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# Years 3/4

## Small Steps Guidance and Examples

Block 4 – Fractions & Decimals

**White Rose Maths**

# Year 3/4 – Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value				Number: Addition and Subtraction				Number: Multiplication and Division			Consolidation
Spring	Number: Multiplication and Division		Measurement: Length, Perimeter and Area		Number: Fractions				Year 3: Fractions Year 4: Decimals			Consolidation
Summer	Measurement: Money		Statistics		Measurement: Time			Geometry – Properties of Shapes		Year 3: Mass and Capacity Year 4: Position and Direction		Consolidation

# Overview

## Small Steps





Year 3 - Fractions	Year 4 - Decimals
 Compare fractions	
 Order fractions	
 Tenths	Recognise tenths and hundredths
 Count in tenths	Tenths as decimals
 Tenths as decimals	Tenths on a place value grid
	Tenths on a number line
	Divide 1 digit by 10
	Divide 2 digits by 10
	Hundredths
	Hundredths as decimals
	Hundredths on a place value grid
	Divide 1 or 2 digits by 100
	Make a whole

# Overview

## Small Steps

### Year 3 - Fractions

### Year 4 - Decimals

		Write decimals
		Compare decimals
		Order decimals
		Round decimals
		Halves and quarters

## Compare Fractions

### Notes and Guidance

Children start to compare unit fractions or fractions with the same denominator.

For unit fractions, children's natural tendency might be to say that  $\frac{1}{2}$  is smaller than  $\frac{1}{4}$ , as 2 is smaller than 4. Discuss how breaking something into more equal parts makes each part smaller.

### Mathematical Talk

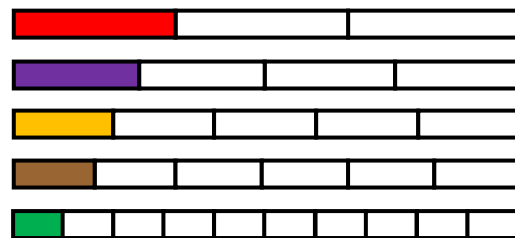
What fraction is represented by this strip? How do you know? How could you convince someone else?

When the numerators are the same, is it easy to compare them? What about the denominators?

Do you need to draw a fraction strip to compare? Which fractions are easy to compare, which are difficult? Why?

## Varied Fluency

- 1 Using the fraction strips below, use the  $>$ ,  $<$  or  $=$  symbol to compare the fractions.



$$\frac{1}{10} \bigcirc \frac{1}{4} \qquad \frac{1}{3} \bigcirc \frac{1}{6} \qquad \frac{1}{5} \bigcirc \frac{1}{4}$$

When the numerators are the same, the \_\_\_\_\_ the denominator, the \_\_\_\_\_ the fraction.

- 2 Using strips of paper, compare these fractions using the  $>$ ,  $<$  or  $=$  symbols.

$$\frac{3}{4} \bigcirc \frac{1}{4} \qquad \frac{1}{6} \bigcirc \frac{5}{6} \qquad \frac{3}{8} \bigcirc \frac{5}{8}$$

When the denominators are the same, the \_\_\_\_\_ the numerator, the \_\_\_\_\_ the fraction.

# Compare Fractions

## Reasoning and Problem Solving



I know that  $\frac{1}{3}$  is larger than  $\frac{1}{2}$  because 3 is bigger than 2

Do you agree with Sally? Explain how you know.

$\frac{1}{3}$  is smaller because it is split into 3 equal parts, rather than 2 equal parts. Children could draw a bar model to show this.

What fraction could go in the missing box? How many can you find?

$$\frac{1}{2} > \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}} > \frac{1}{10}$$

Examples could include  $\frac{1}{3}$ ,  $\frac{1}{4}$  etc.

## Order Fractions

### Notes and Guidance

Children order unit fractions and fractions with the same denominator.

They use bar models and number lines to order the fractions and write them in ascending and descending order.

### Mathematical Talk

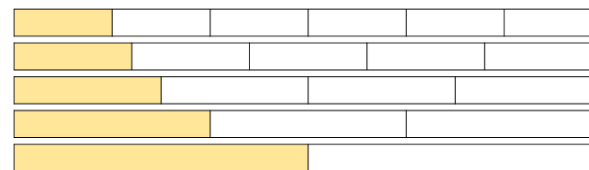
How many equal parts has the whole been split in to?

How many equal parts need shading?

Which is the largest fraction? Which is the smallest fraction?

### Varied Fluency

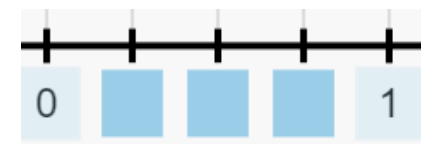
- Split strips of paper into halves, thirds, quarters, fifths and sixths and colour in one part of each strip.  
Now order the strips from smallest to largest.



