National
Numeracy *Strategy*

Unit 4
Fractions, decimals and percentages

Year 5
Summer term

This Unit Plan is designed to guide your teaching.
You will need to adapt it to meet the needs of your class.

Unit Objectives

Year 5

- **Relate fractions to division**, and use division to find simple fractions, including tenths and hundredths of numbers and quantities.   Page 25
- **Relate fractions to their decimal representation: that is recognise the equivalence between the decimal and fraction forms of one half, one quarter, three quarters and tenths and hundredths.**   Page 31
- Begin to understand percentage as the number of parts in every 100 and find simple percentages of small whole-number quantities. Express one half, one quarter, three quarters and tenths and hundredths, as percentages.   Page 33

Resources needed to teach this unit:

- OHT 4.1
- OHP calculator
- Calculators
- A range of dice 1–6, 1–8 or 1–12
- Whiteboards

Link Objectives

Year 4

- Begin to relate fractions to division and find simple fractions such as $1/2$, $1/3$, $1/4$, $1/5$, $1/10$ of numbers or quantities.
- Recognise the equivalence between the decimal and fraction forms of one half and one quarter, and tenths such as 0.3.
- Understand decimal notation and place value for tenths and hundredths and use it in context.

Year 6

- Recognise the equivalence between the decimal and fraction forms of one half, one quarter, three quarters, one eighth and tenths, hundredths and thousandths (e.g. $700/1000 = 70/100 = 7/10 = 0.7$).
- Begin to convert a fraction to a decimal using division.
- **Understand percentage as the number of parts in every 100.**
- Express simple fractions such as one half, one quarter, three quarters, one third, two thirds, and tenths and hundredths, as percentages, (e.g. know that $1/3 = 33^1/3\%$).

(Key objectives in bold)

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Planning sheet	Day One	Unit 4 *Fractions, decimals and percentages*	Term: *Summer*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and vocabulary	**Teaching Activities**	**Objectives and vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Find fractions of numbers of quantities.	• Ask the children to find half then quarter of numbers (two-digit then three-digit numbers) and write the answers on a whiteboard. **Q** What strategies did you use to answer the questions? • Move on to finding half and a quarter of quantities, e.g. cm, km, kg. **Q** What strategies did you use to answer the questions? • A roll of ribbon is 2 m. If I use 58 cm of ribbon, what fraction have I used? What fraction is left? • Shade more rectangles so that exactly half of the shape is shaded. • A cup holds 250 ml of liquid. A bottle holds 500 ml, i.e. What fraction of the bottle does the cup hold? What fraction of the cup does the bottle hold?	Relate fractions to division and use division to find simple fractions including tenths and hundredths of numbers and quantities.	• Using two-digit numbers the children find simple fractions, e.g. tenths and hundredths, drawing on experiences of finding half and quarter and relating to division, e.g. $\frac{1}{4}$ of 28 = 7. **Q** Who could say this as a division calculation? Can you explain why? Extend to $\frac{3}{4}$ of 28 is equal to three lots of one quarter of 28. **Q** Who could say this as a division calculation? • Write a range of simple fractions on the board, e.g. $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{100}$ and ask the children to choose from 32, 48, 96 or 88 and find as many fractions as they can of that number. **Q** How can we find $\frac{3}{4}$ of 36 g? • Give the children problems involving quantities like these: What fraction of £1 is 33p? What fraction of 1 m is 20 cm? What fraction of 1 kg is 300 g? What fraction of a day is 8 hours? • Tell the children Shahed had £15. He gave $\frac{2}{3}$ to charity. Ask how much did he give? How much did he have left? • Give the children the number sentence; $\frac{7}{10}$ of 100 = 70 make up their own word problem. • Tell the class a regular bottle of juice holds 600 ml. A large bottle of juice holds $\frac{1}{4}$ more. **Q** How much will the large bottle of juice hold? Discuss. **Q** What fraction of the large bottle is the regular bottle? What fraction of the regular bottle is the large bottle?	**Q** Would you rather have $\frac{1}{2}$ a bag of sweets or $\frac{6}{10}$? • Ask the children to explain why. **Q** Would you rather have $\frac{3}{6}$ of the bag of sweets or $\frac{1}{2}$? HOMEWORK – Ask the children to write down three fraction problems like the ones above and be able to explain the answers to the class. Match each box to the correct number and make your own. | $\frac{1}{2}$ of 50	20
	25
$\frac{1}{3}$ of 120	30
	35
	40
$\frac{3}{10}$ of 100	45
	50
?	55	 **By the end of the lesson, the children should be able to:** • **Relate fractions to division;** • **Find fractions of numbers and quantities.** (Refer to supplement of examples, section 6, page 25.)
RESOURCES Whiteboards				

