

Unit 11
Fractions, decimals

Unit Objectives
Year 4

- Use fraction notation.
- **Recognise the equivalence of simple fractions (e.g. fractions equivalent to $\frac{1}{2}$, $\frac{1}{4}$ or $\frac{3}{4}$).**
- **Recognise simple fractions that are several parts of a whole and mixed numbers e.g. $5\frac{3}{4}$.**
- Begin to relate fractions to division and find simple fractions such as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{10}$ of numbers or quantities.

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Link Objectives

Year 3

Year 5

- **Recognise unit fractions such as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$ and use them to find fractions of shapes and numbers.**
- Compare familiar fractions: for example know that on the number line one half lies between one quarter and three quarters.
- Begin to recognise simple fractions that are several parts of a whole such as $\frac{3}{4}$, $\frac{2}{3}$ or $\frac{3}{10}$.

- Recognise when two simple fractions are equivalent, including relating hundredths to tenths.
- Change an improper fraction to a mixed number.
- **Relate fractions to division** and use division to find simple fractions including tenths and hundredths of numbers and quantities.

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

- Resource sheet 11.1 (several copies pre-cut)
- Activity sheet 11.1
- OHT 11.1
- OHT 11.2
- OHT 11.3
- OHT 11.4
- Counting stick
- 0–1 number line (unmarked)
- Demonstration-size number lines with halves, thirds, quarters, fifths, sixths, eighths and tenths marked
- Whiteboards
- Linking cubes

(Key objectives in bold)

Planning sheet	Day One	Unit 11 <i>Fractions and decimals</i>	Term: <i>Autumn</i>	Year Group: <i>4</i>
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To recognise unit fractions.</p> <p>VOCABULARY fraction half halves thirds quarters eighths sixths tenths equivalent</p> <p>RESOURCES Counting stick</p>	<ul style="list-style-type: none"> Use a counting stick to assess children's previous understanding of simple fractions. Label one end of counting stick 0 and other end 1. Point to the centre. <p>Q What fraction does this represent?</p> <p>Point to where $\frac{1}{4}$ should be.</p> <p>Q What fraction does this represent?</p> <ul style="list-style-type: none"> Now count in quarters. Now explain that $\frac{1}{2}$ is the same as $\frac{2}{4}$. Now count in tenths. Explain $\frac{1}{2}$, $\frac{2}{4}$, $\frac{5}{10}$ are equivalents. Now count in fifths. <p>Q Can anyone identify other equivalent fractions?</p>	<p>To use fraction notation.</p> <p>To recognise the equivalence of simple fractions.</p> <p>To recognise simple fractions that are several parts of a whole and mixed numbers.</p> <p>VOCABULARY equal parts mixed numbers equivalence</p> <p>RESOURCES 0-1 number line Activity sheet 11.1</p>	<ul style="list-style-type: none"> Give the children, in pairs, an unmarked 0–1 number line and ask them to mark the quarters on it. <p>Q How did you divide your line? How do you know there are four equal parts?</p> <p>Establish that the children fold in half and half again.</p> <p>Stress again that four quarters are equivalent to a whole one and two quarters equivalent to a half. Stress labelling divisions not the portions.</p> <p>Repeat the activity using eighths. Ask questions such as:</p> <p>Q How did you divide up your line this time? Why?</p> <ul style="list-style-type: none"> Establish the equivalences between halves, quarters and eighths and write these on the board, e.g. $\frac{4}{8} = \frac{2}{4} = \frac{1}{2}$. <p>Show on a 0–1 number line (which has been marked) (Activity sheet 11.1) how to mark fifths and then tenths, stressing that the parts are equal. Show the equivalences e.g. $\frac{2}{10}$ and $\frac{1}{5}$. Show the equivalence of other numbers of tenths and fifths and record, e.g. $\frac{4}{10} = \frac{2}{5}$.</p> <p>Using Activity sheet 11.1, ask:</p> <p>Q Can you now mark thirds and sixths and record equivalences?</p> <ul style="list-style-type: none"> Use the counting stick to get children to count from 0 to 10. Point to a position equivalent to $\frac{1}{2}$ and ask children for the value. Repeat for other values. Explain the meaning of mixed numbers. 	<ul style="list-style-type: none"> Draw a 3–5 number line on the board. Ask children to place mixed numbers like $3\frac{1}{2}$, $4\frac{1}{4}$ etc. on the line, explaining their reasoning. Extend to eighths, e.g. $3\frac{3}{8}$, $4\frac{1}{8}$. <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Begin to know the equivalences between halves, quarters and eighths; tenths and fifths; thirds and sixths; Begin to order simple fractions and mixed numbers on a number line. <p>(Refer to supplement of examples, section 6, page 22.)</p>