When the numerators are the same, the \_\_\_\_\_ the denominator, the \_\_\_\_\_ the fraction.

- Place these fractions on the number line.

$$\frac{2}{4} \quad \frac{3}{4} \quad \frac{1}{4}$$



- Order the fractions in descending order.

$$\frac{3}{8} \quad \frac{5}{8} \quad \frac{1}{8} \quad \frac{8}{8} \quad \frac{7}{8}$$

# Order Fractions

## Reasoning and Problem Solving



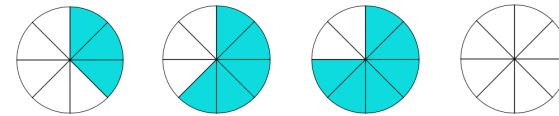
When the denominators are the same, the larger the numerator, the smaller the fraction.

Is James correct?  
Prove it.

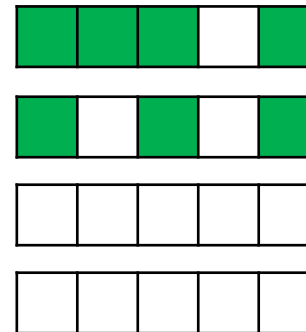
James is incorrect. When the denominators are the same, the larger the numerator the larger the fraction. Children could prove this using bar models or strip diagrams etc.

Complete the fractions so the fractions are ordered correctly.

Fractions in ascending order



Fractions in descending order



Either 7 or 8 parts shaded.

Either 2 or 1 parts shaded in the first, then 1 or 0 shaded in the second depending on how many they shaded in the other.



# Tenths

## Notes and Guidance

Children explore what a tenth is. They recognise that tenths arise from dividing one object into 10 equal parts.

Children represent tenths in different ways and use words and fractions to describe them. For example, one tenth and  $\frac{1}{10}$

## Mathematical Talk

How many tenths are shaded?

How many more tenths do I need to make a whole?

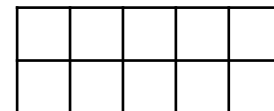
When I am writing tenths, the \_\_\_\_\_ is always 10

## Varied Fluency

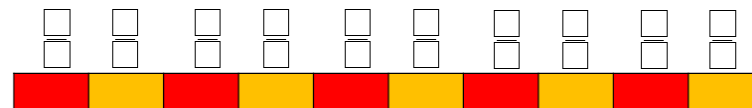
- 1 If the frame represents 1 whole, what does each box represent?

Use counters to represent:

- One tenth
- Two tenths
- Three tenths
- One tenth less than eight tenths

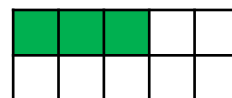


- 2 The counting stick is worth 1 whole. Label each part of the counting stick.



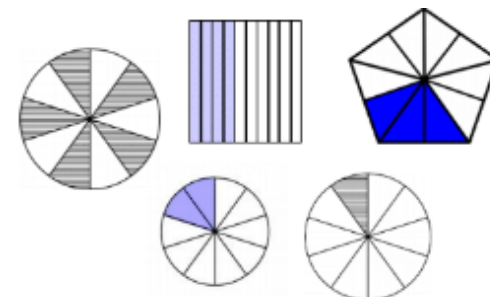
- 3 Identify what fraction of each shape is shaded. Give your answer in words and as a fraction.

E.g.



Three tenths

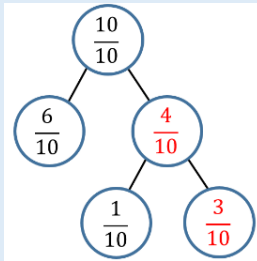
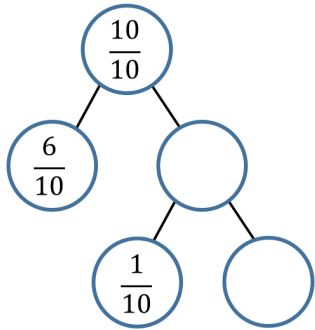
$$\frac{3}{10}$$



# Tenths

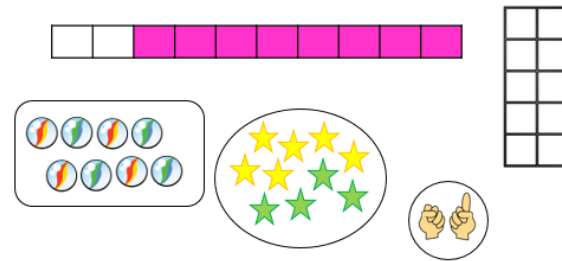
## Reasoning and Problem Solving

Fill in the missing values.  
Explain how you got your answers.



Children could use practical equipment to explain why and how, and relate back to the counting stick.

### Odd One Out



Which is the odd one out?  
Explain your answer.

The marbles are the odd one out because they represent 8 or eighths. All of the other images have a whole which has been split into ten equal parts.

