Mathematics

Fractions

Policy

Parts of a Fraction

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

1 — Numerator

4 — Denominator
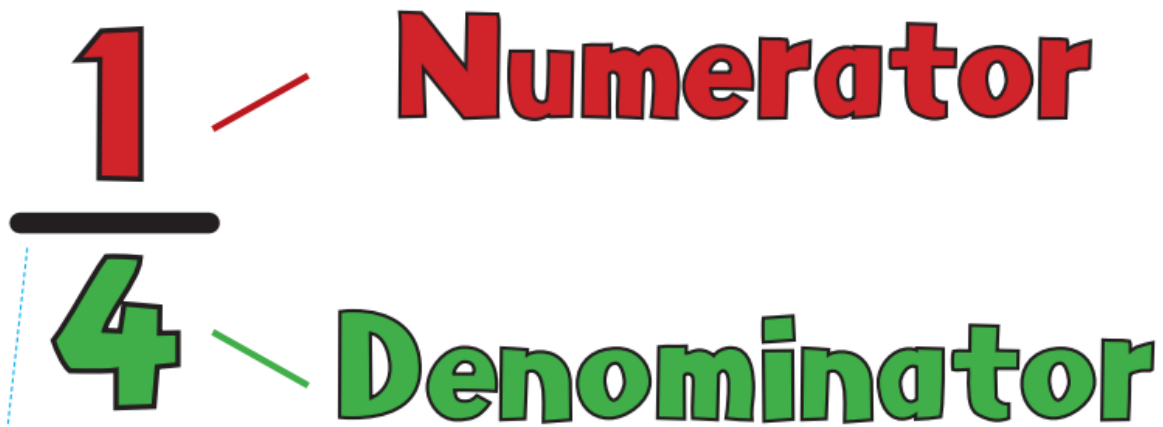
"Fractions is sharing equally"

Defining a Fraction

$\frac{2}{3}$

Equal Parts of a Whole
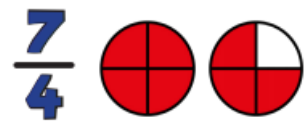
$\frac{1}{5} = 1 \div 5$

A Division

0   $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$ 1
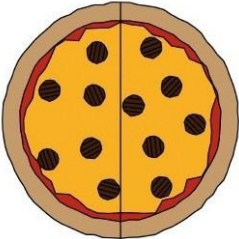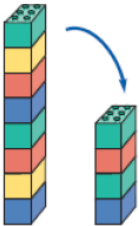
A Number

$\frac{1}{4}$ of 16

A Fraction of an Amount

$\frac{7}{4}$

More than a Whole

$\frac{2}{5} = 40\%$

$= 0.4$
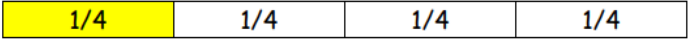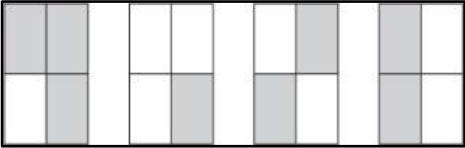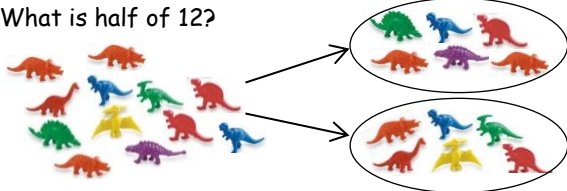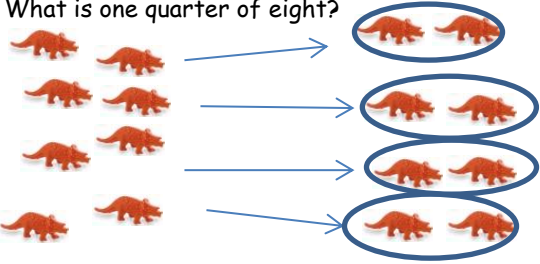
An Equivalence
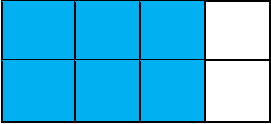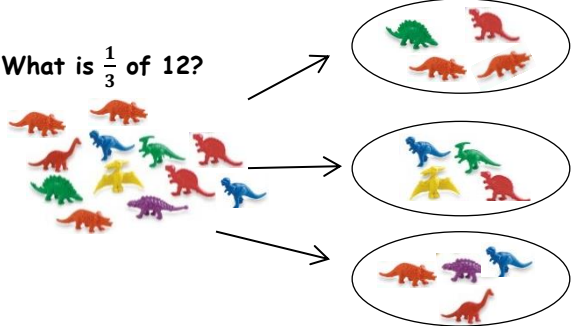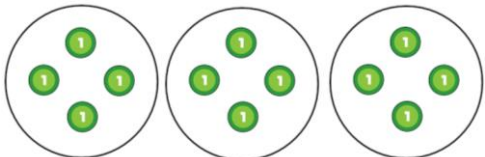
EYFS FRACTIONS

