

## FRACTIONS SEQUENTIAL LEARNING OSMOTHERLEY CP

### **Highlighted= 2020 Maths guidance ready-to-progress criteria**

Year group	sequence	methods
ONE	<p>*recognise, find and name a half as one of two equal parts of an object, shape or quantity</p> <p>* recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.</p>	<p>Pupils are taught half and quarter as ‘fractions of’ discrete and continuous quantities by solving problems using shapes, objects and quantities. For example, they could recognise and find half a length, quantity, set of objects or shape. Pupils connect halves and quarters to the equal sharing and grouping of sets of objects and also to measures, as well as recognising and combining halves and quarters as parts of a whole.</p>
TWO	<p>*recognise, find, name and write fractions</p> <p>a third a quarter two quarters three quarters</p> <p>of a length, shape, set of objects or quantity</p> <p>*write simple fractions for example, <math>\frac{1}{2}</math> of 6 = 3 and recognise the equivalence of <math>\frac{2}{4} = \frac{1}{2}</math></p>	<p>Pupils use fractions as ‘fractions of’ discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet <math>\frac{3}{4}</math> as the first example of a non-unit fraction. Pupils</p>

		<p>should count in fractions up to 10, starting from any number and using the <math>\frac{1}{2}</math> and <math>\frac{2}{4}</math> equivalence on the number line for example: <math>1\frac{1}{4}</math></p> <p><math>1\frac{2}{4}</math> (or <math>1\frac{1}{2}</math>) <math>1\frac{3}{4}</math></p> <p>This reinforces the concept of fractions as numbers and that they can add up to more than one.</p>
THREE	<ul style="list-style-type: none"> <li>* 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</li> <li>* recognise, find and write fractions of a discrete set of objects: unit fractions and nonunit fractions with small denominators</li> <li>* recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators</li> <li>* recognise and show, using diagrams, equivalent fractions with small denominators</li> </ul>	<p>Pupils connect tenths to place value, decimal measures and to division by 10. They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the [0, 1] interval, including relating this to measure. Pupils understand the relation between unit fractions as operators (fractions of), and division by integers. They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, and unit fractions as a division of a quantity. Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.</p>

\* add and subtract fractions with the same denominator within one whole [for example,

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

\* compare and order unit fractions, and fractions with the same denominators

\* solve problems that involve all of the above.

***\*interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.***

***\*find unit fractions of quantities using known division facts (multiplication tables fluency).***

***\*reason about the location of any fraction within 1 in the linear number system.***

***\*add and subtract fractions with the same denominator within one***

FOUR	<p style="text-align: center;"><b>Understand fractions as decimals</b></p> <ul style="list-style-type: none"> <li>* recognise and show, using diagrams, families of common equivalent fractions</li> <li>* count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.</li> <li>* 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</li> <li>* add and subtract fractions with the same denominator</li> <li>* recognise and write decimal equivalents of any number of tenths or hundredths</li> <li>* recognise and write decimal equivalents to half, quarter, three quarter</li> <li>* 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</li> </ul>	<p>Pupils should connect hundredths to tenths and place value and decimal measure. They extend the use of the number line to connect fractions, numbers and measures. Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular <b>emphasis on tenths and hundredths</b>. Pupils make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities. Pupils use factors and multiples to <b>recognise equivalent fractions</b> and simplify where appropriate</p> <p>For example: <math>\frac{6}{9} = \frac{2}{3}</math> or <math>\frac{1}{4} = \frac{2}{8}</math></p> <p>Pupils continue to practise adding and subtracting fractions with the same denominator, to become fluent through a variety of increasingly complex problems beyond one whole. Pupils are taught throughout that decimals and fractions are different ways of expressing numbers and proportions. Pupils' understanding of the number system and decimal place value is extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of whole number by 10 and later 100. They practise counting using simple fractions and decimals,</p>
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- \* round decimals with one decimal place to the nearest whole number
- \* compare numbers with the same number of decimal places up to two decimal places
- \* solve simple measure and money problems involving fractions and decimals to two decimal places.

***\*reason about the location of mixed numbers in the linear number system.***

***\*convert mixed numbers to improper fractions and vice versa.***

***\*add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers***

both forwards and backwards. Pupils learn **decimal notation** and the language associated with it, including in the context of measurements. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with **one or two decimal places** in **several ways**, such as on number lines.

FIVE

**Understand fractions as decimals and percentages**

***\*find non-unit fractions of quantities***

\*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 from one form to the other and write mathematical statements  $> 1$  as a mixed number for example:

$$\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$$

Pupils should be taught throughout that percentages, decimals and fractions are different ways of expressing proportions. They extend their knowledge of fractions **to thousandths** and connect to decimals and measures.

\* add and subtract fractions with the same denominator and denominators that are multiples of the same number

\* multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams

\* read and write decimal numbers as fractions for example:

$$0.71 = \frac{71}{100}$$

\* recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents

\* round decimals with two decimal places to the nearest whole number and to one decimal place

\* read, write, order and compare numbers with up to three decimal places

\* solve problems involving number up to three decimal places \*recognise the per cent symbol (%) and understand that per cent relates to 'number of

	<p>parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal</p> <p>* solve problems which require knowing percentage and decimal equivalents of a half, a quarter, one fifth, two fifths and four fifths and those fractions with a denominator of a multiple of 10 or 25</p> <p><b>*find equivalent fractions and understand that they have the same value and the same position in the linear number system.</b></p> <p><b>*recall decimal fraction equivalents half quarter fifth and tenth and for multiples of these proper fractions</b></p>	
SIX	<p><b>*use common factors to simplify fractions; use common denominators to express fractions that are similar in value</b></p> <p>* compare and order fractions, including fractions <math>&gt; 1</math></p>	<p>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</p>



- \* add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- \* multiply simple pairs of proper fractions, writing the answer in its simplest form  
[for example,  $\frac{1}{2} \times \frac{2}{3} = \frac{1}{3}$ ]
- \* divide proper fractions by whole numbers [for example,  $\frac{3}{4} \div 2 = \frac{3}{8}$ ]
- \* 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

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  $36 \times 4 = 144$ cm). They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators. Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example,  $3 \div 8 = 0.375$ ). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context. Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers, starting

<p>*solve problems which require answers to be rounded to specified degrees of accuracy</p> <p>*recall and use equivalences between simple fractions, decimals and percentages including in different contexts.</p> <p><b>*compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.</b></p>	<p>with the simplest cases, such as <math>0.4 \times 2 = 0.8</math>, and in practical contexts, such as measures and money. Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication. Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers.</p>
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