Planning sheet	Day Two	Unit 11 <i>Fractions and decimals</i>	Term: <i>Autumn</i>	Year Group: <i>4</i>				
Oral and Mental		Main Teaching		Plenary				
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions				
<p>To identify two simple fractions with a total of 1.</p> <p>RESOURCES Demonstration number lines Whiteboards</p>	<ul style="list-style-type: none"> Count forwards and backwards along a number line, marked in eighths, in unison, in pairs and individually. Stop at seven eighths and ask how many more eighths to get to eight eighths or 1. Stop at other points and ask the same question. Use mental imagery to identify two simple fractions with a total of 1. Children to use whiteboards. Draw an empty numberline 0 – 1 and put on $\frac{2}{4}$. <div data-bbox="322 592 725 660" style="border: 1px solid black; padding: 2px;"> <p>Q What fraction do I need to add to $\frac{2}{4}$ to make 1?</p> </div> <div data-bbox="322 676 725 745" style="border: 1px solid black; padding: 2px;"> <p>Q Where would you place $\frac{3}{5}$ on numberline?</p> </div> <p>Establish where 1 is, is the equivalent five fifths.</p> <p>Visualise three fifths.</p> <div data-bbox="322 868 725 936" style="border: 1px solid black; padding: 2px;"> <p>Q What fraction do I need to add to $\frac{3}{5}$ to make 1?</p> </div> <ul style="list-style-type: none"> Repeat with two thirds etc. 	<p>To recognise fractions that are several parts of a whole and mixed numbers.</p> <p>To order simple fractions. Decide whether fractions such as $\frac{3}{8}$ or $\frac{7}{10}$ are greater or less than one half.</p> <p>VOCABULARY mixed numbers greater than, > less than, <</p> <p>RESOURCES Activity sheet 11.1 Resource sheet 11.1 (several copies cut up to make sets of fractions, 1 between 2)</p>	<ul style="list-style-type: none"> Give children a 0–1 number line marked in tenths and ask them to work in pairs to label $\frac{3}{10}$, $\frac{1}{2}$, $\frac{7}{10}$. Ask how they did it. <p>Remind children of yesterday's plenary when they placed mixed numbers on a number line. If necessary go through another example.</p> <p>Use the set of fractions from Resource sheet 11.1, and give to pairs of children. Children place the cards face down. Take turns to select cards randomly and decide whether the fraction is greater than or less than a half. Introduce the symbols > and <.</p> <p>Encourage children to use number lines such as those on Activity sheet 11.1 to aid decisions by marking on them.</p> <p>Record</p> <table border="1" data-bbox="1258 628 1615 783"> <tr> <td style="padding: 2px;">less than (<) $\frac{1}{2}$</td> <td style="padding: 2px;">greater than (>) $\frac{1}{2}$</td> </tr> <tr> <td style="height: 40px;"></td> <td style="height: 40px;"></td> </tr> </table> <ul style="list-style-type: none"> Ask questions such as: <div data-bbox="1115 863 1789 906" style="border: 1px solid black; padding: 2px;"> <p>Q Where did you place $\frac{3}{10}$? How do you know $\frac{3}{10} < \frac{1}{2}$?</p> </div> <div data-bbox="1115 927 1789 970" style="border: 1px solid black; padding: 2px;"> <p>Q Can you explain how you know $\frac{3}{4} > \frac{1}{2}$?</p> </div>	less than (<) $\frac{1}{2}$	greater than (>) $\frac{1}{2}$			<ul style="list-style-type: none"> Ask children to look at their number lines and use these to answer questions such as: <div data-bbox="1830 379 2181 443" style="border: 1px solid black; padding: 2px;"> <p>Q Tell me a fraction between $\frac{1}{2}$ and 1. Between 2 and $2\frac{1}{2}$ etc.</p> </div> <ul style="list-style-type: none"> Ask children to draw a picture or diagram to show $\frac{1}{2}$. Discuss results e.g. <div data-bbox="1854 560 2181 651">  </div> <ul style="list-style-type: none"> Tell the children that \square represents 1. What will $3\frac{1}{2}$ look like? <div data-bbox="1830 762 2181 805" style="border: 1px solid black; padding: 2px;"> <p>Q What will $2\frac{1}{2}$ look like?</p> </div> <p>HOMEWORK – Ask children to draw diagrams to show $5\frac{1}{4}$, $\frac{3}{4}$, $\frac{2}{3}$, $1\frac{1}{3}$ and $2\frac{1}{4}$.</p> <div data-bbox="1830 970 2181 1294" style="border: 1px solid black; padding: 5px;"> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Begin to identify pairs of simple fractions with a total of 1; Be able to order familiar fractions and mixed numbers. <p>(Refer to supplement of examples, section 6, page 22.)</p> </div>
less than (<) $\frac{1}{2}$	greater than (>) $\frac{1}{2}$							

