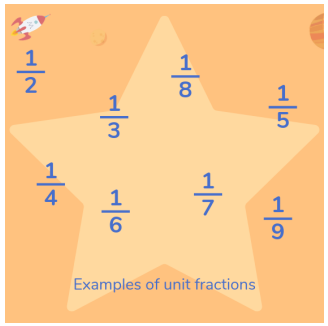
# Infant, Junior School and Camp Education

# Progression in Fractions Policy

2020

## What is a unit fraction?

A unit fraction is any fraction with 1 as its numerator (top number), and a whole number for the denominator (bottom number).




## What are the parts of a fraction?

A fraction has three parts. They are:

The **numerator** which is the number above the bar.

The **denominator** which is the number below the bar.

The **vinculum** which is the bar separating the two numbers.

## What is a non-unit fraction?

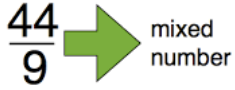
A non-unit fraction is a fraction with a number greater than one as its numerator (top number) and a whole number for the denominator (bottom number).

# What is a fraction?

Fractions are used to represent smaller pieces (or parts) of a whole. The parts might make up one thing, or more than one thing. Either way, altogether, they make up what's called a whole.

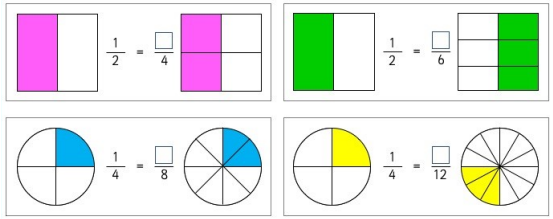
## What are mixed numbers and improper fractions?

When you have a whole number and a fraction side by side, like 1 ½ , it's called a mixed number. You can convert this into a fraction, but the numerator will be bigger than the denominator. In this case 3/2. This is called an improper fraction (you may also hear it being called a top-heavy fraction).


## What are equivalent fractions?

Equivalent fractions are two or more fractions that are all equal. A fraction is a part of a whole: the denominator (bottom number) represents how many equal parts the whole is split into; the numerator (top number) represents the amount of those parts.




## What does it mean to simplify fractions?

This just means that we use the lowest possible numbers when we work out our fractions. We do this to keep things simple – it stops us from ending up with fractions made up of huge numbers (which can be confusing). Simplifying fractions is another area which highlights the importance of children mastering their times tables.

### Simplifying Fractions

- To write a fraction in **simplest form** or **lowest terms** follow these two steps:

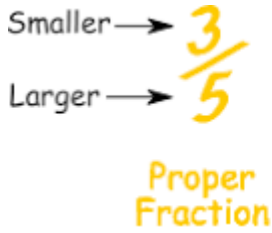
**1 – Find the Greatest Common Factor (GCF) of the numerator and denominator.**

**2 – Divide both the numerator and the denominator by the GCF.**

Example: 12/18 — 12 – 1,2,3,4,**6**,12 — 18 – 1,2,3,**6**,9,18 — 12 ÷ 6 = 2, 18 ÷ 6 = 3

## What is a proper fraction?

This means that the fraction is below 1 or a whole. The denominator is bigger than the numerator.

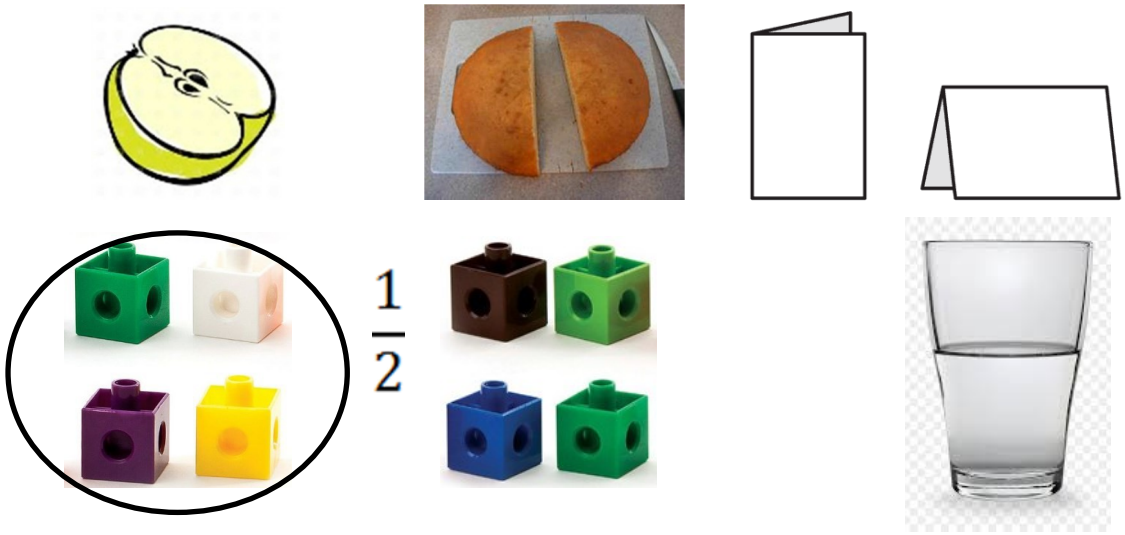


# EYFS Early Learning Goals Fractions

How can we progress with fractions?

**Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.**

## Concrete




Children learn how to share practically using objects. This may happen at snack time or during provision time. Children will check it is fair and that they all have the same amount (early division).

Children will have experiences dealing with 'fractions' in a practical way. Language used will be age appropriate (e.g one half, halves, equal, two parts, quarter, four parts as well as share, whole, split)

Adults will use the language in context when appropriate to expose children to such terms.

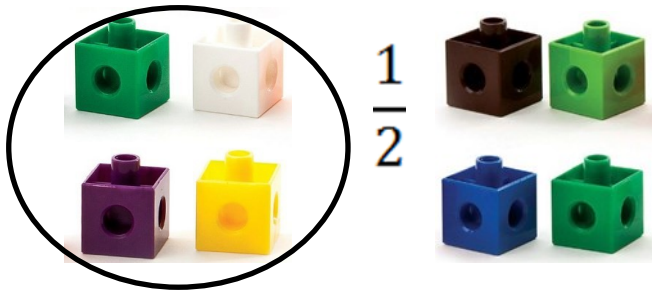
At this stage, children will use practical objects to develop their knowledge and awareness. They may use pictorial prompts but likely in a practical way.

