

Unit 5 part 1

Fractions, decimals and percentages

Five daily lessons

National
Numeracy Strategy

Year 6
Spring term

Unit Objectives Year 6

- Order fractions by converting them to fractions with a common denominator, and position them on a number line.
- **Use a fraction as an 'operator' to find fractions of numbers or quantities.**
- Change a fraction to the equivalent mixed number.
- Begin to convert a fraction to decimal using division.
- Express simple fractions as percentages.
- **Find simple percentages of small whole number quantities.**
- Develop calculator skills and use a calculator effectively.

Page 23

Page 25

Page 23

Page 31

Page 33

Page 33

Page 71

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 5pt.1.1
- Whiteboards
- Counting stick
- OHP calculator
- Calculators
- Related Key Stage 2 National test questions

Link Objectives

Year 5

Year 7

- Order a set of fractions and position them on a number line.
- **Relate fractions to division**, and use division to find simple fractions of numbers and quantities.
- **Relate fractions to their decimal representations.**
- Begin to understand percentage as the number of parts in every 100.

- Use fraction notation to describe parts of shapes and to express a smaller whole number as a fraction of a larger one.
- **Recognise the equivalence of percentages, fractions and decimals.**

(Key objectives in bold)

department for
education and skills

Planning sheet	Day One	Unit 5pt.1 <i>Fractions, decimals and percentages</i>	Term: <i>Spring</i>	Year Group: 6
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>Know simple fractions as percentages/ decimals.</p> <p>RESOURCES Counting stick</p>	<ul style="list-style-type: none"> Use the counting stick marked from 0 to 1. Point to a division and ask what fraction is this? Repeat asking for values as decimals and percentages. Then ask questions like: <div> <p>Q If this is $\frac{1}{4}$ what is that as a decimal/percentage?</p> <p>Q If this is $\frac{1}{5}$ what is that as a decimal/percentage?</p> </div> Write the number 400 on the board. Ask children for $\frac{1}{2}$ of 400, $\frac{1}{4}$ of 400 and then 50%, 25% of 400. Link these to 0.5×400, 0.25×400 and repeat with $\frac{1}{5}$ and $\frac{1}{10}$. 	<p>Begin to convert fractions to decimals using division.</p> <p>Develop calculator skills and use a calculator effectively.</p> <p>VOCABULARY ascending numerator denominator equivalent</p> <p>RESOURCES Calculators OHP calculator</p>	<ul style="list-style-type: none"> Write these fractions on the board: $\frac{1}{10}$, $\frac{1}{5}$, $\frac{4}{10}$, $\frac{5}{6}$, $\frac{9}{16}$. <div> <p>Q Which fraction is bigger than $\frac{3}{5}$ and why?</p> </div> <p>Establish that $\frac{1}{10}$, $\frac{1}{5}$ and $\frac{4}{10}$ are smaller than $\frac{3}{5}$.</p> <div> <p>Q How could we compare the size of $\frac{4}{10}$ and $\frac{3}{5}$?</p> </div> Remind the children that tenths are easy to convert to decimals and $\frac{1}{10} = 0.1$, $\frac{4}{10} = 0.4$. <div> <p>Q What is $\frac{1}{5}$ in tenths?</p> </div> <p>Establish it is $\frac{2}{10}$ and $\frac{2}{10} = 0.2$.</p> Use an OHP calculator and demonstrate how to convert $\frac{1}{5}$ to a decimal using division. Get the children to convert $\frac{1}{10}$, $\frac{4}{10}$, $\frac{3}{5}$ with their calculators. <div> <p>Q How does this help us to compare fractions?</p> </div> Ask the children to convert $\frac{5}{6}$ and $\frac{9}{16}$ to decimals and write the answers on the board. Establish that $\frac{9}{16}$ is smaller than $\frac{3}{5}$. Write the five fractions in order of size, smallest first. Write $\frac{6}{7}$ and $\frac{5}{6}$ on the board. Get children to convert them to decimals and discuss the calculator displays. Remind the children the answer on the display is only part of the decimal representation. Order the two fractions. Give the children groups of fractions and ask them to convert them to decimals and then order them, e.g. $\frac{2}{7}$, $\frac{1}{5}$, $\frac{3}{8}$. Collect answers and correct errors. 	<ul style="list-style-type: none"> Write $\frac{5}{11}$ on the board. Invite children to write a fraction on the board that they think is smaller than $\frac{5}{11}$. <div> <p>Q Is this correct? How do you know?</p> </div> <p>Check whether they are right by using the OHP calculator. Repeat with another fraction and ask for bigger and smaller fractions.</p> Write $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{6}$, $\frac{1}{4}$ on the board. Ask the children to sort them in ascending order. <div> <p>Q What is the correct order? Did you use a calculator; if you didn't how did you do it?</p> </div> Ask the children to think of four fractions that they would not need a calculator to help sort. Take responses. <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Enter fractions into a calculator and interpret the display to find the equivalent decimal; Predict the result before confirming; Use a calculator to compare fractions. <p>(Refer to supplement of examples, section 6, page 31.)</p>

