The Oaks Primary School
Bringing Learning to Life

The Oaks Fraction Policy

March 2021

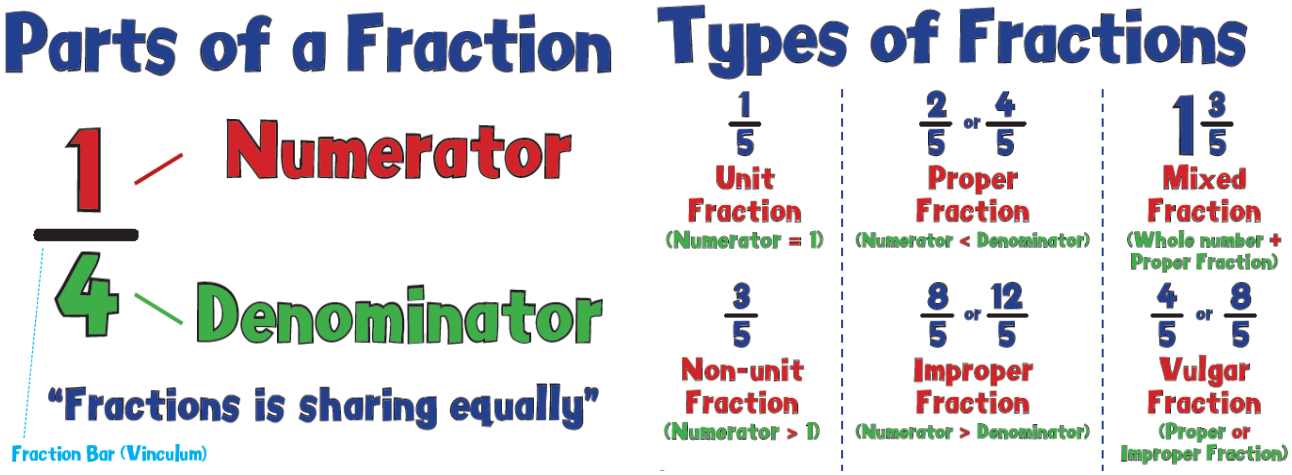
In line with the National Curriculum (2014)

Fractions Policy

March 2017

This policy will outline the progression of fractions and the methods taught for calculating with fractions at The Oaks Primary School.

Fractions are taught throughout school from Reception to Year 6. The Sense of Number Visual Fraction slides are used as a support tool along with as many practical resources as possible. Staff should follow a concrete-pictorial-abstract approach to teaching fractions.



Reception

Talk about halves using practical objects such as food (e.g. cutting toast in half)

Year 1

Children should recognise, find and name half as one of 2 equal parts of an object, shape or quantity.

Recognise, find and name a quarter as one of 4 equal parts of an object, shape or quantity.

Year 2

Recognise, find, name and write fractions 1/3, ¼, 2/4, ¾ of a length, shape set of objects or quantity.

Write simple fractions e.g. ½ of 6 = 3 and recognise the equivalence of 2/4 and ½.

Year3

Count up and down in tenths. Recognise that tenths arise from dividing an object into 10 equal parts and in dividing 1 digit numbers or quantities by 10.

Recognise, find and write fractions of a discrete set of objects: unit fractions & non-unit fractions with small denominators.

Recognise and show using diagrams equivalent fractions with small denominators.

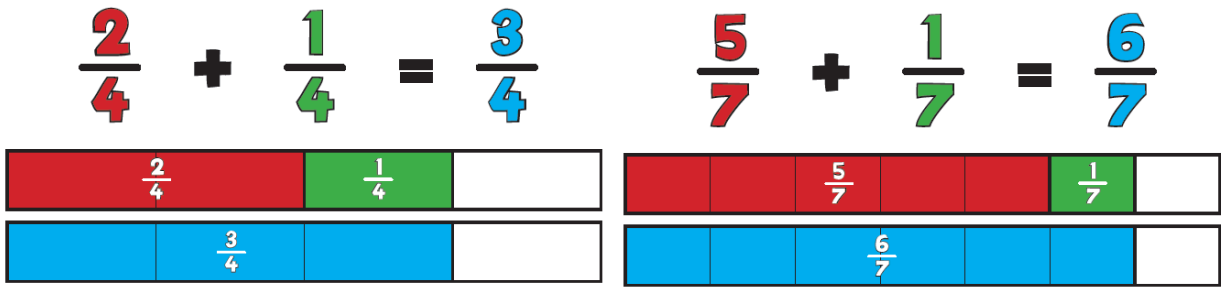
Recognise and use fractions as numbers: unit and non-unit fractions with small denominators.

