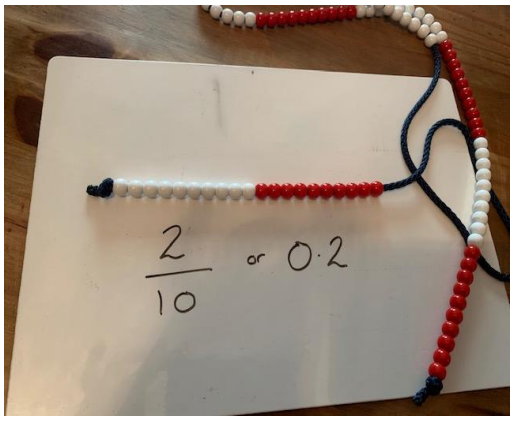
Planning Overview
Year 4 Decimals and Money

Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten
Recognise and write decimal equivalents of any number of tenths or hundredths
Recognise and write decimal equivalents to ¼, ½ and ¾
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 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.

4MD–1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients) understand this as equivalent to making a number 10 or 100 times the size.

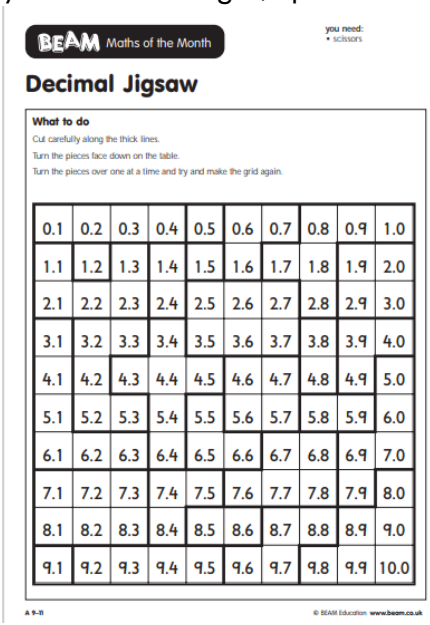
Bead strings have been used as the constant resource throughout this unit of work, but you may prefer to teach using Dienes. The 100 block represents the whole, the 10 sticks represent the tenths and the 1 blocks represent the hundredths.

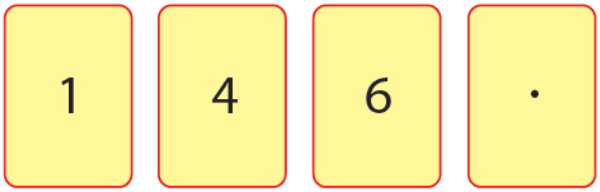
Money will be included throughout this planning overview but you may prefer to use one of the resources above to teach decimals and then revisit and apply to money at the end of the unit of work.

	Teaching and Learning
Recap tenths from Y3 **Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten**	Recap tenths as a fraction and a decimal on a bead string. Why is 0.4 equivalent to the fraction $\frac{4}{10}$? Recap that in 0.4 we have 0 whole numbers and a 4 in the tenths column.  Here we have $\frac{2}{10}$ of the bead string or 0.2 of the bead string (2 in the tenths column) How could we use the bead string to help us with questions such as: Which is more 0.4 or 0.6?

	Which number is closer to one whole 0.9 or 0.8? What do I add to 0.7 to make one whole? Which two of these numbers make one whole? 0.9 0.3 0.1 0.7 0.8 0.2 10 tenths make a whole or 10 x 10p coins = £1.00 How would you make £0.40? 4 x 10p How would you make £0.60? 6 x 10p Extend beyond 1 and maintain the link with money, can children understand that 10 tenths make a whole? How many tenths would be in 1.2? 3.3? 10ps in £1.20, £3.30? Can children partition decimal numbers in different ways? E.g. 3.3 could be 3 ones and 3 tenths, 2 ones and 13 tenths. £3 and 2 x 10p, £2 and 12 x 10p Which is bigger 32 tenths or 4 ones? £3.20 or £4?
Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten	Decide which resource you would like to introduce hundredths with e.g. money, bead strings or dienes. Discuss a single bead, penny or cube being $\frac{1}{100}$ (one out of 100). Ask children to show $\frac{3}{100}$, $\frac{6}{100}$ Talk to children about representing this as a decimal. Why is $\frac{3}{100}$ 0.03 as a decimal? Because we have a 3 in the hundredths column, no tenths and no wholes. Ask children to show you 0.04, 0.07. How would we represent this as a fraction? Ask children to represent $\frac{10}{100}$ on their beadstrings. How do we show this as a decimal? *Misconception -some children may automatically record this as 0.010* Support the children in making the link between tenths and hundredths, look closely at their $\frac{10}{100}$, how many tenths does this show? We write this as 0.1 which is 10 hundredths or 1 tenth. The link to money may support children in developing their understanding with this, e.g. 10 pennies is the same as 1 ten pence piece. Ask children to show this on a bead string – find me a tenth and count how many hundredths are in that tenth? How many hundredths are in 4 tenths? There are 40 hundredths in 4 tenths.