Planning sheet	Day Two	Unit 5pt.1 <i>Fractions, decimals and percentages</i>	Term: <i>Spring</i>	Year Group: 6
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
Order fractions.	<ul style="list-style-type: none"> Shuffle the fraction cards on Resource sheet 5pt.1.1. Choose four cards at random and ask four children to come out and hold up the cards. Ask the class to put the 'fraction children' in order. Shuffle the pack and repeat this with four other cards. If two cards show the equivalent fractions, get the children to identify these and select another card. 	<p>Order fractions by converting them to a common denominator and position them on a number line.</p> <p>Develop calculator skills and use a calculator effectively.</p> <p>VOCABULARY common denominator numerator denominator</p> <p>RESOURCES OHP calculator Calculators</p>	<ul style="list-style-type: none"> Write on the board: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{6}$. <div>Q How can we put these fractions in order without using a calculator?</div> <p>Ask children for: $\frac{1}{2}$ of 600, $\frac{1}{3}$ of 600 and $\frac{1}{6}$ of 600.</p> <p>Write these in brackets under the fractions and use the numbers 300, 200, 100 to order the fractions.</p> <p>Get children to confirm the answers using calculators to convert the fractions to decimals.</p> <ul style="list-style-type: none"> Write a number line on the board: <div> $0 \quad \left \quad \frac{1}{6} \quad \frac{2}{6} \quad \frac{3}{6} \quad \frac{4}{6} \quad \frac{5}{6} \quad \right \quad 1$ </div> <div>Q Where would $\frac{1}{2}$ be? Where would $\frac{1}{3}$ be? Why?</div> <p>Establish that $\frac{2}{6} = \frac{1}{3}$ and $\frac{1}{2} = \frac{3}{6}$ and check using the calculator.</p> <ul style="list-style-type: none"> Emphasise that it is easier to order $\frac{3}{6}$, $\frac{2}{6}$ and $\frac{1}{6}$ which have a common denominator. Discuss with the children the term common denominator. Give the children groups of fractions to order from smallest to largest by converting all to tenths, and position on a number line e.g. $\frac{3}{10}$, $\frac{2}{5}$, $\frac{1}{2}$, $\frac{7}{10}$, $\frac{4}{5}$. Discuss their answers and methods. Repeat giving children other sets of fractions to convert to a common denominator and sort in order. Collect answers and correct errors. 	<ul style="list-style-type: none"> Remind the children that a fraction can be changed by multiplying/dividing both the numerator and denominator by the same number. Write $\frac{30}{60}$ on the board and ask children to give equivalents by multiplying and dividing. <div>Q Are $\frac{12}{18}$, $\frac{16}{24}$, $\frac{40}{90}$, $\frac{10}{15}$ equivalent?</div> <p>Ask children the numbers to divide the numerators and denominators by and convert each fraction to $\frac{2}{3}$.</p> <p>HOMEWORK – Give the children the following nine fractions:</p> <p>$\frac{16}{20}$, $\frac{6}{10}$, $\frac{20}{25}$, $\frac{25}{100}$, $\frac{15}{25}$, $\frac{5}{20}$, $\frac{24}{40}$, $\frac{15}{60}$, $\frac{80}{100}$.</p> <p>Say these fractions form three sets of equivalent fractions. Ask the children to put the fractions in the sets.</p> <div> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Recognise that: <ul style="list-style-type: none"> a fraction can be reduced to an equivalent fraction by dividing both numerator and denominator by the same number; a fraction can be changed to an equivalent fraction by multiplying both numerator and denominator by the same number; Compare and order simple fractions by converting them to a common denominator. <p>(Refer to supplement of examples, section 6, page 23.)</p> </div>