# Year 1 Fractions

How can we progress with fractions?

**Recognise, find and name a half as one of two equal parts of an object, shape or quantity.**

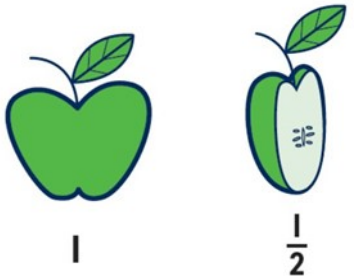
## Concrete



$\frac{1}{2}$

## Pictorial

A whole apple  Half an apple



1  $\frac{1}{2}$

## Abstract

Half of 10 = ☐

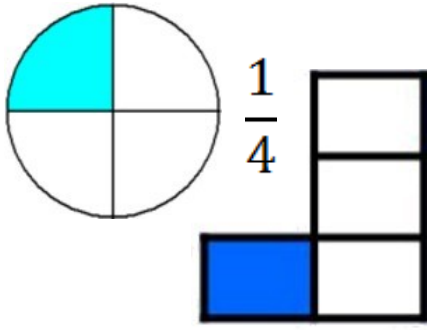
Half of 8 = ☐

$\frac{1}{2}$ of 14 = ☐

**Recognise, find and name a quarter as one of four equal parts an object, shape or quantity.**

## Concrete

## Pictorial



$\frac{1}{4}$

## Abstract

A quarter of 20 = ☐

A quarter of 12 = ☐

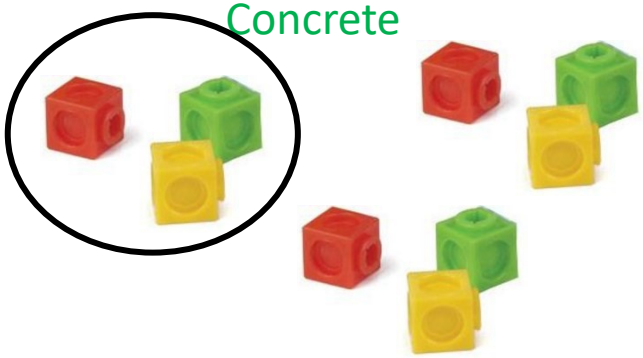
$\frac{1}{4}$ of 8 = ☐

# Year 2 Fractions

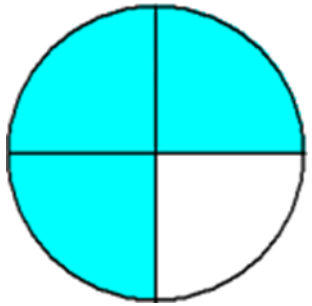
How can we progress with fractions?

**Recognise, find and name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity.**

Concrete

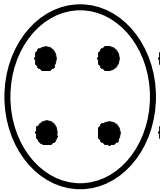


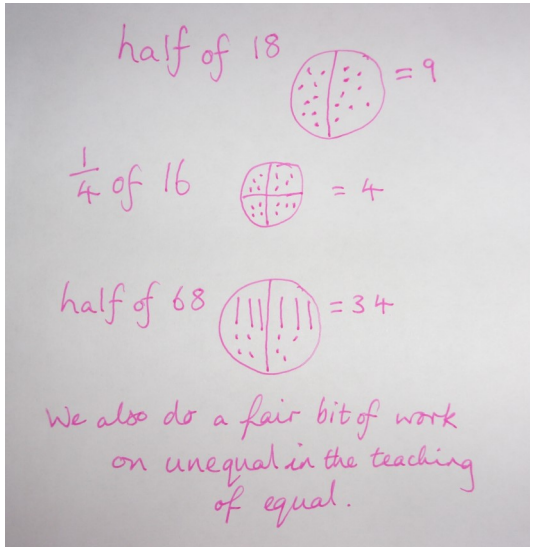
Pictorial



Abstract

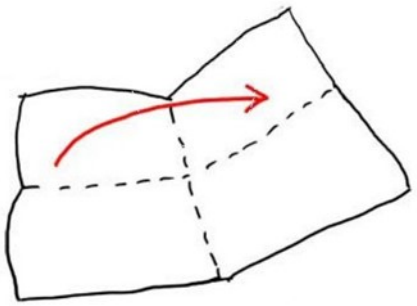
$\frac{2}{4}$ of 8 =



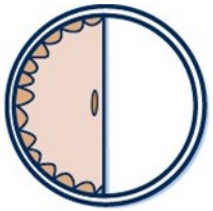


## Write simple fractions and recognise the equivalence of 2/4 and 1/2

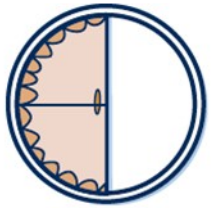
### Concrete



### Pictorial



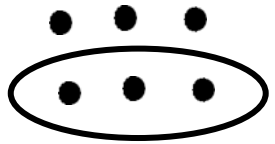
I have $\frac{1}{2}$ a pie



You have $\frac{2}{4}$ of a pie

### Abstract

$\frac{1}{2}$ of 6 = ☐

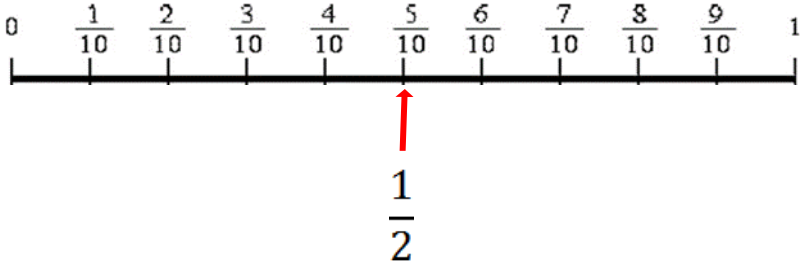


# Year 3 Fractions

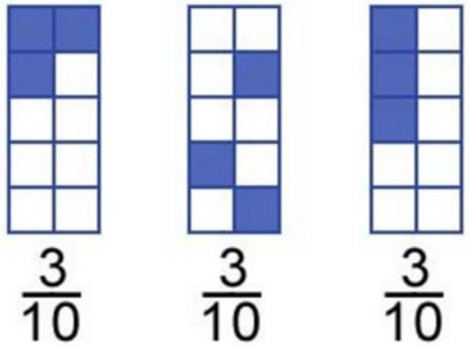
How can we progress with fractions?