Curriculum Objectives	Strategies and Images
*Children will solve problems including halving.	Can you cut the pizza in half? Children will begin to recognise that halving an object involves splitting it down the middle into two equal parts. What is half of 8? Half of 8 is 4 Children will build the number and physically split it in half by sharing it into two equal groups.

YEAR 1 FRACTIONS

Curriculum Objectives	Strategies and Images
*Children can recognise, find and name a half as one of two equal parts of an object, shape or quantity. *Children can recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	**Shading fractions of a shape** Shade half of this shape… | 1/2	1/2 | Shade one quarter of this shape… | 1/4	1/4	1/4	1/4 | Children will learn to shade one half or one quarter of a shape. The shape will be split into 2 or 4 equal parts. Which shape is ¼ shaded? What is half of 12? Children will use practical resources to make the number and split it into two equal groups to find half. Half of 12 is 6. Can you cut the pizza into quarters? What is one quarter of eight? One quarter of 8 is 2.

YEAR 2 FRACTIONS

Curriculum Objectives	Strategies and Images
*Children can recognise, find, name and write fractions ½ 1/3 ¼ 2/4 ¾ of a length, shape, set of objects or quantity. *Children can write simple fractions for example, ½ of 6 = 3. *Children can recognise the equivalence of ½ and 2/4. *Children should count in fractions up to 10, starting from any number and using the and equivalence on the number line (for example, 1, 1 ¼ , 1 2/4 , 1 ¾ , 2)	Shading fractions of a shape As well as finding ½ and ¼ of a shape, the children may be asked to shade the fractions shown below… The shape might be split into more parts as shown in the example below. If shading $\frac{3}{4}$ they will be taught to shade 3 parts for every 4 parts there are. To shade $\frac{3}{4}$ of a shape split into 8 parts, you would need to shade 6 parts out of 8. $\frac{3}{4}$ of 8 is 6. **What is $\frac{1}{3}$ of 12?** Children will use sharing circles to find fractions of objects. To find a third they need 3 circles and will share out practical objects first. Once confident with practical resources, they will move onto drawing the sharing circles and drawing dots or counters in them. $\frac{1}{3}$ of 12 = 4

What is $\frac{2}{3}$ of 12?

They will then learn how to find $\frac{2}{3}$ of a quantity. They will recognise that to do this they will need to count how many there are in 2 out of the 3 groups.

$\frac{2}{3}$ of 12 = 8
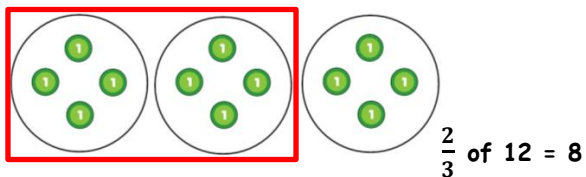
$\frac{1}{3}$ of 12 = 4
4 + 4 = 8

What is ½ of 80?
When challenged with higher numbers, instead of sharing out objects or drawing dots, children can share out ten sticks.
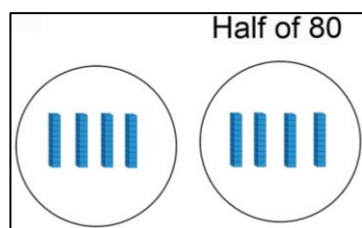
½ of 80 = 40 (4 ten sticks)

Equivalence of $\frac{1}{2}$ and $\frac{2}{4}$
Children will use visual representations and diagrams to show that one half is the same as two quarters.