RESOURCES
Resource sheet 5pt.1.1

Planning sheet	Day Three	Unit 5pt.1 <i>Fractions, decimals and percentages</i>	Term: <i>Spring</i>	Year Group: 6
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
Find halves of decimals with an even last digit.	<ul style="list-style-type: none"> Ask the children a range of questions such as: <div> Q What is half of 4.8? Q What is 0.78 divided by 2? Q What number would you double to get 0.12? </div> <p>Children write answers on whiteboards.</p> <ul style="list-style-type: none"> Discuss the children's answers and their strategies. On the board write: <div>0.48</div> <p>Ask children to halve this. Write the answer under 0.48 and ask for half this. Repeat to form</p> <div> 0.48 0.24 0.12 0.06 0.03 </div> <div>Q What is the next number?</div> <p>Establish it is 0.015. Point to two numbers in the list and for the larger ask</p> <div>Q What would you divide this by to get the smaller number?</div> 	<p>Use a fraction as an operator to find fractions of numbers and quantities.</p> <p>VOCABULARY denominator numerator</p>	<ul style="list-style-type: none"> Write £300 on the board. Say $\frac{2}{5}$ of this goes on food, $\frac{3}{10}$ goes on rent, the rest is for spending. How much is there to spend? <p>Establish that finding $\frac{1}{5}$ of £300 means divide by 5 to get £60, $\frac{2}{5}$ means $2 \times £60 = £120$. Work through the rest of the problem.</p> <p>Give the children this problem. A giant bar of chocolate is 600 cm long. Gemma has $\frac{1}{5}$th of the bar, John has $\frac{2}{10}$ths. How much is left? Allow the children to work in pairs to solve the problem.</p> <div>Q How did you find the answer?</div> Work through similar problems. Collect answers and establish that to find a fraction of a quantity divide by the denominator and multiply by the numerator. Pose the problems: <p>Jug A when full holds 1 litre Jug B when full holds 75ml</p> <p>Jug A is $\frac{11}{20}$ full. Jug B is $\frac{5}{6}$ full.</p> <p>Which has more liquid in it?</p> <p>Collect answers and discuss the children's methods.</p> 	<ul style="list-style-type: none"> Write 120km on the board. Ask children to work out $\frac{1}{12}$ of 120km, $\frac{7}{12}$ of 120km in their heads. <div>Q What other fractions of 120km can you work out in your heads?</div> <p>Repeat with 450kg. Ask children to work out $\frac{1}{9}$ of 450kg, $\frac{7}{9}$ etc.. Remind children of the division and multiplication method.</p> <div> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Find fractions of numbers and quantities. <p>(Refer to supplement of examples, section 6, page 25.)</p> </div>
RESOURCES Whiteboards				