**Count up and down in tenths: recognise that tenths arise from dividing an object into ten equal parts and in dividing one-digit numbers or quantities by ten.**

## Concrete




## Pictorial




## Abstract

$\frac{1}{10}$ of 6 = 0.6

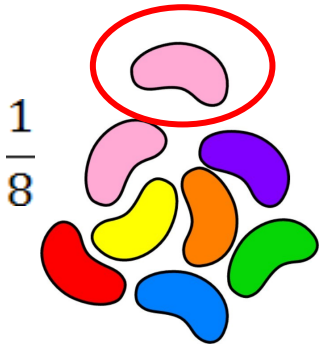
because 6 ÷ 10= .6

$\frac{1}{10}$ of 7 = 0.7

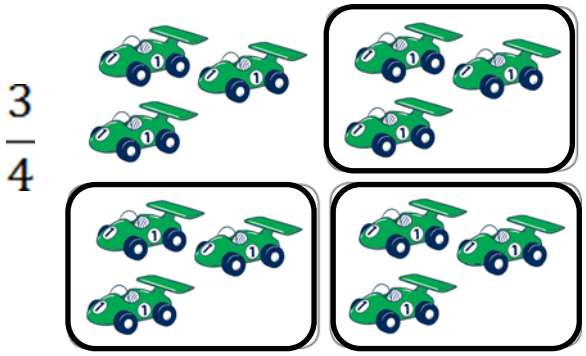
because 7 ÷ 10 = 0.7

**Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions and use fractions as numbers.**

## Concrete




## Pictorial




## Abstract

$\frac{1}{5}$ of 15 sweets = 3

because 15 ÷ 5 = 3

$\frac{2}{5}$ of 15 sweets = 6

because

15 ÷ 5 = 3 and 3 x 2 = 6

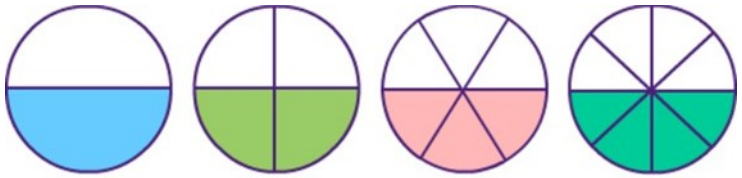
## Recognise and show, using diagrams, equivalent fractions with small denominators.

### Concrete

two halves $\frac{2}{2}$

four quarters $\frac{4}{4}$

### Pictorial



$\frac{1}{2}$ $\frac{2}{4}$ $\frac{3}{6}$ $\frac{4}{8}$

### Abstract

Sam says that two quarters is

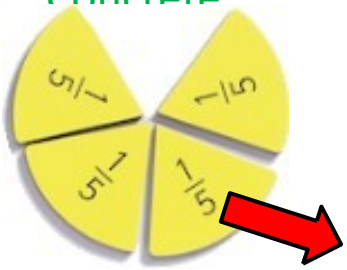
the same as one half.

Is he correct?

How do you know?

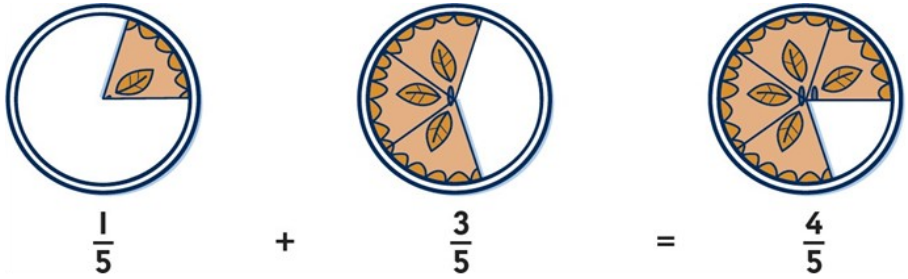
## Add and subtract fractions with the same denominator

### Concrete



$\frac{1}{5}$

### Pictorial



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

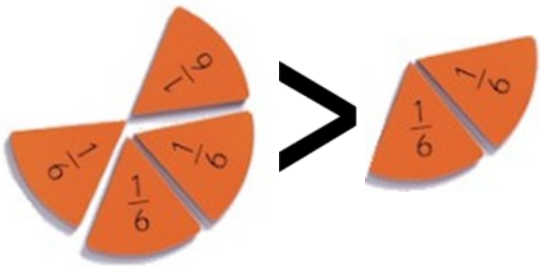
### Abstract

$$\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$$

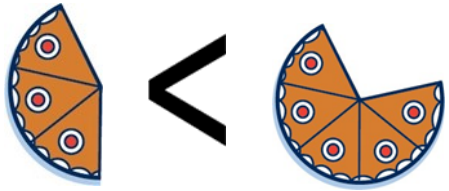
$$\frac{5}{8} - \frac{2}{8} = \frac{3}{8}$$

## Compare and order unit fractions with the same denominator

### Concrete



### Pictorial



### Abstract

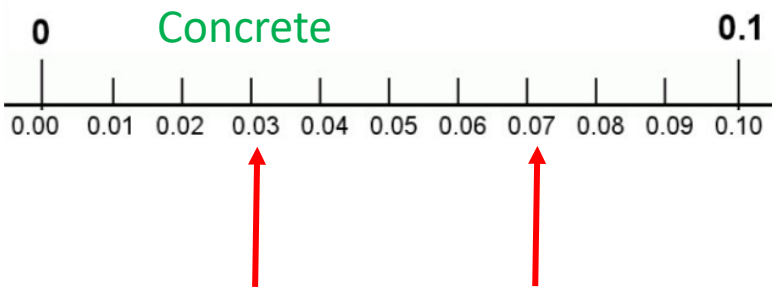
$\frac{2}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{7}{8}$

# Year 4 Fractions

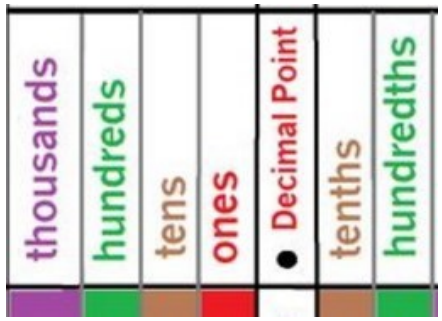
How can we progress with fractions?