Add and subtract fractions with the same denominator within one whole.

Compare and order unit fractions and fractions with the same denominator.

Solve problems with all of the above.

Adding Fractions with the same denominator. After doing this with concrete objects, we can then move on to pictorial representations.



We then move onto an abstract approach.

For example, for 3/7 + 2/7, we add the numerators together to find out how many sevenths there are in total, therefore 3/7 + 2/7 = 5/7. The denominator stays the same as we are totalling the amount of sevenths altogether.

Year 4

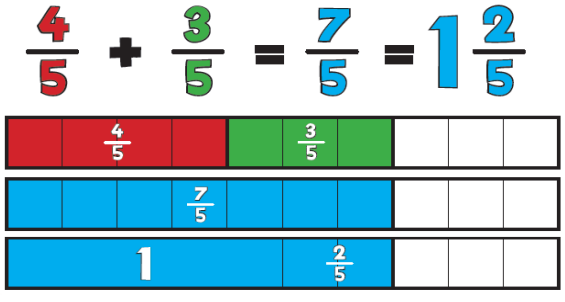
Recognise and show using diagrams, families of common equivalent fractions.

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

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

Add and subtract fractions with the same denominator.

After doing this with concrete objects, we can then move on to pictorial representations.



We then move onto an abstract approach. For example, for 3/7 + 5/7, we add the numerators together to find out how many sevenths there are in total, therefore 3/7 + 5/7 = 8/7. The denominator stays the same as we are totalling the amount of sevenths altogether. As the answer is an IMPROPER fraction, we can then convert 8/7 to a mixed number fraction which would be one whole and 1/7.

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

Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$

Find the effect of dividing a one or two digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths

Round decimals with 1d.p to the nearest whole number

Compare numbers with the same number of decimal places up to 2dp

Solve simple measure and money problems involving fractions and decimals to 2dp

Year 5

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

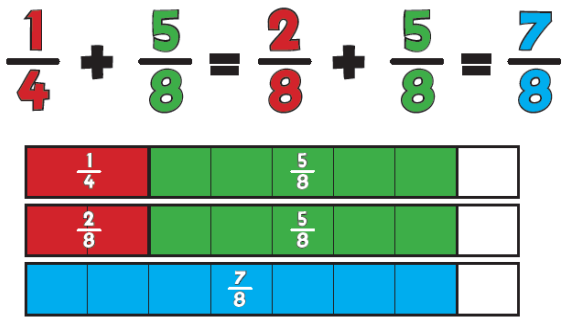
Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.

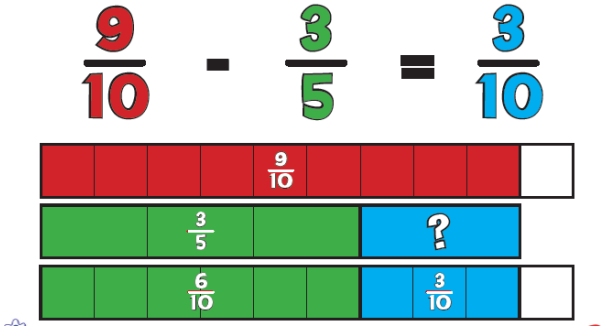
Recognise mixed numbers and improper fractions and convert them from one to the other and write mathematical statements ≥1 as a mixed number E.g. 2/5 + 4/5 = 6/5 = 1 1/5

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

Add fractions beyond a whole.

We first do this as a concrete then pictorial approach.