	Ask children to think about $\frac{60}{100}$ and how this is written 0.6 as a decimal. Reiterate that $\frac{60}{100}$ is the same as $\frac{6}{10}$. Ask children to represent 0.45 on the bead string. How many tenths and hundredths are in this number? How could we use the bead string to help us with questions such as: Which is more? 0.4 or 0.04? Which number is closer to one whole? 0.9 or 0.09? What do I add to 0.09 to make one whole? Which two of these numbers make one whole? 0.9 0.01 0.1 0.09 0.91 0.19 Partition a range of hundredths, ask children to partition in standard and non-standard ways. Use the context of money to reinforce the relationship between the decimal places and the ones: 100 hundredths make a whole or 100 x 1p coins = £1.00 10 hundredths make a tenth or 10 x 1p coins = 10p = £0.10 Money can support this concept as we could show 0.45 in a range of different ways using pennies and ten pence pieces. How would you make £0.45? 4 x 10p + 5 x 1p or 45 x 1p Explore place value in numbers with a value in the 1s column. Use money to support with this and discuss the ones column being the £ column e.g. £2.45 Play 'Cover the Board' to reinforce parts to a decimal. Children roll a dice 3 times to generate a decimal to 2 decimal places. Children can use their digits to create any number that they like. Children cover their number using counters on a Gattegno chart. Their partner does the same thing but with a different colour counter. Children are aiming to have 3 of their colour counters in a row. children will need to start thinking carefully about what decimal number they create from their dice roll in order to be strategic. 

Count up and down in hundredths	Recap counting up and down in tenths. Looking at and relating to the sequence of counting in 1s. Complete BEAM decimals jigsaw. Look at which digit changes as you move left/right, up/down on the grid.  BEAM Maths of the Month you need: • scissors **Decimal Jigsaw** **What to do** Cut carefully along the thick lines. Turn the pieces face down on the table. Turn the pieces over one at a time and try and make the grid again. 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 4.0 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 5.0 5.1 5.2 5.3 5.4 5.5 5.6 5.7 5.8 5.9 6.0 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 7.0 7.1 7.2 7.3 7.4 7.5 7.6 7.7 7.8 7.9 8.0 8.1 8.2 8.3 8.4 8.5 8.6 8.7 8.8 8.9 9.0 9.1 9.2 9.3 9.4 9.5 9.6 9.7 9.8 9.9 10.0 A 9–11 © BEAM Education www.beam.co.uk Use a bead string as a counting stick and count up and down in hundredths from a variety of starting points. Children apply this to counting from different whole numbers e.g starting at 3 and counting back in hundredths, starting at 5.76 and counting on in hundredths. Apply this to money Start with an amount of money, add £1s, 1ps and 10ps to continue a sequence. Spot the mistake…
Compare and order decimals	Comparing 2 decimals numbers Using a bead string and pegs to represent numbers, children to put pegs on decimals to represent: 0.1, 0.01, 0.3, 0.34, 0.9, 0.09 Which of these decimal numbers is largest, which is the smallest? Children move onto looking at the value of the digits in the most significant columns first. Using this strategy, they can order or compare numbers in the abstract. ‘Sam thinks that 0.34 is bigger than 0.5 because it has more digits. Is he correct? Why?’ Continue to make the links to money to support children’s understanding.