# Tenths & Hundredths

## Notes and Guidance

Children recognise tenths and hundredths using a hundred square.

They see that ten hundredths are equivalent to one tenth and use a part whole model to partition a fraction into tenths and hundredths.

## Mathematical Talk

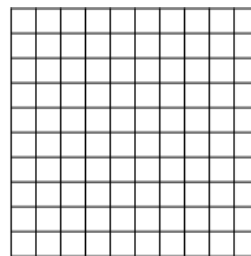
If each row is one row out of ten equal rows, what fraction does this represent?

If each square is one square out of one hundred equal squares, what fraction does this represent?

How many squares are in one row? How many hundredths are in one tenth?

## Varied Fluency

- 1 Here is a hundred square.



Each square is \_\_\_ out of \_\_\_ equal squares.

Each square represents  $\frac{\square}{\square}$

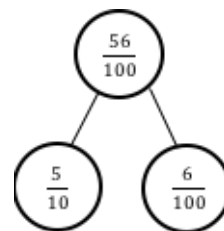
Each row is \_\_\_ out of \_\_\_ equal rows.

Each row represents  $\frac{\square}{\square}$

Complete the table.

Shaded	Tenths	Hundredths
2 rows	$\frac{2}{10}$	$\frac{20}{100}$
4 rows		
	$\frac{7}{10}$	

- 2 We can partition 56 hundredths into tenths and hundredths.



Partition:

- 65 hundredths
- 31 hundredths
- 82 hundredths

# Tenths & Hundredths

## Reasoning and Problem Solving

Who is correct? Explain why.

5 hundredths is equivalent to 50 tenths.

Lydia



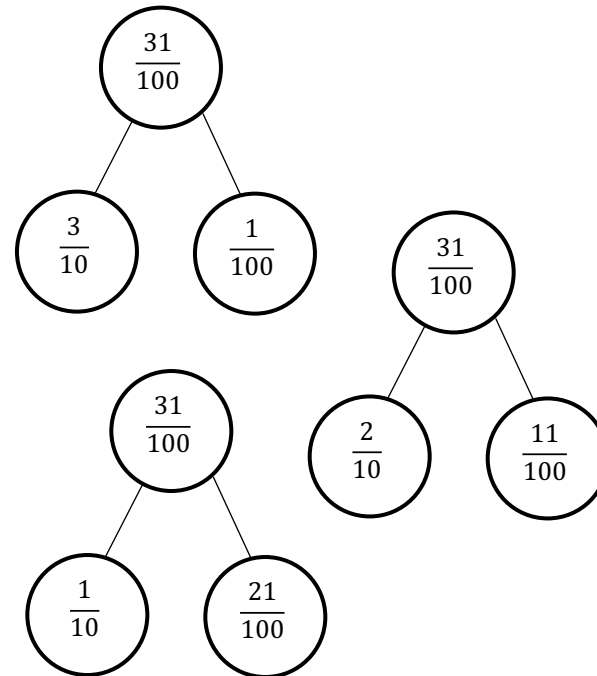
50 hundredths is equivalent to 5 tenths.



Owen

Lydia is incorrect. She is confused about the conversion between tenths and hundredths.

Jamie says he can partition tenths and hundredths in more than one way.



Use Jamie's method to partition 42 hundredths in more than one way.

Children may partition 42 hundredths as:

- 4 tenths and 2 hundredths
- 3 tenths and 12 hundredths
- 2 tenths and 22 hundredths
- 1 tenth and 32 hundredths
- 0 tenths and 42 hundredths

# Count in Tenths

## Notes and Guidance

Children count up and down in tenths. They continue to represent tenths in multiple ways and to use words and fractions to describe them. For example, one tenth and  $\frac{1}{10}$

Children also explore what happens when counting past  $\frac{10}{10}$  and link this to their understanding of wholes.

## Mathematical Talk

Let's count in tenths. What comes next? Explain how you know.

If I start at \_\_\_ tenths, what will be next?

What tenth comes between \_\_\_ and \_\_\_?

When we get to 10/10 what else can we say? What happens next?

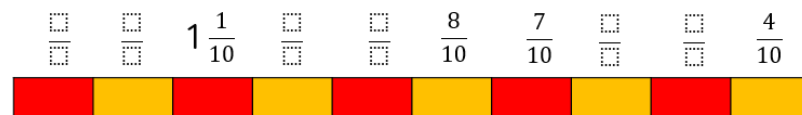
## Varied Fluency

1 Continue the pattern in the table and answer the questions.

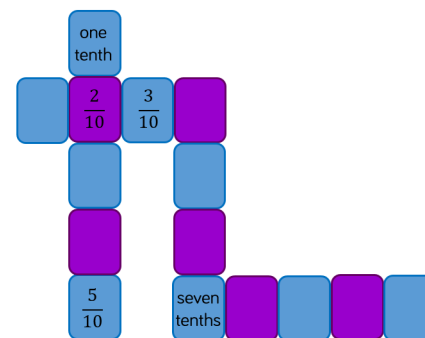
- What comes between  $\frac{4}{10}$  and  $\frac{6}{10}$ ?
- What is one more than  $\frac{10}{10}$ ?
- If I start at  $\frac{8}{10}$  and count back  $\frac{4}{10}$ , where will I stop?