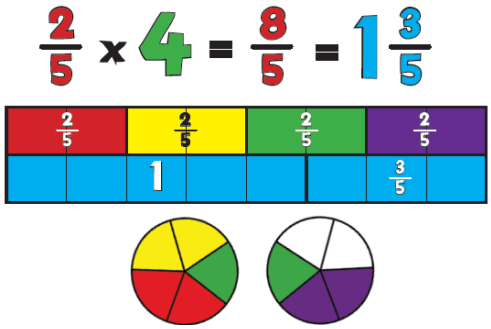


When moving onto an abstract approach, we need to find a common denominator to solve the equation. E.g. ¾ + 3/8 – the common denominator would be 8. We have to multiply the denominator of the first fraction (4) by 2, to get a common denominator of 8, so we also need to do the same calculation to the numerator: 3 x 2 = 6. Our calculation is now 6/8 + 3/8.

So, 6/8 + 3/8 = 9/8 or convert this back to a Mixed Number which would be 1 1/8

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

Introduce this initially as a concrete approach – if we have $\frac{3}{4}$ x 4, use pizza, shapes etc to find 3 lots of $\frac{3}{4}$. We can then move onto a pictorial approach to support a formal method.



To multiply fractions we multiply the numerator by the whole number. The denominator stays the same. So for 2/5 x 4 we multiply 2 by 4 to get an answer of 8. The fraction is now 8/5. We can then convert this from an improper fraction to a mixed number, and would have an answer of 1 3/5.

In the instance of multiplying a mixed number fraction by a whole number we would do the following:

$4\frac{3}{4}$ x 5, we would first multiply 4 by 5 to get 20. We then need to multiply the fraction, as described above. Therefore we would multiply the numerator 3 by 5 to get 15. Our fraction is now 15/4 convert this to a mixed number (which would be $3\frac{3}{4}$) and add it to the whole number (20 + 3 $\frac{3}{4}$). Our answer is $23\frac{3}{4}$.

Read and write decimal numbers as fractions. E.g. 0.71 = 71/100

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

Round decimals with 2 decimal places to the nearest whole number and to 1dp

Read write order and compare numbers with up to 3dp

Recognise the % symbol and understand that per cent relates to 'number of parts per 100'.

Write percentages as a fraction with a denominator of 100 and as a decimal fraction

Solve problems that require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25

Year 6

Pupils should be taught to:

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

To simplify fractions we need to divide both numerator and denominator in the fraction by the Greatest Common Factor

E.g. Simplify the fraction 8/12 :

The largest number that goes exactly into both 8 and 12 is 4, so the *Greatest Common Factor* is 4. We therefore divide both the numerator and denominator by 4.

÷ 4

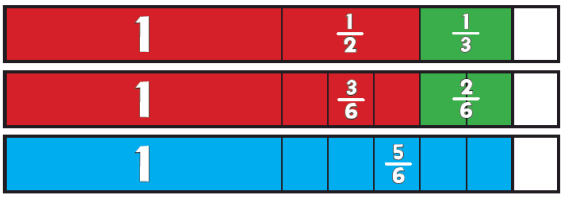
$\frac{8}{12} = \frac{2}{3}$

÷ 4

Compare and order fractions, including fractions > 1

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

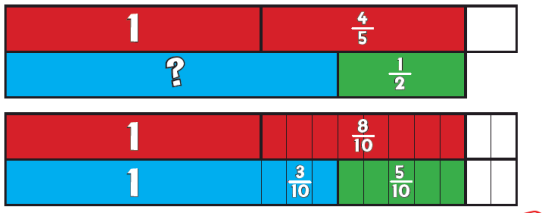
$1\frac{1}{2} + \frac{1}{3} = 1\frac{3}{6} + \frac{2}{6} = 1\frac{5}{6}$



To add mixed number fractions, we can first add the whole numbers together. We then add the fractions as detailed earlier, then convert the answer to a mixed number if necessary. We then then add the total to the whole numbers.

E.g. 3 1/4 + 2 1/5. We first need to add the whole numbers together (3+2=5). We then add the fractions: 1/4 + 1/5, the common denominator is 20. Therefore 5/20 + 4/20 = 9/20. We then add this total to the whole numbers so our answer to 3 1/4 + 2 1/5 = 5 9/20.