**Count up and down in hundredths: recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10.**

## Concrete




## Pictorial




1 hundredth = 0.01 = $\frac{1}{100}$

## Abstract

$\frac{1}{100}$ of 60 = 0.6

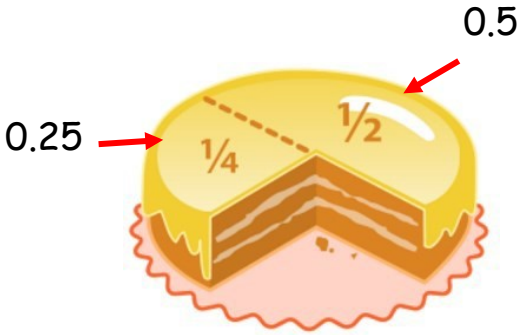
because 60 ÷ 100 = 0.6

$\frac{1}{100}$ of 70 = 0.7

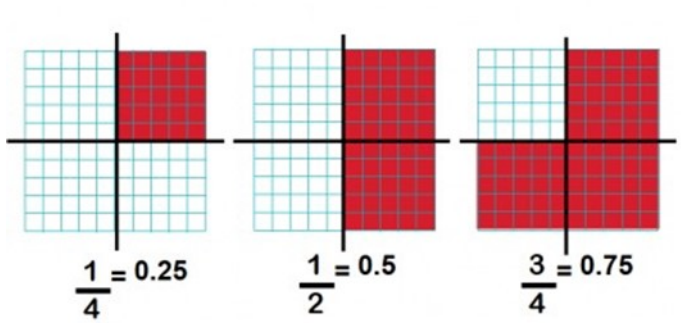
because 70 ÷ 100 = 0.7

**Recognise and write decimal equivalences for 3/100, 1/2, 1/4, 7/100 and 3/4**

## Concrete




## Pictorial




## Abstract

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

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

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

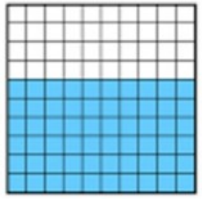
## Recognise and write decimal equivalents of any number of tenths or hundredths.

### Concrete

$\frac{1}{10}$ of the chocolate = 0.1

### Pictorial

0.6
six tenths



0.60
sixty hundredths

### Abstract

$\frac{1}{10} = 0.1$

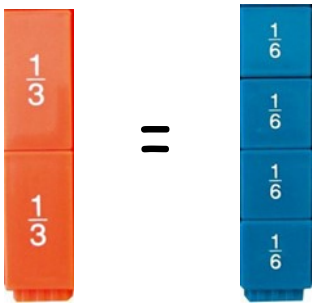
$\frac{3}{10} = 0.3$

$\frac{5}{10} = \frac{1}{2} = 0.5$

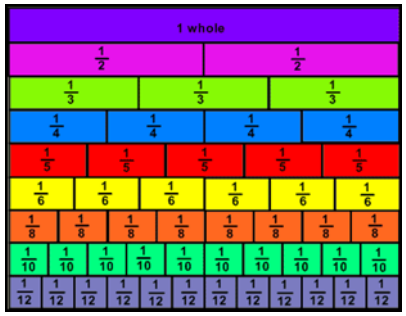
$\frac{8}{100} = 0.08$

## Recognise and show, using diagrams, families of common equivalents

### Concrete




### Pictorial




### Abstract

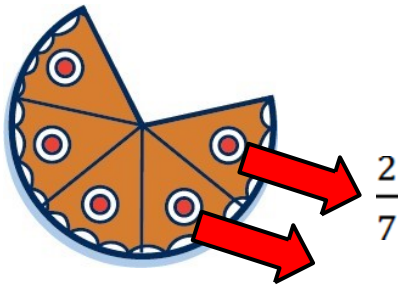
$\frac{2}{3} = \frac{4}{6}$

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

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

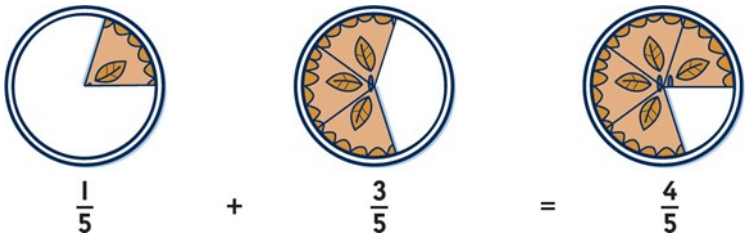
## Add and subtract fractions with the same denominator.

### Concrete



$\frac{2}{7}$

### Pictorial




### Abstract

Sam eats $\frac{2}{7}$ of a whole pizza.

How much does he have left?

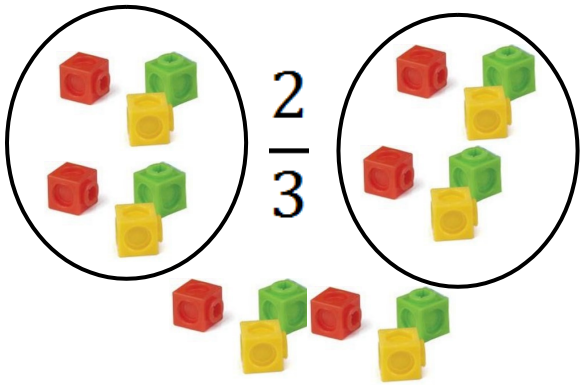
Lucy and Ben both eat

three eighths of a cake.