Representation	Words	Fraction
	One tenth	$\frac{1}{10}$

2 Continue counting in tenths.  
Label each part of the counting stick.



3 Complete the sequence.



# Count in Tenths

## Reasoning and Problem Solving

Jason is counting in tenths.



Seven tenths, eight tenths, nine tenths, ten tenths, one eleventh, two elevenths, three elevenths...

Can you spot his mistake?

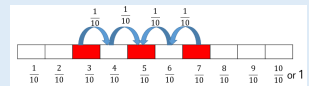
Jason thinks that after ten tenths you start counting in elevenths. He does not realise that ten tenths is the whole, and so the next number in the sequence after ten tenths is eleven tenths or one and one tenth.

Tania says five tenths is  $\frac{2}{10}$  smaller than seven tenths, but  $\frac{2}{10}$  larger than three tenths.

Do you agree?

Explain why.

This is correct. Children could show it using pictures, ten frames, number lines etc. For example:



# Tenths as Decimals

## Notes and Guidance

Children write tenths as decimals and fractions. They write any number of tenths as a decimal and represent the decimals using concrete and pictorial representations.


Children understand that a tenth is a part of a whole split into 10 equal parts.

## Mathematical Talk

- What is a tenth?
- How many different ways can we write a tenth?
- What can we use to represent a decimal?

## Varied Fluency

1 Complete the table.

Image	Words	Fraction	Decimal
			
	Five tenths		
			0.9

2 Write the numbers shown as fractions and decimals.



3 Draw or make representations of:

0.4      0.8      0.1

What’s the same about all the decimals?

What’s different?

## Tenths as Decimals

### Reasoning and Problem Solving

Who is correct? Explain why.

1.2 is equivalent to 1 whole and 2 tenths.



Jemima

Both children are correct, they have just partitioned the number differently.



Oscar

1.2 is equivalent to 12 tenths.

What is the difference between six tens and six tenths?

Show me.

Children may use concrete or pictorial representations to show tens and tenths, and discuss that tenths are part of a whole whereas tens are larger than a whole.



# Tenths as Decimals

## Notes and Guidance

Children are introduced to tenths as decimals for the first time. They compare fractions and decimals written as words, in fraction form and as decimals and link them to pictorial representations.

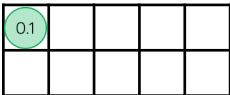
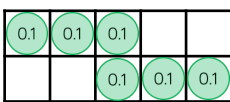
Children learn that the number system extends to the right of the decimal point into the tenths column.

## Mathematical Talk

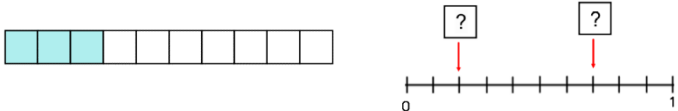
- What is a tenth?
- How many different ways can we write a tenth?
- What does equivalent mean?
- What is the same and what is different about decimals and fractions?

## Varied Fluency

1 Complete the table.

Image	Words	Fraction	Decimal
	One tenth	$\frac{1}{10}$	0.1
			
	Nine tenths		

2 Write the fractions and decimals shown.



3 Here is a decimal written in a place value grid.

Ones	Tenths
0	8

Can you represent this decimal pictorially?  
Can you write the decimal as a fraction?

# Tenths as Decimals

## Reasoning and Problem Solving

### True or False?



Tulisa

10 cm is one tenth of 1 metre

20 cm is two tenths of 2 metres



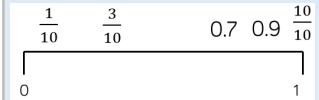
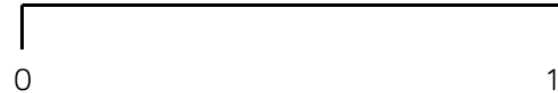
Owen

Explain your answer.

Tulisa is correct because 10 cm goes into 1 metre ten times.  
Owen is incorrect because 20 cm goes into 2 metres ten times, so it is one tenth.

Place the decimals and fractions on the number line.

0.7    $\frac{3}{10}$     $\frac{1}{10}$    0.9    $\frac{10}{10}$



## Tenths on a Place Value Grid

### Notes and Guidance

Children read and represent tenths on a place value grid. They see that the tenths are to the right hand side of the decimal point and that this means that they are a part of a whole.

Children use concrete representations to make tenths on a place value grid and write the number they have made as a decimal.