Planning sheet	Day Three	Unit 11 <i>Fractions and decimals</i>	Term: <i>Autumn</i>	Year Group: <i>4</i>														
Oral and Mental		Main Teaching		Plenary														
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions														
<p>To recognise equivalents of simple fractions.</p> <p>RESOURCES Linking cubes</p>	<ul style="list-style-type: none"> Ask the children to each make a sample linked cube shape, with half one colour and half another. <p>Ask questions like:</p> <div data-bbox="315 411 723 459" style="border: 1px solid black; padding: 2px;"> <p>Q How many cubes did you use?</p> </div> <p>Establish that a half can be represented by 3 out of 6, 5 out of 10 etc.</p> <p>Record these on the board as $\frac{3}{6}$, $\frac{5}{10}$ etc. to set up the family of equivalent fractions.</p> <div data-bbox="315 624 723 691" style="border: 1px solid black; padding: 2px;"> <p>Q Did anyone use an odd number of cubes? Why not?</p> </div> <p>Extend to other equivalents.</p>	<p>To find simple fractions of quantities.</p> <p>To recognise equivalents of simple fractions.</p> <p>VOCABULARY equivalence multiples denominator numerator</p> <p>RESOURCES OHT 11.2 OHT 11.3</p>	<ul style="list-style-type: none"> Discuss homework. Ask some children to draw their diagrams on the board – but try to look at everybody's. Use the diagrams to assess understanding of $\frac{2}{3}$ and $2\frac{1}{2}$. Ask questions such as: <div data-bbox="1115 379 1794 427" style="border: 1px solid black; padding: 2px;"> <p>Q Does your diagram include parts of the whole?</p> </div> <div data-bbox="1115 443 1794 491" style="border: 1px solid black; padding: 2px;"> <p>Q Does your diagram show fractions of quantities?</p> </div> <div data-bbox="1115 507 1794 555" style="border: 1px solid black; padding: 2px;"> <p>Q Does your diagram show positions on a number line?</p> </div> <p>Ask the children to hold up the pictures they drew for homework to represent $5\frac{1}{4}$, $\frac{3}{4}$, $\frac{2}{3}$, $1\frac{1}{3}$, and $2\frac{1}{4}$. Check their work and correct any misinterpretations. Quickly display some examples and discuss why they are correct or not.</p> <ul style="list-style-type: none"> Ask the children to choose an appropriate number of cubes to make a shape with $\frac{3}{4}$ one colour, $\frac{1}{4}$ another colour. Discuss results and record fractions equivalent to $\frac{3}{4}$ and $\frac{1}{4}$. <div data-bbox="1115 762 1794 810" style="border: 1px solid black; padding: 2px;"> <p>Q Is it possible to use 9 cubes, 10 cubes? Why not?</p> </div> <p>Establish that you would need multiples of 4.</p> <ul style="list-style-type: none"> Introduce thirds by asking the class to make a shape using 12 cubes, one third in one colour and $\frac{2}{3}$ in another colour. Discuss and record equivalent fractions, as above. <p>Draw this diagram on the board and invite children to shade $\frac{2}{3}$ of the shape.</p> <div data-bbox="1328 1007 1666 1082" style="border: 1px solid black; width: 150px; height: 47px; margin: 0 auto;"> <table border="1" style="width: 100%; height: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%;"></td> <td style="width: 33%;"></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> </div> <div data-bbox="1115 1114 1794 1161" style="border: 1px solid black; padding: 2px;"> <p>Q Are there other ways we can shade $\frac{2}{3}$ of this shape?</p> </div> <p>Children record 3 different shadings of their own for $\frac{2}{3}$.</p> <p>Show OHT 11.2</p> <div data-bbox="1328 1219 1666 1294" style="border: 1px solid black; width: 150px; height: 47px; margin: 0 auto;"> <table border="1" style="width: 100%; height: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table> </div> <p>Ask what fraction of this shape can we shade? Get children to demonstrate their answers. Discuss some of the answers to correct any mistakes and repeat with other grids.</p> <p>Establish equivalence between $\frac{2}{8} = \frac{1}{4}$ etc.</p> <p>Use OHT 11.3 to show and write other fractions.</p>															<ul style="list-style-type: none"> Ask <div data-bbox="1832 331 2184 419" style="border: 1px solid black; padding: 2px;"> <p>Q What is $\frac{1}{4}$ of 20 cubes? $\frac{1}{10}$ of 20 cubes? etc.</p> </div> <div data-bbox="1832 435 2184 483" style="border: 1px solid black; padding: 2px;"> <p>Q How do you find $\frac{1}{4}$ of 20?</p> </div> <p>Draw out the relationship between the denominator and the number of cubes.</p> <div data-bbox="1832 627 2184 938" style="border: 1px solid black; padding: 5px;"> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Find fractions of simple shapes; Calculate simple fractions of quantities; Recognise equivalence of simple fractions. <p>(Refer to supplement of examples, section 6, page 24.)</p> </div>