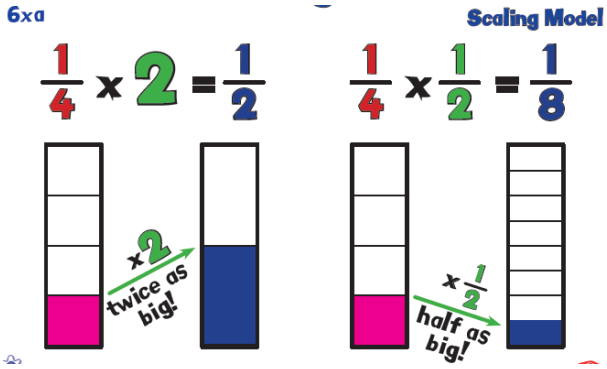
$1\frac{4}{5} - \frac{1}{2} = 1\frac{8}{10} - \frac{5}{10} = 1\frac{3}{10}$



To subtract mixed number fractions, we need to convert to Improper Fractions first. We can then subtract the fractions as detailed earlier. Then convert back to Mixed Fractions.

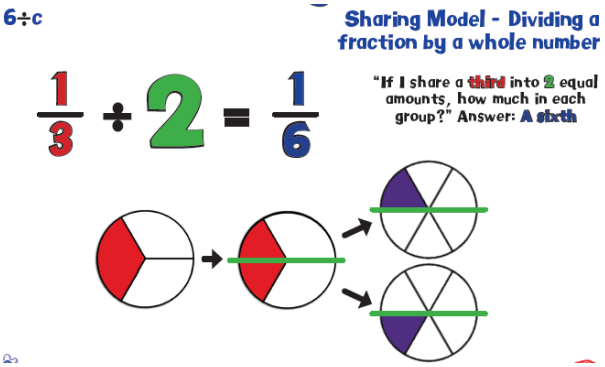
So 4 1/4 – 2 5/6 = 17/4 - 17/6. The common denominator is 12. So our calculation is now 51/12 – 34/12 = 17/12. We can then convert this back to a Mixed Number Fraction so our answer is 1 5/12.

Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]

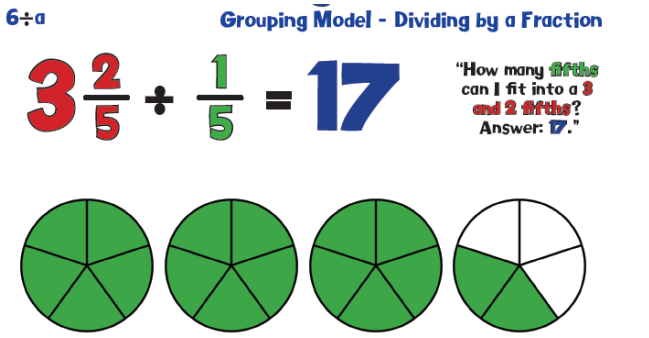


We multiply the numerators together and then we multiply the denominators together. So, $\frac{3}{4}$ x 2/5 would be 6/20. As 3 x 2 = 6 and 4 x 5 = 20. We can then simplify our answer to 3/10.

Divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$]



To divide a fraction by a whole number, we need to multiply the denominator by the whole number. So in the example, 1/3 ÷ 2, we multiply the denominator 3 by 2. Our answer is therefore 1/6.



To divide a fraction by a fraction, we leave the first fraction in the equation alone. Then turn the division sign into a multiplication sign. Flip the second fraction over (find its reciprocal). Multiply the numerators of the two fractions together. Finally, multiply the denominators of the two fractions together.
So, $\frac{3}{4} \div 2/5 = \frac{3}{4} \times 5/2 = 15/8$. We can then convert this to a mixed number so our answer is 1 7/8

Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]

Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places

Multiply one-digit numbers with up to two decimal places by whole numbers

Use written division methods in cases where the answer has up to two decimal places

Solve problems which require answers to be rounded to specified degrees of accuracy

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

Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other (for example, $\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$) and progress to varied and increasingly complex problems.

Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle.

Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if $\frac{1}{4}$ of a length is 36cm, then the whole length is 36 × 4 = 144cm).