### Mathematical Talk

What is a tenth?

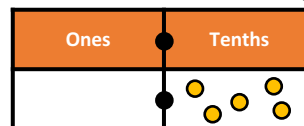
How many ones are there?

How many tenths are there?

Why do we need to use the decimal point?

### Varied Fluency

- 1 Write the decimal represented in each place value grid.



There are  ones and  tenths.

The decimal represented is



- 2 Use counters or place value counters to make the decimals on a place value grid.

0.7      0.1      0.8

There are  ones and  tenths.

- 3
- | Ones | Tenths |
|------|--------|
| 3    | 2      |
- There are  ones and  tenths.  
 ones +  tenths  
 $= 3 + 0.2 = 3.2$

Use the place value grid and sentences to describe the decimals:

4.5      5.4      2.2

# Tenths on a Place Value Grid

## Reasoning and Problem Solving

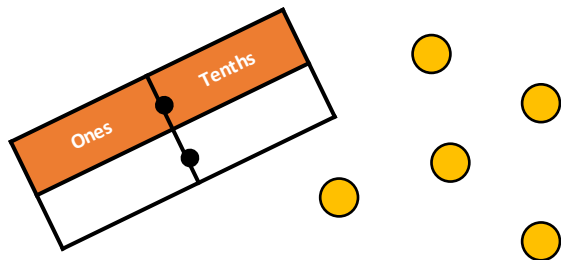
Use five counters and a place value grid. Place all five counters in either the ones or the tenths column.

How many different numbers can you make?

Describe the numbers you have made by completing the sentences.

There are  ones and  tenths.

ones +  tenths =



Children can make:

0.5

1.4

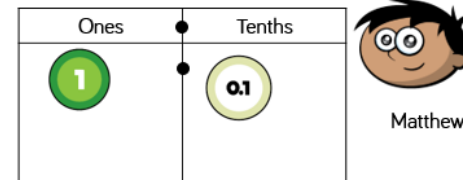
2.3

3.2

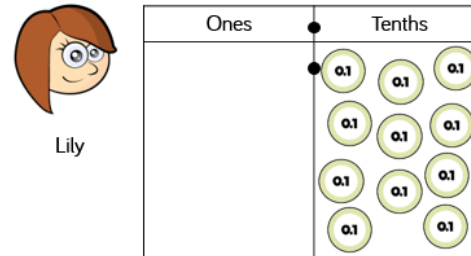
4.1

5.0

Two children built eleven tenths.



Matthew



Lily

Who built it correctly?  
Explain your answer.

They both built it correctly. Matthew exchanged ten tenths for one whole.

## Tenths on a Number Line

### Notes and Guidance

Children read and represent tenths on a number line. They link the number line to measurement to look at measuring in centimetres and metres.

Children complete empty number lines and mark decimals on a number line using fraction and decimal notation.

### Mathematical Talk

How many equal parts is the number line split into?

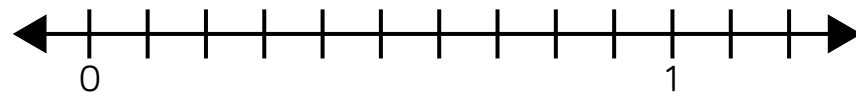
What are the jumps between each number?

How many tenths are in one whole?

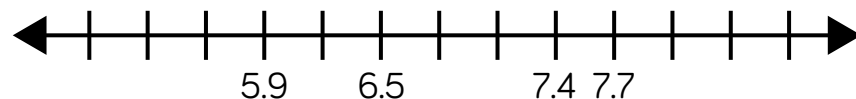
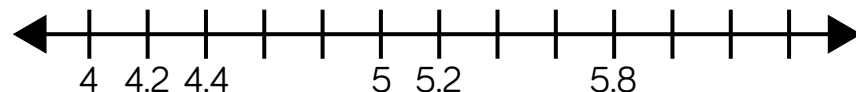
What is 0.1 metres in centimetres?

### Varied Fluency

- 1 Fill in the missing decimals.



- 2 Complete the number lines.



- 3 The ruler goes up in jumps of 0.1 metres.  
How long is the ribbon?

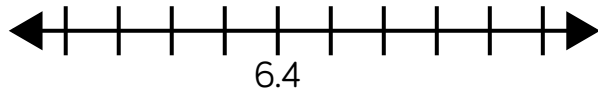


The ribbon is  metres long.

## Tenths on a Number Line

### Reasoning and Problem Solving

What could the start and end numbers on the number line be?

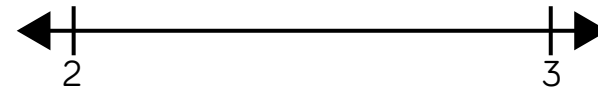


Prove it.

The start and end numbers could be 6 and 6.9 respectively, or 5.6 and 7.4

Children can find different start and end numbers by adjusting the increments that the number line is going up in.