Planning sheet	Day Four	Unit 5pt.1 <i>Fractions, decimals and percentages</i>	Term: <i>Spring</i>	Year Group: 6
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
Find simple percentages.	<ul style="list-style-type: none"> Give children a range of percentage questions like: <div>Q What is 50% of £100. What is 70% of 100cm?</div> Children write their answers on whiteboards. Discuss the children's answers and methods. Write 600m on the board. <div>Q What is 10% of 600m?</div> <p>Write on the board:</p> <p style="text-align: right;">10% is 60m</p> <p>Extend by asking 5% is?</p> <p style="text-align: right;">2.5% is?</p> <p>Use these to build up other percentages such as 35%.</p> <div>Q What is 27.5% of 600m?</div>	<p>Change a fraction to an equivalent mixed number.</p> <p>Use a fraction as an operator to find fractions of numbers and quantities.</p> <p>VOCABULARY denominator numerator common denominator improper fraction mixed number</p> <p>RESOURCES Calculators</p>	<ul style="list-style-type: none"> Discuss the homework with the children. <div>Q Which would you rather have: $\frac{3}{5}$ of £10 or $\frac{2}{3}$ of £12?</div> Children discuss the problem in pairs. Ask the children how they worked it out. Say: A bar of chocolate costs $2\frac{1}{2}$ times more than it did 10 years ago. If it cost 20p then what does it cost now? Work through the problem with the children; record <p>$2 \times 20p = 40p$ $\frac{1}{2} \times 20p = 10p$ Cost now is: $40p + 10p = 50p$</p> Give similar questions to children. Collect answers and correct errors. Remind children that $3\frac{1}{5}$ is called a mixed number. <div>Q How many fifths in 3?</div> <p>Establish that there are 5 fifths in 1 so there are 15 in 3, and $3\frac{1}{5}$ is $\frac{16}{5}$. Say this is an improper fraction. Give children other mixed numbers to convert, and change improper fractions back to mixed numbers.</p> <div>Q What is $2\frac{1}{3}$ as an improper fraction?</div> <p>Establish $2\frac{1}{3} = \frac{7}{3}$. Ask children to find $2\frac{1}{3}$ of 225m, using calculators. Compare $2 \times 225 + \frac{1}{3} \times 225$ with $7 \times (225 \div 3)$. Explain that these two methods give the same answer.</p>	<ul style="list-style-type: none"> <div>Q What is $2\frac{4}{5}$ of 1 litre?</div> <p>With the children convert this to $\frac{14}{5}$ of 1 000ml and use calculators to find the answer.</p> Give the children questions to assess their understanding of the vocabulary of fractions. Ask what these words mean: <p>numerator denominator common denominator improper fraction mixed number.</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Find fractions of numbers and quantities. <p>(Refer to supplement of examples, section 6, page 25.)</p>

RESOURCES
Whiteboards

Planning sheet	Day Five	Unit 5pt.1 <i>Fractions, decimals and percentages</i>	Term: <i>Spring</i>	Year Group: 6
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
Find simple percentages.	<ul style="list-style-type: none"> Write on the board the price of five items from a shop, e.g. £7.80. Tell the children that it's 'sale' day and the prices have been reduced by 10%. <div> Q What would 10% of each price be? Q What would the new price be? </div> <p>Children record their answers on whiteboards.</p> <div> Q If 10% of the cost of an item is 40p, what is the original cost? </div>	<p>Express simple fractions as decimals and percentages.</p> <p>Find simple percentages of whole number quantities.</p> <p>Develop calculator skills and use a calculator effectively.</p>	<ul style="list-style-type: none"> Draw three number lines on the board: <div> $0 \text{ --- } 1$ $0 \text{ --- } 1$ $0 \text{ --- } 100\%$ </div> <p>Explain that the first line represents fractions, the second line decimals and the third percentages. Point to a fraction on the first line e.g. $\frac{1}{4}$. Ask children to mark the equivalents in decimals and percentages. Repeat for other fractions, and start with a decimal and a percentage.</p> <div> Q What is 10% of 300? </div> <p>Establish the answer is 30. Ask children to find 5%, 20%, 30% etc in their heads.</p> <ul style="list-style-type: none"> Demonstrate how to find 35% of 300 on an OHP calculator. <div> $300 \times 35 \%$ </div> <div> Q How can we find 6% of 300? </div> <p>Get children to do this on their calculators.</p> <p>Remind children that 10% of 300 is 30 and 5% is 15 so 6% should be a bit more. Ask how they would find an estimate for 27% of 300. Get children to find 27% of 300 on their calculators.</p> Write the following on the board: <div> <div> 70% 10% 45% 25% 2% 60% </div> <div> 15% 35% 5% </div> </div> <div> 465 130 275 615 240 760 520 320 1440 </div> <p>The children have to choose a percentage from the first circle and a number from the second and work out the answer with a calculator or in their heads.</p> <p>Collect answers and discuss methods and estimates.</p> 	<ul style="list-style-type: none"> Ask the children for examples of questions where they used a calculator. Write them on the board. <div> Q Can anyone think of ways we could do these mentally? </div> Write 420 on the board. Ask children what percentages they can find in their heads. List these and discuss the methods the children use. <div> Q When would you use a calculator? </div> <p>Take feedback.</p> <div> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Without a calculator answer questions such as: find 25% of 300; With a calculator answer questions such as: find 20% of £362. <p>(Refer to supplement of examples, section 6, page 33.)</p> </div>
RESOURCES Whiteboards		VOCABULARY equivalent percentages RESOURCES Calculators OHP calculator		