$$\frac{1}{2} \qquad \frac{2}{4}$$
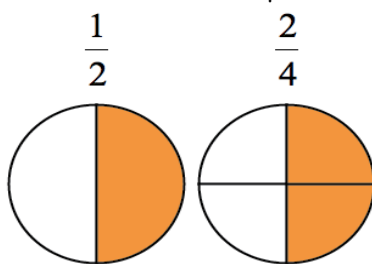
Counting in fractions
Children will learn to count in halves and quarters, firstly using practical resources…

½   1   1 ½   2   2 ½   3   3 ½

Then without practical resources…

½	1	1 ½	2	2 ½	3	3 ½	4

YEAR 3 FRACTIONS

Curriculum Objectives	Strategies and Images
*Children can recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. *Children can recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. *Children can 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. *Children can add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7] *Children can compare and order unit fractions, and fractions with the same denominators. *Children can recognise and show, using diagrams, equivalent fractions with small denominators.	**Shading fractions of a shape** Children will learn to shade shapes to represent a range of different unit fractions (where the numerator is 1) and non-unit fractions (where the numerator is bigger than 1). How many ways can you shade $\frac{1}{5}$ of the shape? Children will show different ways to shade the same fraction of a shape using their fractions knowledge. Shading $\frac{1}{5}$ means shade 1 part out of every 5 parts. $\frac{1}{5}$ of 10 parts = shade 2 parts. **Finding fractions of a number** Children will use their times table knowledge to help them find fractions of a number as shown below… **What is $\frac{1}{8}$ of 16?** To find $\frac{1}{8}$ you divide by the denominator (8). $16 \div 8 = 2$ so… $\frac{1}{8}$ of 16 = 2 **What is $\frac{3}{5}$ of 25?** $25 \div 5 = 5$ divide by the denominator $5 \times 3 = 15$ times the answer by the top (numerator) So… $\frac{3}{5}$ of 25 = 15

<u>Tenths</u>

$\frac{1}{10}$

26·5

$\frac{1}{10}$ of 50 = 5

50 ÷ 10 = 5

Children will learn to count in tenths and write them in both fraction form and decimal form. $\frac{1}{10}$ = 0.1

$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$	$\frac{9}{10}$	$\frac{10}{10}$

0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

<u>Add and Subtract Fractions</u>
Children will use pictorial representations to help them add and subtract fractions with the same denominator.

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

<u>Order and compare fractions</u>
Children will use visual representations to help them order and compare fractions.

$\frac{2}{5}$

$\frac{4}{5}$

$\frac{4}{5}$ is the greater fraction.
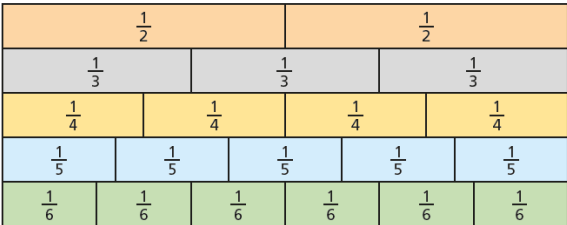
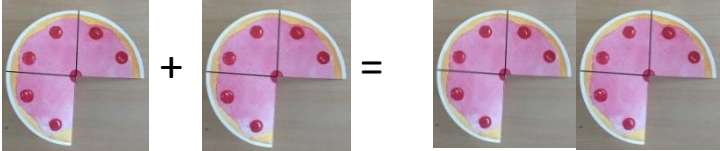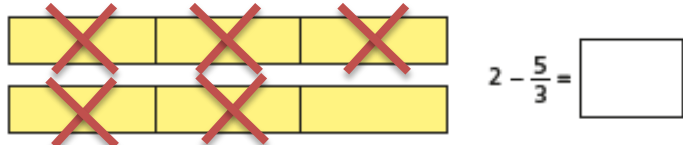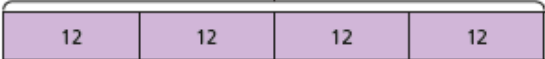They will also use < > = symbols to compare fractions…

$$\frac{2}{5} < \frac{4}{5}$$

<u>Equivalent fractions</u>
Children will use visual representations such as pizzas and pies to recognise fractions that are the same (equivalent)