Planning sheet	Day Four	Unit 11 <i>Fractions and decimals</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To begin to relate fractions to division.</p> <p>RESOURCES OHT 11.4 Whiteboards</p>	<ul style="list-style-type: none"> Show OHT 11.4. Using the number 30 ask for $\frac{1}{3}$ of 30, $\frac{1}{2}$ of 30, $\frac{1}{5}$ of 30. Ask if the children can find other fractions of 30. Collect answers. In pairs ask children to pick a number from the OHT and on whiteboards find different fractions of their chosen number. <p>For example; children could set out their work like this:</p> <div style="text-align: center;"> </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Q Have you found all the fractions which produce positive integers?</p> </div> <p>Ask children how they worked some of them out.</p>	<p>To begin to relate fractions to division and find simple fractions such as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{10}$ of numbers or quantities.</p> <p>RESOURCES OHT 11.4</p>	<ul style="list-style-type: none"> Ask children to explain how they know that: $\frac{1}{3}$ of 30 = 10 <p>Link to division $30 \div 3 = 10$ and multiplication $3 \times 10 = 30$</p> <p>Establish that to find:</p> <p>$\frac{1}{2} \rightarrow$ divide by 2 $\frac{1}{3} \rightarrow$ divide by 3 $\frac{1}{4} \rightarrow$ divide by 4</p> <p>Practise simple examples and record as</p> <p>$\frac{1}{2}$ of 50p = 25p and $2 \times 25p = 50p$</p> <p>Ask:</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Q How can we find $\frac{2}{3}$ of 30?</p> </div> <p>If we know that $\frac{1}{3}$ of 30 = 10 then $\frac{2}{3}$ of 30 = 20</p> <ul style="list-style-type: none"> Illustrate with other examples: find $\frac{3}{10}$ of £50 $\frac{1}{10}$ of £50 = $50 \div 10 = £5$ then then $\frac{3}{10}$ of £50 = $5 \times 3 = £15$ <p>Work through other examples: find $\frac{5}{6}$ of 42.</p> <p>We know $\frac{1}{6}$ of 42 = $42 \div 6 = 7$ $\frac{5}{6}$ of 42 = $7 \times 5 = 35$</p> <p>Set children questions to work through in pairs. Collect responses and share results.</p>	<ul style="list-style-type: none"> Return to OHT 11.4. Pick a number e.g.60. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Q How do we find $\frac{1}{5}$ of 60?</p> </div> <p>Establish $60 \div 5 = 12$ So $\frac{1}{5}$ of 60 is 12</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Q How do we find $\frac{3}{5}$ of 60?</p> </div> <p>Establish 12×3. So $\frac{3}{5}$ of 60 = 36</p> <p>In pairs children choose a number from OHT 11.4 and ask each other to find fractions of that quantity.</p> <ul style="list-style-type: none"> Share any interesting or difficult questions asked and discuss solutions. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Begin to calculate fractions of numbers and quantities, e.g. $\frac{1}{2}$ of 36, $\frac{2}{3}$ of £90. <p>(Refer to supplement of examples, section 6, page 24.)</p> </div>