How much have they eaten altogether?

**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.**

## Concrete




## Pictorial


## Abstract

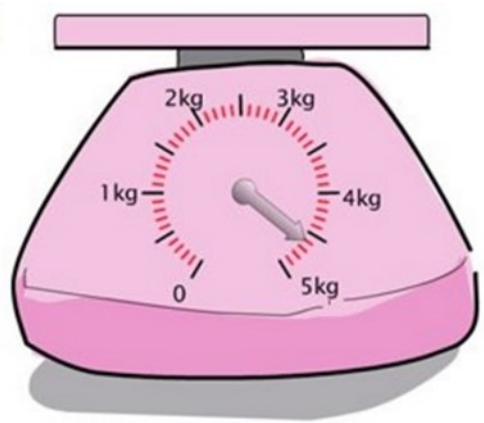
$\frac{2}{3}$ of £18

£18 ÷ 3 = £6

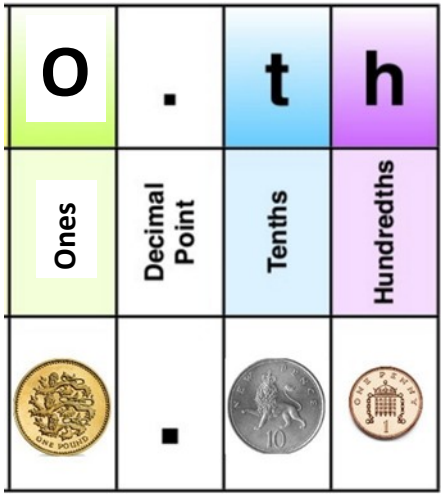
£6 x 2 = £12

**Solve simple measure and money problems involving fractions and decimals to two decimal places**

## Concrete




## Pictorial




## Abstract

100cm = 1m

50cm = $\frac{1}{2}$ = 0.5m

25cm = $\frac{1}{4}$ = 0.25m

10cm = $\frac{1}{10}$ = 0.1m

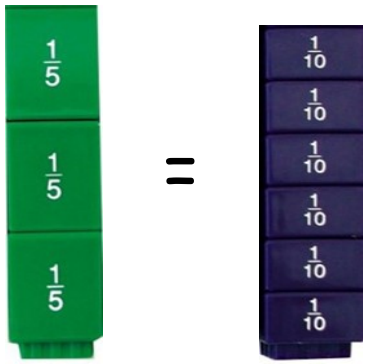
30cm = $\frac{3}{10}$ = 0.3m

# Year 5 Fractions

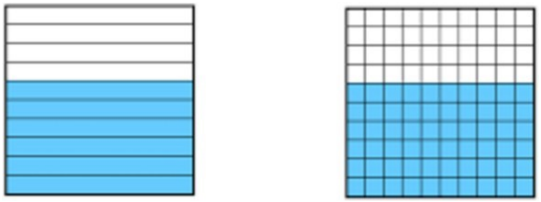
How can we progress with fractions?

**Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.**

Concrete




Pictorial



$$\frac{6}{10} = \frac{60}{100}$$

Abstract

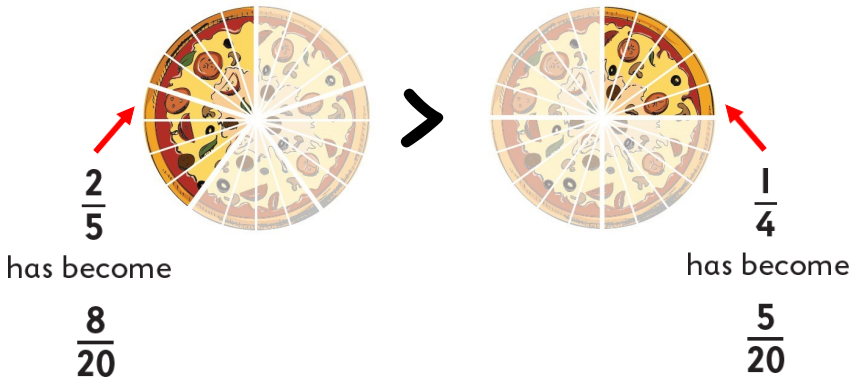
$$\frac{3}{5} = \frac{6}{10} = \frac{60}{100}$$

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

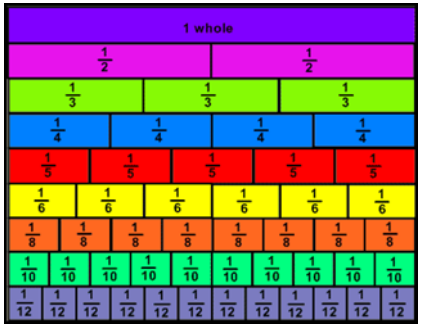
$$\frac{1}{5} = \frac{2}{10} = \frac{20}{100}$$