1/2   2/4   4/8

YEAR 4 FRACTIONS

Curriculum Objectives	Strategies and Images
*Children can recognise and show, using diagrams, families of common equivalent fractions. *Children can 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. *Children can add and subtract fractions with the same denominator. *Children can count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. *Children can recognise and write decimal equivalents of any number of tenths or hundredths. *Children can recognise and write decimal equivalents to ¼ ½ and ¾. *Children can 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. *Children can round decimals with one decimal place to the nearest whole number.	**Equivalent fractions** Children will use visual representations such as fraction walls to recognise fractions that are the same (equivalent) (fraction wall showing rows of $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$) $\frac{1}{2}$ is the same as $\frac{2}{4}$ and $\frac{3}{6}$ ... $\frac{1}{3}$ is the same as $\frac{2}{6}$ **Add and Subtract Fractions** Children will build on their knowledge of adding and subtracting fractions with the same denominator. The answer will often be larger than one whole as shown below… $\frac{3}{4} + \frac{3}{4} = \frac{6}{4}$ or 1 whole and $\frac{2}{4}$ They will also learn how to subtract fractions from whole numbers using diagrams to help them… $2 - \frac{5}{3} = \boxed{}$ The 2 wholes will be split into 6 thirds. 5 thirds will be subtracted which leaves 1 third. So… $2 - \frac{5}{3} = \frac{1}{3}$ **Fractions of an amount** Children will continue to use the method of dividing by the denominator, times by the top to find fractions of a number. **What is ¾ of 48?** 48 (bar model: 12 | 12 | 12 | 12) 48 ÷ 4 = 12 divide by the denominator 12 x 3 = 36 times the answer by the top (numerator) So… $\frac{3}{4}$ of 48 = 36

| *Children can compare numbers with the same number of decimal places up to two decimal places.

*Children can solve simple measure and money problems involving fractions and decimals to two decimal places. | <u>Hundredths</u>
Children will build on their knowledge of decimals by learning about hundredths. The diagram below shows a hundred square with 60 squares coloured in which represents 60 hundredths.
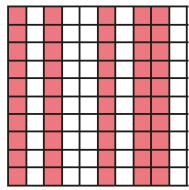
$\frac{60}{100}$ (60 hundredths)
which is the same as
$\frac{6}{10}$ (6 tenths)

They will learn how to represent tenths and hundredths as decimals.

<table><tr><td></td><td>Twelve hundredths</td><td>$\frac{12}{100}$</td><td>0.12</td></tr></table>
They will also explore how to divide whole numbers by 10 and 100 to create tenths and hundredths as shown below…

$7 \div 10 = 0.7$
$7 \div 100 = 0.07$

U . $\frac{1}{10}$ $\frac{1}{100}$
7 .
0 . 7   ($\div 10$)
0 . 0 7   ($\div 100$)

Using their place value knowledge, they will learn that they need to move the digits in a place value grid to divide. They move the digits 1 space to the right for ÷10 and 2 spaces to the right for ÷100.

Children will learn how to write ¼ ½ and ¾ as decimals…

$\frac{1}{4} = 0.25$ $\frac{1}{2} = 0.5$ $\frac{3}{4} = 0.75$
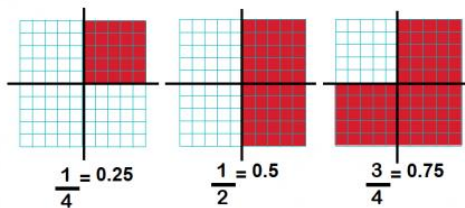
<u>Comparing decimals</u>
Children will compare numbers with 2 decimal places as shown below…
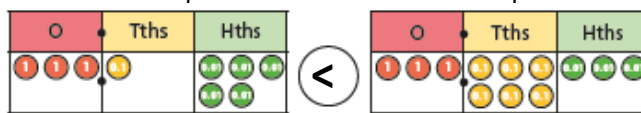
3.15 is less than 3.63

They will then use their decimal knowledge to solve measurement problems involving money.

Write the amounts in descending order.