	Mastery with Greater Depth Using these cards can you make a number between 4·1 and 4·61?  What is the smallest number you can make using all four cards? What is the largest number you can make using all four cards? Order decimals on a number line Use the bead string to represent a concrete number line 0 – 1 and draw an equivalent number line on the board for the children. Peg each tenth on the bead string and mark on the number line. Ask children to peg between one of the tenth markers, how many hundredths does this show? Fluency questions to position decimal numbers on a 0-1 number line with ten divisions marked. Can children order a range of amounts of money? Children to use 3 digit cards to systematically create as many decimal numbers as possible. What is the smallest? Largest? What size of number line will you need? Can children order and position the numbers. Can children order decimals that have similar digits? 3.3, 3.43, 4.33, 3.4, 3.34, 4.3, 4.43
Rounding decimals (1dp) to the nearest whole number	Recap rounding whole numbers if needed. Use a bead string where the range is from 3 to 4. How would we record halfway? 3.5 Where would 3.2 be? Is it closer to 3 or 4? Look at the same concept but on a number line. Can children describe why 4.6 would round to 5 and not 4? Can they say a number that would round to 4? What is the smallest/biggest decimal (1dp) that can be rounded to 5?

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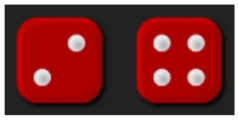
NRICH – round the dice decimals
Round the Dice Decimals 1
Age 7 to 11
Challenge Level ★

There are two dice, each of them with faces labelled from 1 to 6.
When the dice are rolled they can be combined in two different ways to make a number less than 10 with one decimal place.

For example, if I roll a 2 and a 3 I can combine them to make 2.3 or 3.2.

Now round each of these numbers to the nearest whole number: 2.3 rounds to 2 and 3.2 rounds to 3. Repeat for other rolls of the dice.

Do both of the numbers you make ever round to the same whole number?

There are some interactive dice here that you can use for this problem.

Link to money.
Is £3.20 closer to £3 or £4?

Mastery

Round to the nearest whole number.
$8\frac{3}{8}$ 8·38 8·83

Can children recognise in $8\frac{3}{8}$ that $\frac{3}{8}$ is less than $\frac{1}{2}$ so will round down?
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<td>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</td>
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Recap dividing by 10 and 100 when our starting number was a 3 or a 4-digit number.
Recap how when we divide by 10 our number moves down the place value system by one column and when we divide by 100 our number moves down the place value system by 2 columns

<table>
<tr><td>1,000</td><td>2,000</td><td>3,000</td><td>4,000</td><td>5,000</td><td>6,000</td><td>7,000</td><td>8,000</td><td>9,000</td></tr>
<tr><td>100</td><td>200</td><td>300</td><td>400</td><td>500</td><td>600</td><td>700</td><td>800</td><td>900</td></tr>
<tr><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr>
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÷ 100
NCETM PD Materials

Demonstrate how the same principle happens when our starting number is a one or a 2-digit number and we end up with a decimal number.