Planning sheet	Day Five	Unit 11 <i>Fractions and decimals</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To decide whether fractions are greater or less than one half.</p> <p>VOCABULARY greater than > less than <</p> <p>RESOURCES Number lines Linking cubes OHT 11.1</p>	<ul style="list-style-type: none"> Show the class OHT 11.1. Pick a fraction and ask children to say whether it is bigger or smaller than $\frac{1}{2}$. Repeat. <p>Pick other fractions to compare with $\frac{1}{2}$. Remind class of the meaning of the symbols > and <. Record the answers using the symbols > and <. Get children to explain their answers making reference to a number line or using linking cubes.</p>	<p>To find simple fractions such as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$ of numbers or quantities.</p> <p>To relate this to solving word problems.</p>	<ul style="list-style-type: none"> Remind children how to relate fractions to division. For example $\frac{1}{2} \rightarrow$ divide by 2: $\frac{1}{3} \rightarrow$ divide by 3 etc. <p>Set the following problem:</p> <p style="padding-left: 40px;">There are 300 children in Townsville School; $\frac{4}{5}$ of the children went on a school trip. How many children went on the school trip?</p> <p>Allow time for the children to solve the problem and discuss solutions. Draw class together and work through some similar problems.</p> <ul style="list-style-type: none"> Return to the relationship between fractions and division. <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Q What is $\frac{1}{5}$ of 15, 20, 30?</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Q Find $\frac{2}{5}$ of 100cm.</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Q What is $\frac{2}{3}$ of 60p?</div> <p>Set the following problem:</p> <p style="padding-left: 40px;">Peter had 48 cars. He gave away $\frac{3}{4}$ of them. How many had he left?</p> <p>Demonstrate for the children how to record different solutions, e.g.</p> <p style="padding-left: 80px;">$\frac{1}{4}$ of 48 cars = 12 cars $\frac{3}{4}$ of 48 cars = $3 \times 12 = 36$ cars 48 – 36 = 12 cars left</p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Q If Peter gave away $\frac{3}{4}$ what fraction has he kept?</div> <p>Record Peter has $\frac{1}{4}$ left.</p> <p style="padding-left: 40px;">$\frac{1}{4}$ of 48 cars = 12 cars</p> <p>Compare 2 methods.</p> <p>Establish that the children can use their knowledge of totalling fractions to 1 to help solve problems.</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Q Which is greater: $\frac{2}{3}$ of £90 or $\frac{3}{5}$ of £100?</div> <p>Establish</p> <p style="padding-left: 40px;">$\frac{1}{3}$ of £90 is £30 so $\frac{2}{3}$ of £90 is £60 $\frac{1}{5}$ of £100 is £20 so $\frac{3}{5}$ of £100 is £60</p> <p>and work through other examples such as:</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Q Which would you prefer to receive as pocket money each month – $\frac{5}{6}$ of £24 or $\frac{3}{7}$ of £49?</div> <div style="border: 1px solid black; padding: 5px;"> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Say which of $\frac{3}{4}$, $\frac{1}{3}$, $\frac{5}{8}$, $\frac{2}{3}$, $\frac{3}{10}$ are greater than one half; Calculate mentally, simple fractions of numbers or quantities. <p>(Refer to supplement of examples, section 6, page 22-24.)</p> </div>

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

15	12	20	10
16	100	30	40
50	18	60	8