Place the decimals on the number line.



2.7   2.3   1.9   2.5   2.9   3.2

Which were the easiest to place?

Are there any decimals that we cannot place on this number line? Why?

Children will need to split the number line into 10 equal parts and then place the tenths on the number line. They will find that 1.9 and 3.2 cannot be placed on this number line as they are below 2 and above 3 respectively.

## Divide 1-digit by 10

### Notes and Guidance

Children use a place value chart to see how the digits move when dividing by 10. Emphasise the importance of 0 as a place holder.

They use counters to represent the digits before using actual digits within the place value chart. Children could also use place value sliders to support this understanding.

### Mathematical Talk

What number is represented on the place value chart?

Why is 0 important when dividing a one-digit number by 10?

What is the same and what is different when dividing by 10 on a Gattegno chart compared to a place value chart?

### Varied Fluency

- 1 Sally uses counters to make a 1-digit number.

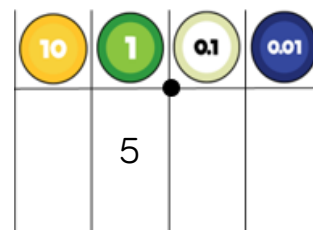


To divide the number by 10, we move the counters one column to the right.  
What is the value of the counters now?

Use this method to solve:

$$3 \div 10 = \square \quad 7 \div 10 = \square \quad \square = 4 \div 10$$

- 2 Here is a one-digit number on a place value chart.



When dividing by 10, we move the digits 1 place to the  

$$5 \div 10 = \square$$

Use this method to solve:

$$8 \div 10 = \square \quad \square = 9 \div 10 \quad 0.2 = \square \div 10$$

# Divide 1-digit by 10

## Reasoning and Problem Solving

Choose a digit card from 1 – 9 and place a counter over the top of that number on the Gattegno chart.

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009

When you divide your number by 10, which direction do you move on the chart?  
How is this different to the place value chart?

Children will see that you move down one row to divide by 10 on a Gattegno chart whereas on a place value chart you move on column to the right.

Complete the number sentences.

$$4 \div 10 = 8 \div \square \div 10$$

$$15 \div 3 \div 10 = \square \div 10$$

$$64 \div \square \div 10 = 32 \div 4 \div 10$$

2

5

8



## Divide 2-digits by 10

### Notes and Guidance

Children use a place value chart to see how 2 digit-numbers move when dividing by 10

They use counters to represent the digits before using actual digits within the place value chart. Children could also use place value sliders to support this understanding.

### Mathematical Talk

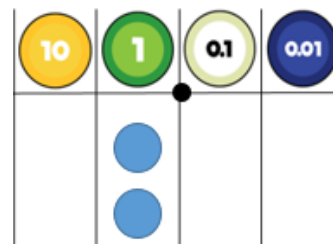
What number is represented on the place value chart?

Do I need to use 0 as a place holder when dividing a 2-digit number by 10?

What is the same and what is different when dividing by 10 on a Gattegno chart compared to a place value chart?

### Varied Fluency

- 1 Tim uses counters to make a 2-digit number.

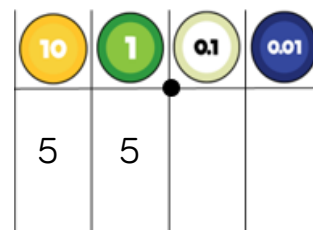


To divide the number by 10, we move the counters one column to the right.  
What is the value of the counters now?

Use this method to solve:

$$42 \div 10 = \square \quad 35 \div 10 = \square \quad \square = 26 \div 10$$

- 2 Here is a one-digit number on a place value chart.



When dividing by 10, we move the digits 1 place to the  

$$55 \div 10 = \square$$

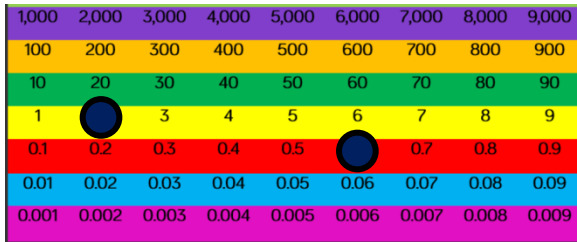
Use this method to solve:

$$82 \div 10 = \square \quad \square = 93 \div 10 \quad 2.3 = \square \div 10$$

## Divide 2-digits by 10

### Reasoning and Problem Solving

Justin has used a Gattegno chart to divide a 2-digit number by 10. He has placed counters over the numbers in his answer.



What was Justin's original number?  
How can you use the chart to help you?

Justin's original number was 26. You can move the counters each up one to multiply them by 10 which is the inverse to division.

Larry says,



When I divide a 2-digit number by 10, my answer will always have digits in the ones and tenths columns.

Prove that Larry is incorrect.