Planning sheet	Day Two	Unit 4 *Fractions, decimals and percentages*		Term: *Summer*	Year Group: *5*
Oral and Mental		**Main Teaching**			**Plenary**
Objectives and vocabulary	**Teaching Activities**	**Objectives and vocabulary**	**Teaching Activities**		**Teaching Activities/Focus Questions**
Know simple fractions as percentages.	• Split the class into two groups. Choose a child from the first group to say a simple fraction, e.g. ½, ¼, ¾ etc. The other group have to shout out the percentage equivalent. • Repeat this and then alter the game by picking a child from the percentage group to say a percentage. The fraction group have to shout out the fraction equivalent. Q Which fractions have difficult percentage equivalents? Q Give me a percentage between 50–100%, what is the decimal equivalent? What is the fraction equivalent? Q Give me a percentage above 100% What is the fraction and decimal equivalent? Q Write $^4/_{10}$ as: - an equivalent fraction - a decimal - a percentage	Relate fractions to their decimal representations.	• Discuss the homework. Select a few of the problems to discuss with the class. Write 0.5, 0.25, 0.75, 0.1, $^1/_2$, $^1/_4$, $^3/_4$, $^1/_{10}$ randomly on the board and ask the children to discuss in pairs which are equivalent. Q Can you explain how you worked out which were equivalent? • Draw a number line on the board and ask children to write the fractions and decimals on it. Q Who could now say the percentage equivalents? 0 1 Using an OHP calculator ask a child to put into the calculator 1 ÷ 4, etc. Explain that you have used the calculator to convert ¼ into a decimal equivalent to –0.25. • Play the 'three in a row' game. A child chooses two numbers (generate the numbers by using the different dice) and makes a fraction, uses a calculator to convert to a decimal and places above 0 to 1 number line. Each child places 5 decimals on the line and the fraction equivalent below the line.		• Ask probing questions such as: Q I have 0.75 on my calculator. What division did I key in? Q Could I key in any other numbers to get to this answer? Q Did anyone get any displays that were unusual, e.g. $^1/_3$ = 0.33333333? Q What does this mean? Q Did you find any more recurring decimals, etc? **By the end of the lesson the children should be able to:** • **Enter fractions into a calculator and interpret the display to find the equivalent decimal.** (Refer to supplement of examples, section 6, page 31.)
		VOCABULARY equivalent decimal fractions decimal point numerator denominator			
VOCABULARY percentages equivalents		RESOURCES Calculators OHP calculator Dice 1–6, 1–8, 1–12			