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

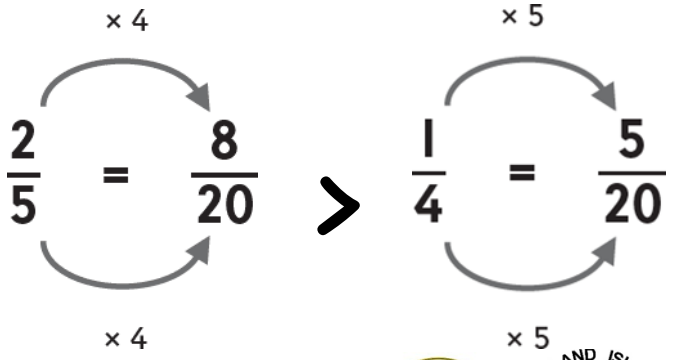
Concrete




Pictorial

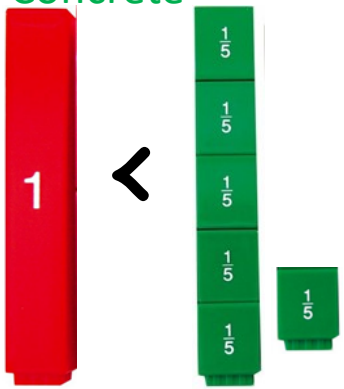



Abstract

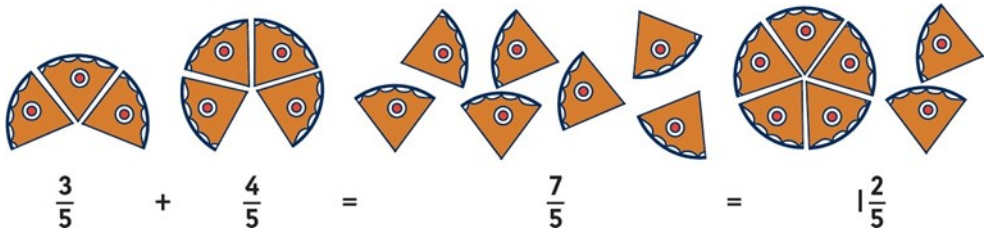


## Recognise mixed numbers and improper fractions. Convert from one form to the other and write mathematical statements >1 as a mixed number.

### Concrete




### Pictorial




### Abstract

$$\frac{7}{2} = 3\frac{1}{2}$$

because 7 ÷ 2 = 3

with 1 half left over

$$2\frac{1}{3} = \frac{7}{3}$$

because 2 x 3 = 6

with 1 third left to add

## Add and subtract fractions with the same denominators and denominators that are multiples of the same numbers.

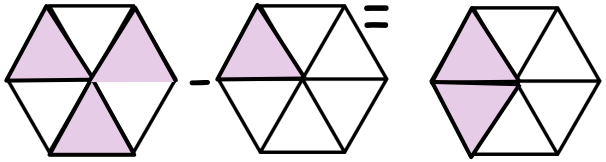
### Concrete

So,

$\frac{8}{20} + \frac{5}{20} = \frac{13}{20}$

$\frac{2}{5} + \frac{1}{4} = \frac{13}{20}$

### Pictorial

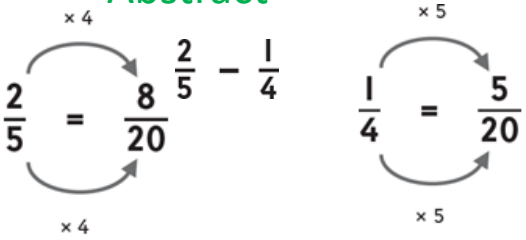


So,

$\frac{8}{20} - \frac{5}{20} = \frac{3}{20}$

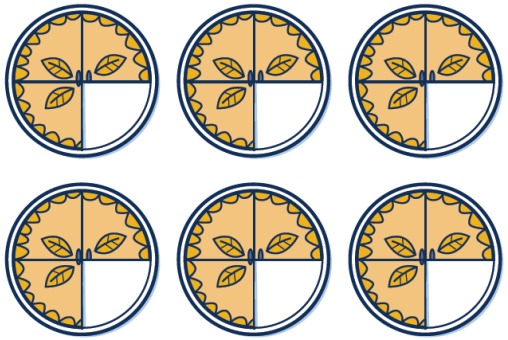
$\frac{2}{5} - \frac{1}{4} = \frac{3}{20}$

### Abstract



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

### Concrete



6 lots of $\frac{3}{4}$

### Pictorial

$4\frac{2}{4}$ altogether

### Abstract

Multiply a proper fraction by a whole number:

$$\frac{3}{4} \times 6 = \frac{18}{4}$$

Change to a mixed number

$$\frac{18}{4} = 4\frac{2}{4}$$

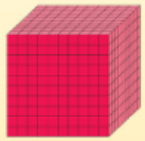
## Recognise and use altogether thousandths and relate them to tenths, hundredths and decimal equivalents.

### Concrete

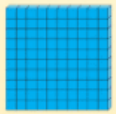
**Decimal numbers**

**I am learning** to show a decimal number using concrete materials.

It can be difficult to find a suitable concrete material to use to represent thousandths because they are such a small fraction. We can use base ten blocks, but we need to give each block a new and different value.



(a) This block can represent one whole unit = 1.



(b) 10 flats = 1 block.
1 flat = $\frac{1}{10}$ block.
So 1 flat = $\frac{1}{10}$ or 0.1.



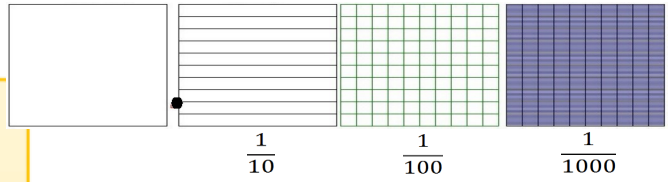
(c) 100 rods = 1 block.
1 rod = $\frac{1}{100}$ block.
So 1 rod = $\frac{1}{100}$ or 0.01.



(d) 1,000 cubes = 1 block.
1 cube = $\frac{1}{1000}$ block.
So 1 cube = $\frac{1}{1000}$ or 0.001.

1 large block = 10 flats = 100 rods = 1,000 cubes.
1 unit = $\frac{10}{10} = \frac{100}{100} = \frac{1000}{1000}$
Together, these base ten blocks show the number 1.111 or $1\frac{111}{1000}$.

### Pictorial




### Abstract

**67.153**

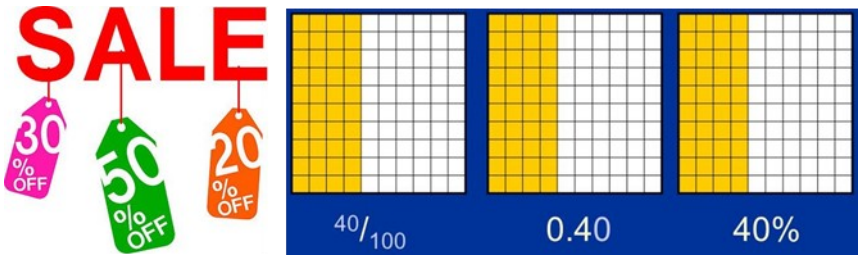
How many thousandths does this number have?

How many thousandths do you need to add to it to make it 67.16?