Children should give an example of when Larry is incorrect. For example, when you divide 80 by 10, the answer is 8 so there would not be anything in the tenths column.

# Hundredths

## Notes and Guidance

Children recognise that hundredths arise from dividing one whole into one hundred equal parts. Linked to this, they see that one tenth is ten hundredths.

Children count in hundredths and represent tenths and hundredths on a place value grid and a number line.

## Mathematical Talk

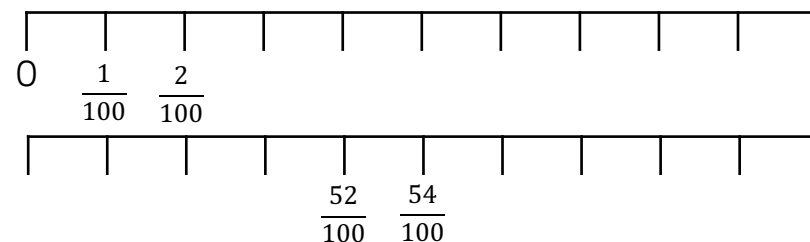
One hundredth is one whole split into how many equal parts?

How many hundredths can I exchange one tenth for?

How many hundredths are equivalent to 5 tenths? How does this help me complete the sequence?

## Varied Fluency

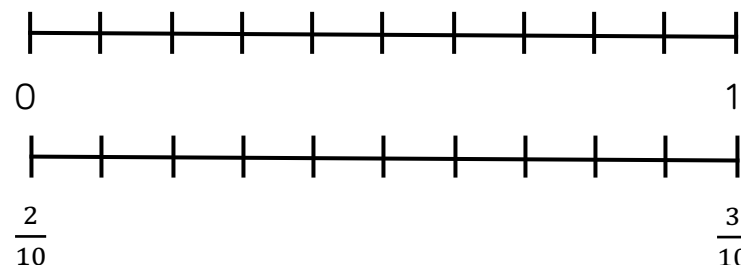
- 1 Complete the number lines.



- 2 Complete the sequences.

- $\frac{27}{100}, \frac{28}{100}, \frac{29}{100}, \frac{30}{100}, \square, \square, \square$
- $\frac{52}{100}, \frac{51}{100}, \frac{5}{10}, \square, \square, \square$

- 3 Use fractions to complete the number lines.

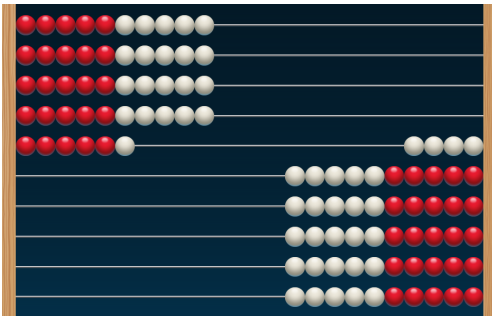


# Hundredths

## Reasoning and Problem Solving

Here is a Rekenrek made from 100 beads.

If the Rekenrek represents one whole, what fractions have been made on the left and on the right?



Can you partition both of the fractions?

On the left, there are 46 hundredths, this is equivalent to 4 tenths and 6 hundredths.

On the right, there are 54 hundredths, this is equivalent to 5 tenths and 4 hundredths.

Complete the statements.

3 tenths and 2 hundredths = 2 tenths and  hundredths

12

14 hundredths and 3 tenths = 4 tenths and  hundredths

4

5 tenths and 1 hundredth < 5 tenths and  hundredths

Anything more than 1

5 tenths and 1 hundredth >  tenths and 5 hundredths

0, 1, 2, 3 or 4

Use a place value grid or place value counters to prove your answers.

# Hundredths as Decimals

## Notes and Guidance

Children use a place value chart to see how 2 digit-numbers move when dividing by 10

They use counters to represent the digits before using actual digits within the place value chart. Children could also use place value sliders to support this understanding.

## Mathematical Talk

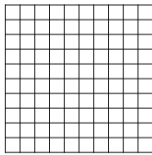
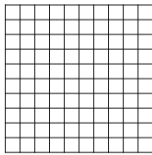
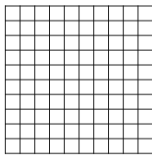
What number is represented on the place value chart?

Do I need to use 0 as a place holder when dividing a 2-digit number by 10?

What is the same and what is different when dividing by 10 on a Gattegno chart compared to a place value chart?

## Varied Fluency

1 Complete the table.

Image	Words	Fraction	Decimal
	56 hundredths		
		$\frac{17}{100}$	
			0.32

2 Write the number as a fraction and as a decimal.



# Hundredths as Decimals

## Reasoning and Problem Solving

Tamina says,



17 hundredths is the same as 1,700

Is she correct?

Explain your answer.

Tamina is wrong as she has mistaken hundredths for hundreds.

Two children have been asked to write the decimal represented on the 100 grid.