Gattegno chart:
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<tr><td>1,000</td><td>2,000</td><td>3,000</td><td>4,000</td><td>5,000</td><td>6,000</td><td>7,000</td><td>8,000</td><td>9,000</td></tr>
<tr><td>100</td><td>200</td><td>300</td><td>400</td><td>500</td><td>600</td><td>700</td><td>800</td><td>900</td></tr>
<tr><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr>
<tr><td>0.1</td><td>0.2</td><td>0.3</td><td>0.4</td><td>0.5</td><td>0.6</td><td>0.7</td><td>0.8</td><td>0.9</td></tr>
<tr><td>0.01</td><td>0.02</td><td>0.03</td><td>0.04</td><td>0.05</td><td>0.06</td><td>0.07</td><td>0.08</td><td>0.09</td></tr>
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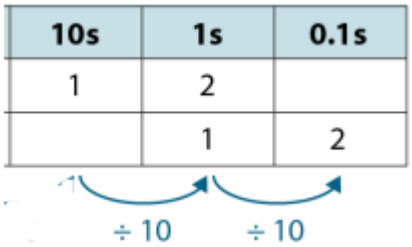
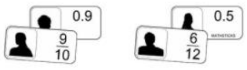
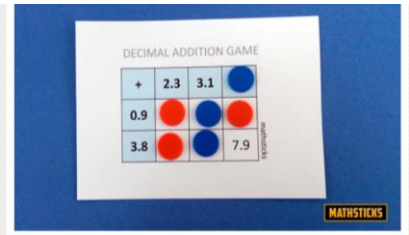
	 NCETM PD Materials Fluency questions - dividing by 10 and 100. Extend to missing number questions e.g. 23 ÷ ☐ = 2.3 Greater Depth Can they reason about equivalent calculations e.g. True or False: 23.4 ÷ 100 = 2.34 ÷ 10 and explain reasoning without calculating?
Link Decimals to fractions (½, ¼, ¾)	Use a bead string and split the string into halves. How many beads are in one of these halves? 50 beads out of 100 – how do we record this as a decimal? 0.5. So ½ of our bead string is the same as 0.5 of our bead string. Repeat with a quarter of the bead string – how many beads? 25 out of 100. How do we record this as a decimal? 0.25 Repeat with ¾ of the bead string. How many beads is this? 75 out of 100 beads. How do we record this as a decimal? 0.75 Mathsticks – fractions and decimals mission impossible game  The activity follows the theme of spotting rouge figures… in this case fractions that do not match to fraction decimals. It is easy to give this a Mission Impossible (or James Bond) style context since the children are presented with 12 silhouettes of people – could be 'suspects'. Most of the figures form a natural pair:  Use money to explore fraction equivalence to decimals. Take a pound coin and ask how are we going to find ½? Exchange £1 into 10 x 10p coins. Show half is 50p or £0.50. Now look at a ¼. Change the £1 into 10 x 10p coins. Share equally between 4 to get £0.20. Exchange remaining 2 x 10p coins into 1p coins and share between 4 to get £0.25.

	Mastery Match each fraction to its decimal equivalent. $\frac{1}{2}$ $\frac{4}{10}$ $\frac{3}{4}$ $\frac{1}{4}$ 0·25 0·75 0·4 0·5 Circle the equivalent fraction to 0·25. $\frac{2}{5}$ $\frac{5}{2}$ $\frac{25}{100}$ $\frac{100}{25}$
Solve simple measure and money problems involving fractions and decimals to two decimal places. **Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.**	Reinforce addition and subtraction bonds and related facts to 1 and 10 e.g. what would we need to add to 0.35 to make 1? What would we need to add to £6.45 to make £10? Extend to finding 4 related facts and then apply to missing numbers and money e.g. £10 - ? = £4.50 Mathsticks – decimal addition game  Children should have been taught a range of mental strategies within the addition and subtraction unit of work. Children will need time to revisit these and apply to decimals and money problems. e.g. Sam pays for a bar of chocolate with a £2 coin. The chocolate cost £1.35, how much change did he get? Can the children count on or back to find the change? Extend to two-step problems. Sam buys two packets of crisps with a £2 coin and gets, 84p change. How much does one packet of crisps cost? Sam buys a toy car for £1.59 and a pack of cards for £1.54, he pays with a £10 note, how much change does he get?
Solve Problems involving money	Use and extend children's understanding of coins. Can children recognise and find totals of amounts of coins? Can they use their mental strategies to find the totals efficiently? Can they scale their multiplication facts to answer questions in line with the mastery question below?

Mastery

Which would you rather have, 3 × 50p coins or 7 × 20p coins?

Explain your reasoning.

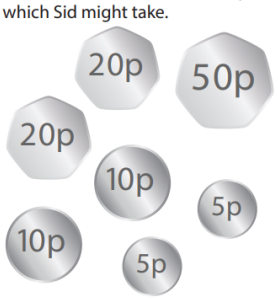
Extend the word problems from the earlier section but show the amount of change in coins,

e.g. Sam buys two packets of crisps with a £2 and this is his change.

How much was one packet of crisps?

Mastery with Greater Depth

Sid and Sam share some money. Sid gets twice as much as Sam. Tick the coins which Sid might take.



Is there more than one way of sharing the coins?