## Recognise % symbol and understand the meaning: write % as a fraction, decimal and percentage

### Concrete


### Pictorial




### Abstract

$\frac{4}{10} = 40\% = 0.4$

$\frac{32}{100} = 32\% = 0.32$

$\frac{75}{100} = 75\% = 0.75$

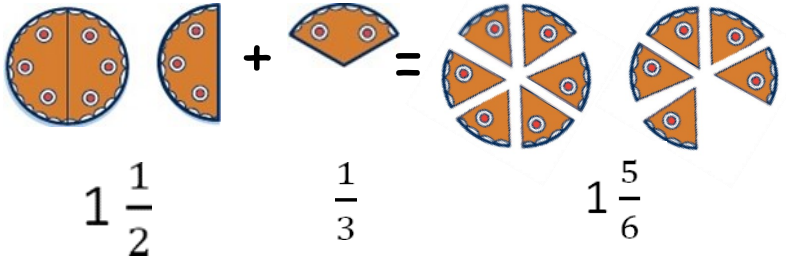
$\frac{2}{25} = \frac{8}{100} = 8\% = 0.08$

# Year 6 Fractions

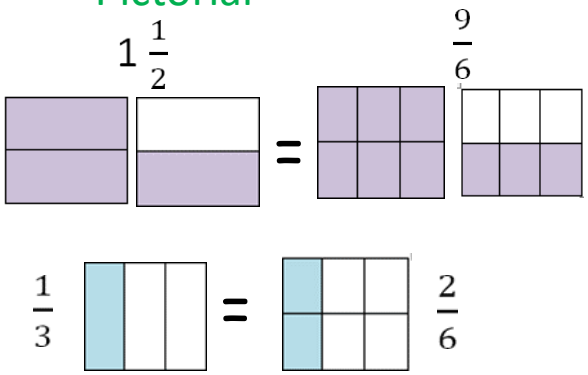
How can we progress with fractions?

**Add and subtract fractions with different denominators and mixed numbers using the concept of equivalent fractions.**

## Concrete




## Pictorial




## Abstract

$1\frac{1}{2} + \frac{1}{3} = 1\frac{5}{6}$

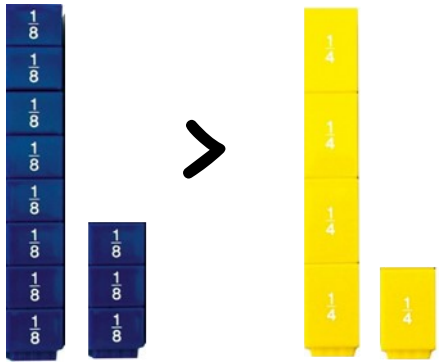
because $1\frac{1}{2} = \frac{3}{2}$

$\frac{3}{2} = \frac{9}{6}$ and $\frac{1}{3} = \frac{2}{6}$

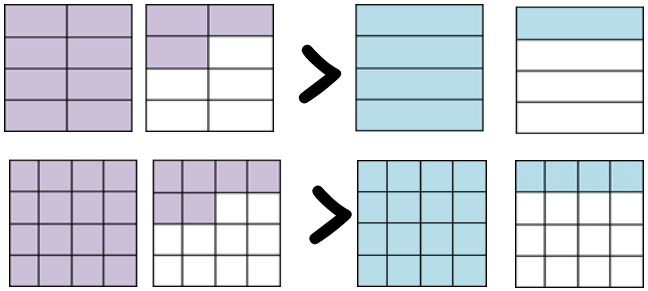
so $\frac{9}{6} + \frac{2}{6} = \frac{11}{6} = 1\frac{5}{6}$

**Compare and order fractions including fractions >1**

## Concrete




## Pictorial




## Abstract

Which is greater?

$\frac{2}{8} < \frac{6}{16}$

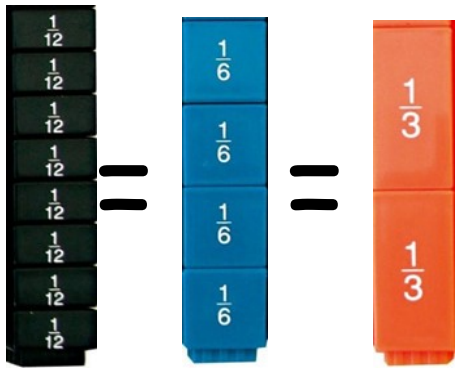
Ordering from smallest to largest by using equivalent fractions:

$\frac{5}{12}, \frac{2}{3}, \frac{5}{6}$

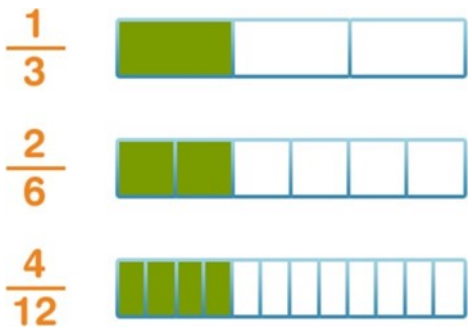
$\frac{5}{12}, \frac{8}{12}, \frac{10}{12}$

## Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.