Planning sheet	Day Three	Unit 4 *Fractions, decimals and percentages*		Term: *Summer*	Year Group: *5*
Oral and Mental		**Main Teaching**			**Plenary**
Objectives and vocabulary	Teaching Activities	Objectives and vocabulary	Teaching Activities		Teaching Activities/Focus Questions
Find simple percentages of small whole number quantities.	• Ask the children to work out in their heads: 25% of £100 10% of £40 30% of £1 10% of 5 kg 70% of 100 cm 10 of 3 m **Q** What is 10% of £1? **Q** What other percentage of £1 can you work out now you know that 10% of £1 equals 10p? • Ask the children to work out 20%, 30%, 50%, 90%, 5%, 15%, etc.	Relate fractions to division and their decimal representations.	• Display OHT 4.1, point to a number on the grid. **Q** What fraction of 100 is this number? Cover half of the number square. **Q** What fraction of 100 has been covered? Ensure that the children say $^1/_2$ as well as $^{50}/_{100}$. • Use an OHP calculator to show how to find half of 1. Cover up ten squares. **Q** What fraction of 100 is this? Ensure children say $^1/_{10}$ as well as $^{10}/_{100}$. Demonstrate how to find $^1/_{10}$ of 1 on the OHP calculator. Establish that $^1/_{10}$ = $^{10}/_{100}$ = 0.1. Repeat. • Ask children to come out and show fractions and their decimal equivalents on the number square and the OHP calculator. The children then work in pairs. One child says a fraction of 100 and the other child has to find a decimal equivalent using a calculator. • Use a calculator for the following: **Q** Haseem has £13.50 to share between 15 people for drinks in a café. What fraction of the money would each person receive? How much money would each person receive? Discuss that 13.5 in a calculator display means £13.50 in the context of money. Discuss 0.9 is $^9/_{10}$ or $^{90}/_{100}$ of £1 which is 90p. So 0.9 → 90p.		**Q** Can you tell me two fractions that are the same as 0.2? **Q** Are there any other decimals that have fractions that are both fifths and tenths? **Q** You have been using your calculator to find an answer. The answer on the display reads 3.6. What might this mean? **Q** What would you prefer, three pizzas shared between four people or six pizzas shared between ten people. HOMEWORK – Ask the children to look in newspapers and magazines for examples of the % sign. Ask them if they can cut them out and bring them tomorrow. **By the end of the lesson the children should be able to:** • **Enter fractions into a calculator and interpret the display to find the equivalent decimal.** (Refer to supplement of examples, section 6, page 31.)
VOCABULARY percentages RESOURCES Whiteboards		VOCABULARY equivalent RESOURCES OHT 4.1 OHP calculator Calculator			

Planning sheet	Day Four	Unit 4 *Fractions, decimals and percentages*	Term: *Summer*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and vocabulary	**Teaching Activities**	**Objectives and vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Order fractions.	• Ask the children for as many equivalent fractions of ½ as they can think of and write them on the board. Repeat this for ¼ and ¾. Now ask for ten random fractions and write these on the board. • Ask the children to write them down in order from the smallest to the largest. **Q** What were the harder fractions to put in order and why? Complete:	Express one half, one quarter, three quarters, and tenths and hundredths as percentages.	• Ask the children to share with the class the % signs they have found at home. **Q** What are percentages? Who uses percentages? **Q** On a 100 grid if we cover half the numbers how many will be hidden? Use OHT 4.1 to demonstrate. On the board record: $^1/_2 = {}^{50}/_{100}$. Establish that the words per cent mean 'out of 100'. So $^{50}/_{100}$ can be said as 50% or 50 out of 100. **Q** If we covered all the numbers that are multiples of 10 how many numbers would be hidden? Stress the connection between $^1/_{10} = {}^{10}/_{100} = 10\%$. Continue with other examples. • Give the children fractions that they have to write down as percentages. $^1/_4, {}^1/_2, {}^3/_4, {}^1/_{10}, {}^5/_{10}, {}^9/_{10}, {}^{10}/_{100}$ etc. Now give the children percentages that they have to write down as fractions. **Q** The population of the world is approximately 6000 million. Over the next five years, it is estimated the population will increase by 600 million. Calculate the percentage increase in the population over the next five years. Discuss the methods the children used to find the percentage. Repeat with other increases and decreases.	**Q** What percentage of 200 is 100? **Q** What percentage of 300 is 150? **Q** What percentage of 200 is 50? **Q** What is 100% of £120? What is 200% of £120? What is 300% of £120? What is 250% of £120? What is 125% of £120? Choose the cards that show more than a half:

Complete:

	Greater than $^1/_2$	Less than $^1/_2$
$^{12}/_{20}$		
$^2/_3$		
$^5/_8$		
$^7/_{16}$		

Choose the cards that show more than a half:

$^6/_{10}$	19%	85%
$^9/_{10}$	0.39	0.07
0.7	52%	$^3/_5$

By the end of the lesson the children should be able to:

• **Understand, read and write, spelling correctly, percentage, per cent and %;**
• **Recognise the % sign on clothes labels, in sales, and on food packets;**
• **Know that, e.g. one whole = 100%;**
• **Know that, e.g. 10% = 0.1 = $^1/_{10}$.**

(Refer to supplement of examples, section 6, page 33.)

VOCABULARY
percentages
per cent
%
increase
decrease

VOCABULARY
equivalent

RESOURCES
OHT sheet 4.1

Planning sheet	Day Five	Unit 4 *Fractions, decimals and percentages*	Term: *Summer*	Year Group: *5*
Oral and Mental		**Main Teaching**		**Plenary**

Objectives and vocabulary	Teaching Activities	Objectives and vocabulary	Teaching Activities	Teaching Activities/Focus Questions

To express one half, one quarter, three quarters, and tenths and hundredths as percentages.	• Give the children quick fire questions. Give them fractions that they have to write the percentage equivalent to and then vice versa.
	
	The children can respond using whiteboards.
	
	• Give the children questions like:
	
	Q What is $^{150}/_{300}$ as a percentage?
	
	• Write a percentage which is greater than 75% and smaller than 150%. What is the fraction equivalent?
	
	• Shade more rectangles so 75% of the shape is shaded.
		Find simple percentages of small whole-number quantities.	• Draw on the board a number line marked 0–100% below the line:
			
			0 100%
			
			Invite the children to place simple percentages on to the line (10%, 25%, 50%, 75% and 1%).
			
			The children should explain their reasoning as to why they have placed the % in a certain position. They should give their responses in a sentence such as: because 50% is half of 100% or 75% is halfway between 50% and 100%.
			
			Place a numerical quantity above the line:
			
			0 200
			0 25% 50% 75% 100%
			
			Demonstrate how to calculate the percentage of a given quantity using equivalent fractions, e.g. 50% of 200 = $^{1}/_{2}$ of 200 = 100.
			
			• Challenge the children to consider how to calculate 25%, 75%, 10% and 1%.
			
			The children explain their method.
			
			• Explore different numerical values for the line, e.g. 0–400, 0–50, 0–1000.
			
			Ask the children:
			
			• 14 500 people visited London Zoo in 1997. This is an increase of 20% on 1996. How many visitors were there in 1996?
			
			• A class of 25 children has 14 boys. What percentage are girls?
			
			• Ask the children to make up their own percentage word problem.
			
			Discuss any misconceptions.
				• Give the children this problem;
				
				Lucky Luke won the lottery. He spent 25% of his winnings on a house, 10% on a car, 10% on presents for his friends, 15% he gave away to charity, the rest he put in the bank.
				
				The children have to work with a partner to choose an amount for Luke to win and to calculate the percentages above related to that figure.
				
				• Draw a line to match the decimal fraction and percentage:
				
				$^{3}/_{4}$ 10%
				             20%
				             30%
				0.2 40%
				             60%
				             75%
				$1^{1}/_{2}$ 90%
				            100%
				$^{3}/_{10}$ 150%
				            160%
				
				By the end of the lesson children should be able to:
				
				• **Understand, read and write, spelling correctly, percentage, per cent and %;**
				• **Recognise the % sign on clothes labels, in sales, and on food packets;**
				• **Know that, e.g. one whole = 100%;**
				• **Know that e.g. 10% = 0.1 = $^{1}/_{10}$.**
				
				(Refer to supplement of examples, section 6, page 33.)

VOCABULARY fraction percentage equivalent RESOURCES Whiteboards		VOCABULARY percentage % equivalent		

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100