.
7. Now finish off by writing as a mixed number.

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Multiplying two fractions

What is $\frac{1}{3} \times \frac{1}{4}$?

This is $\frac{1}{4}$ of a circle.
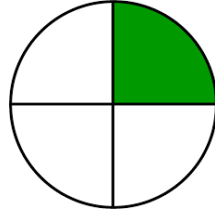
Remember that $\frac{1}{3} \times \frac{1}{4}$ means:

$$\frac{1}{3} \text{ lots of } \frac{1}{4} \text{ or } \frac{1}{3} \text{ of } \frac{1}{4}$$

What is $\frac{1}{3} \times \frac{1}{4}$?

This is $\frac{1}{3}$ of our $\frac{1}{4}$ of a circle.
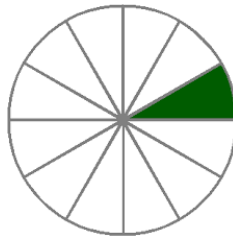
This is $\frac{1}{12}$ of our whole.

$$\frac{1}{3} \times \frac{1}{4} \text{ is the same as } \frac{1}{3} \text{ of } \frac{1}{4}$$

$$\frac{1}{3} \times \frac{1}{4} = \frac{1 \ x \ 1}{3 \ x \ 4} = \frac{1}{12}$$

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Dividing a proper fraction by a whole number using diagrams
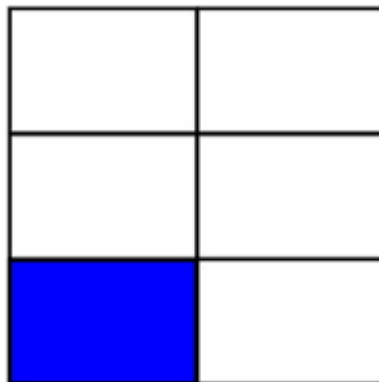
Dividing a fraction by a whole number

What is $\frac{1}{3} \div 2$?

This is $\frac{1}{3}$

What does $\frac{1}{3} \div 2$ mean?

This is $\frac{1}{3} \div 2$.

What fraction is this part?

It is $\frac{1}{6}$ of the whole.

$\frac{1}{3} \div 2$ is the same as $\frac{1}{2}$ of $\frac{1}{3}$

$$\frac{1}{3} \text{ of } 2 \quad = \quad \frac{1}{2} \text{ of } \frac{1}{3} \quad = \quad \frac{1}{2} \times \frac{1}{3} \quad = \quad \frac{1 \quad x \quad 1}{2 \quad x \quad 3} \quad = \quad \frac{1}{6}$$

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