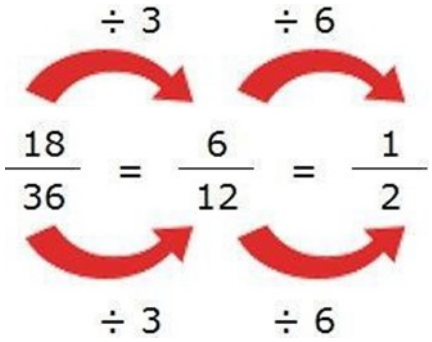
### Concrete




### Pictorial

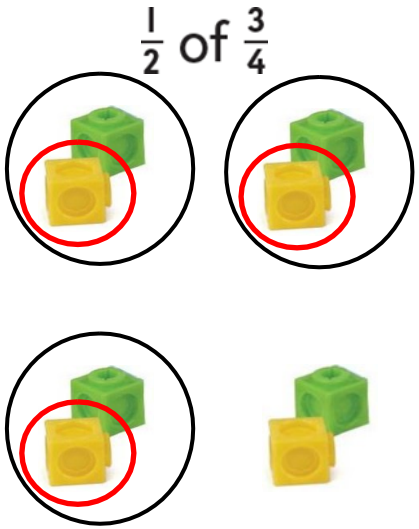



### Abstract

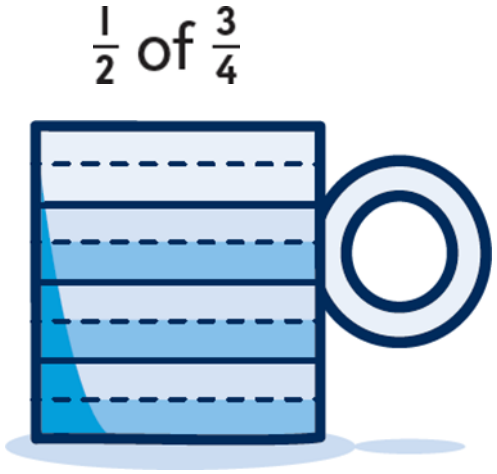



## Multiply simple pairs of proper fractions, writing the answer in its simplest form

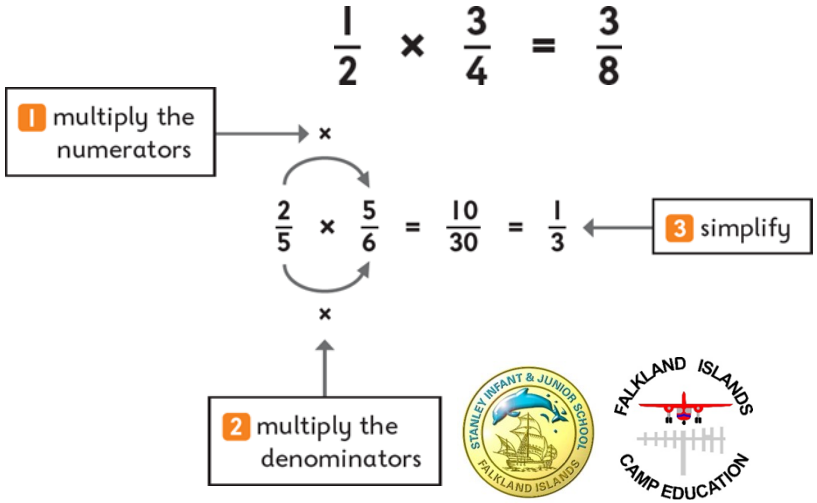
### Concrete




### Pictorial




### Abstract

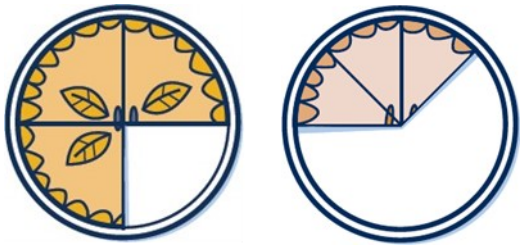


## Recall and use equivalences between simple fractions, decimals and percentages including in different contexts.

### Concrete


### Pictorial

Which would you prefer 75% or $\frac{3}{8}$ of a pie?



75%

$\frac{3}{8}$

### Abstract

John scored $\frac{40}{80}$ in his spelling test and Hannah scored 40%. Who scored more?

**John = $\frac{40}{80}$ =50%**

**Hannah = 40%**

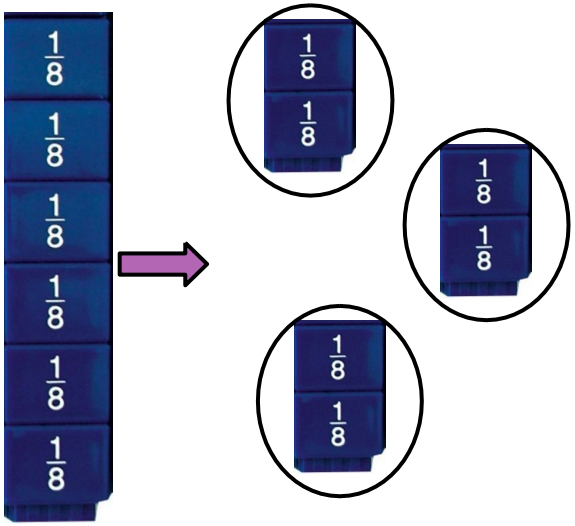
One paving slab is 0.3m long and another is $\frac{1}{4}$ of a metre. Which is longer?

$\frac{1}{4}$ **= 0.25m**

**0.3m is larger than 0.25m**

## Divide proper fractions by whole numbers.

### Concrete




### Pictorial

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

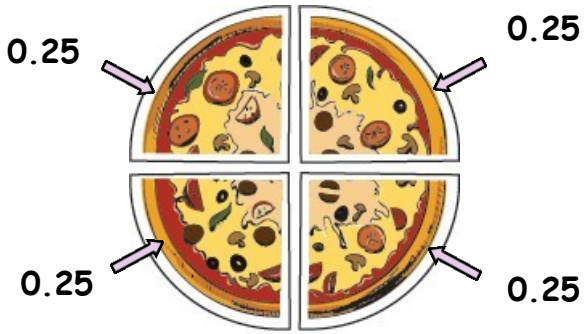
### Abstract

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

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

## Associate fractions with division and calculate decimal fraction equivalents.

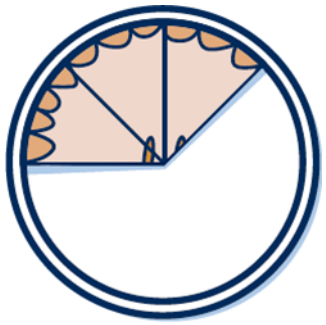
### Concrete



quarters

### Pictorial

3 slices of pie ‘out of’ 8



$\frac{3}{8}$

### Abstract

$\frac{3}{8}$

3 ‘out of’ 8 is the same as 3 ‘divided by’ 8

$3 \div 8 = 0{\cdot}375$

So $\frac{3}{8} = 0{\cdot}375$

$$
\begin{array}{r}
0.375 \\
\hline
8 \,\big|\, 3.^{3}0^{6}0^{4}0
\end{array}
$$