£5.05   550p   5,500p   £50.50   £55.05 |

YEAR 5 FRACTIONS

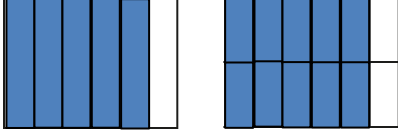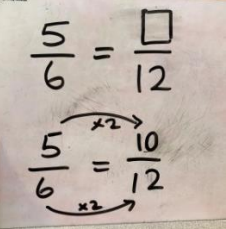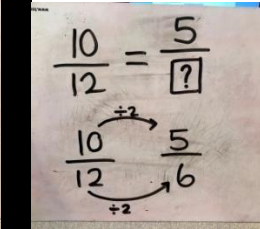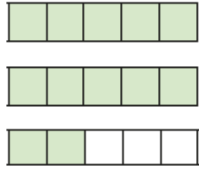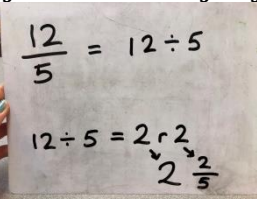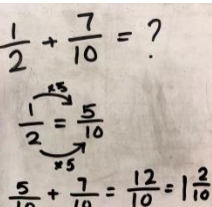| Curriculum Objectives	Strategies and Images
*Children can compare and order fractions whose denominators are all multiples of the same number. *Children can identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. *Children can recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number. *Children can add and subtract fractions with the same denominator and denominators that are multiples of the same number. *Children can multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. *Children can read and write decimal numbers as fractions [for example, 0.71 = 100 71] *Children can recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. *Children can round decimals with two decimal places to the nearest whole number and to one decimal place.	**Equivalent fractions** Children will find a variety of equivalent fractions and compare fractions whose denominators are multiples of the same number. $\frac{5}{6} = \frac{\square}{\square}$ $\frac{5}{6}$ is equivalent to $\frac{10}{12}$ You need to do the same to the numerator as you do to the denominator! **Mixed numbers and improper fractions** The children will learn how to convert improper fractions (where the numerator is bigger than the denominator) into mixed numbers by using their division knowledge as shown below… $\frac{\square}{5} = \square$ $\frac{12}{5}$ is the same as $\frac{5}{5} + \frac{5}{5} + \frac{2}{5}$ $\frac{12}{5} = 12 \div 5$ $12 \div 5 = 2 r 2$ $2\frac{2}{5}$ **Adding and subtracting fractions with different denominators** Children will use their times table knowledge to identify the common denominator to help them add fractions with different denominators… $\frac{1}{2} + \frac{7}{10} = \square = \square$ $\frac{1}{2} + \frac{7}{10} = ?$ $\frac{1}{2} = \frac{5}{10}$ $\frac{5}{10} + \frac{7}{10} = \frac{12}{10} = 1\frac{2}{10}$ The answer can be written as an improper fractions ($\frac{2}{10}$) or a mixed number ($1\frac{2}{10}$)

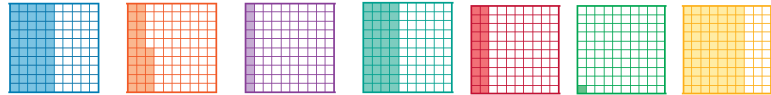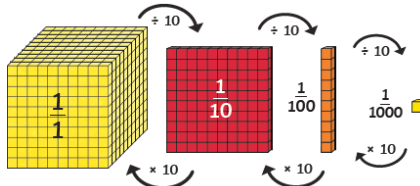|	
*Children can read, write, order and compare numbers with up to three decimal places. *Children can solve problems involving number up to three decimal places. *Children can recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal. *Children can solve problems which require knowing percentage and decimal equivalents of ½ ¼ 1/5 2/5 4/5 and those fractions with a denominator of a multiple of 10 or 25.	**Multiply fractions by whole numbers** Children can use their knowledge of adding fractions to help them multiply fractions by whole numbers. 5 lots of 1/8 is the same as adding 1/8 5 times as shown below… $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \boxed{}$ $5 \times \frac{1}{8} = \boxed{}$ $= \frac{5}{8}$ **Decimals and Percentages %** Children will be introduced to percentages and learn the percentage and decimal equivalents for the fractions shown below… $50\% = \frac{50}{100} = \frac{1}{2} = 0.5$ $25\% = \frac{25}{100} = \frac{1}{4} = 0.25$ $10\% = \frac{10}{100} = \frac{1}{10} = 0.1$ $40\% = \frac{40}{100} = \frac{2}{5} = 0.4$ $20\% = \frac{20}{100} = \frac{1}{5} = 0.2$ $1\% = \frac{1}{100} = 0.01$ $70\% = \frac{70}{100} = \frac{7}{10} = 0.7$ They will also add and subtract decimals using column addition or subtraction, remembering to line up the decimal points. $$\begin{array}{r} 0.25 \\ + \ 0.072 \\ \hline 0.322 \end{array}$$ **Thousandths** Children will extend their knowledge of tenths and hundredths by learning about thousandths. They will use the method of moving the digits 3 spaces to the right to divide by 1000 as shown below… Children will use their fractions knowledge to solve problems… Complete the number square. The total of each column is $\frac{4}{5}$ The total of each row is $\frac{4}{5}$ Create your own problem like this for a partner.

YEAR 6 FRACTIONS

Curriculum Objectives	Strategies and Images
*Children can use common factors to simplify fractions; use common multiples to express fractions in the same denomination. *Children can compare and order fractions, including fractions > 1. *Children can add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. *Children can multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ x ½ = 1/8] *Children can divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6] *Children can associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8] *Children can identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places. *Children can multiply one-digit numbers with up to two decimal places by whole numbers.	**Adding and subtracting mixed numbers** Children will expand on their knowledge of adding and subtracting fractions by moving onto adding and subtracting mixed numbers… Ensure that the denominators are the same $3\frac{2}{4} + 1\frac{1}{4}$ $3\frac{1}{2} + 1\frac{1}{4} = ?$ Add the whole numbers, then the fractions $3 + 1 = 4$ $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$ $= 4\frac{3}{4}$ They will add the whole number and then add the fractions. Once complete they will find the mixed number answer. For example, $3\frac{1}{2} + 1\frac{1}{4} = 4\frac{3}{4}$ **Multiply fractions** Children will learn to multiply fractions with different denominators. Firstly, they must multiply the numerators and the denominators. $\frac{1}{4} \times \frac{2}{3}$ $\frac{1 \times 2}{4 \times 3} = \frac{2}{12}$ Once they have found the answer they must put the fraction in its simplest form as shown below… $\frac{2}{12} \quad \frac{1}{6}$ (÷2) So… $\frac{1}{4} \times \frac{2}{3} = \frac{2}{12}$ which is simplified to $\frac{1}{6}$ **Divide fractions by whole numbers** Children will use diagrams to help them understand the concept of dividing a fraction by a whole number. $\frac{6}{7} \div 2 = \boxed{}$ $\quad \boxed{\frac{6}{7} \div 2 = \frac{3}{7}}$

*Children can use written division methods in cases where the answer has up to two decimal places. *Children can solve problems which require answers to be rounded to specified degrees of accuracy. *Children can recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.	They will divide the numerator but keep the denominator the same. In the example above they would calculate $6 \div 2 = 3$, so the answer would be $\frac{3}{7}$ because the denominator stays the same. They will also learn how to 'stick, swap, flip' when dividing fractions as shown below…

Dividing fractions:

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

Stick Swap Flip

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

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

Multiplying and dividing decimals

Multiply decimals by a whole number (integer). Children will s et it out using the formal method for multiplication and add the decimal point in.

$$
\begin{array}{r}
1 \cdot 48 \\
\times \quad 3 \\
\hline
4 \cdot 44 \\
1 \quad 2
\end{array}
$$

Check that you have the same number of decimal places.

Dividing decimals by a whole number (integer). Children will set it out using the formal method for division and add the decimal point in.

$$12 \cdot 6 \div 3 = 4 \cdot 2$$

$$
\begin{array}{r}
0\,4 \cdot 2 \\
3\overline{)12 \cdot 6}
\end{array}
$$

Calculate decimal fraction equivalents to 0.375

Calculate a decimal as a fraction equivalent

0.375

$$\frac{375}{1000} \quad \frac{75}{200} \quad \frac{3}{8}$$

-5 -25 -5 -25

Calculate a fraction as a decimal equivalent

$$\frac{3}{8}$$ So 3 divided by 8

$$
\begin{array}{r}
0 \cdot 375 \\
8\overline{)3 \cdot 0\,0\,0}
\end{array}
$$