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

Tom says the grid shows 0.70

Emma says the grid shows 0.7

Who do you agree with?

Explain your answer.

They are both correct. The grid shows 70 hundredths or 7 tenths and this is what Tom and Luke have given as their answer. The 0 isn't needed on the end as it is not a place holder and doesn't change the value of the number.

## Hundredths on a Place Value Grid

### Notes and Guidance

Children read and represent hundredths on a place value grid. They see that a number can be made up of tenths and hundredths and use a part whole model to represent this.

Children use concrete representations to make hundredths on a place value grid and write the number they have made as a decimal.

### Mathematical Talk

What is a hundredth?

How many hundredths are equivalent to one tenth?

How many different ways can you partition 0.56?

## Varied Fluency

- 1 Write the decimal represented in each place value grid.

Ones	Tenths	Hundredths
	● ●	● ● ●

There are \_\_\_\_ tenths.

There are \_\_\_\_ hundredths.

Ones	Tenths	Hundredths
	● ● ●	● ● ● ●

The decimal represented is \_\_\_\_

- 2 Make the decimals on a place value grid.

0.34

0.43

0.03

0.11

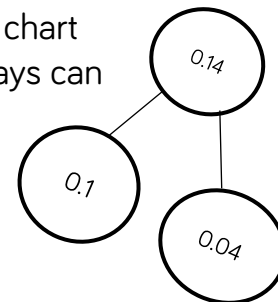
Write sentences to describe each number.

- 3 Represent the decimals on a place value chart and in a part whole model. How many ways can you partition each number?

0.27

0.35

0.72



# Hundredths on a Place Value Grid

## Reasoning and Problem Solving

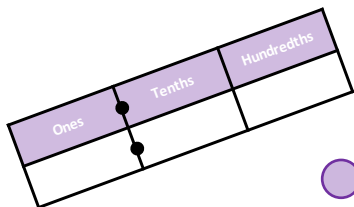
Use four counters and a place value grid. Place all four counters in either the ones, tenths or hundredths column.

How many different numbers can you make?

Describe the numbers you have made by completing the sentences.

There are  ones,  tenths and  hundredths.

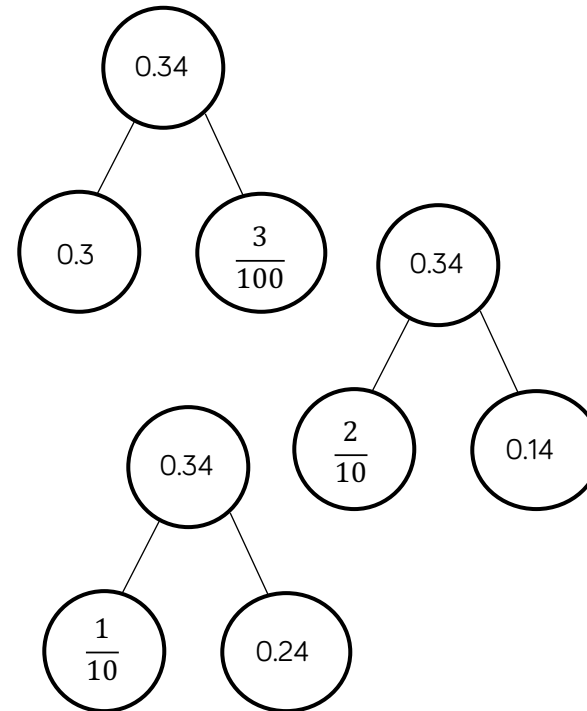
ones +  tenths +  hundredths =



Children can either make:

4, 3.1, 3.01, 2.2, 2.11, 2.02, 1.3, 1.21, 1.12, 1.03, 0.4, 0.31, 0.22, 0.13, 0.04

Hamza says he can partition 0.34 in more than one way.



Use Hamza's method to partition 0.45 in more than one way.

Children may partition 0.45 into:  
 0 tenths and 45 hundredths  
 1 tenth and 35 hundredths  
 2 tenths and 25 hundredths  
 3 tenths and 15 hundredths  
 4 tenths and 5 hundredths



## Divide 1 or 2-digits by 100

### Notes and Guidance

Children divide one and two-digit numbers by 100

They use counters to represent the digits before using actual digits within the place value chart. Children could also use place value sliders to support this understanding.

### Mathematical Talk

What number is represented on the place value chart?

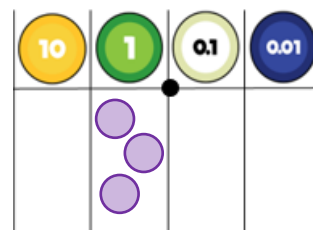
Why is 0 important when dividing a one or two-digit number by 100?

What is the same and what is different when dividing by 100 on a Gattegno chart compared to a place value chart?

What happens to the value of each digit when you divide by 10 and/or 100?

### Varied Fluency

- 1 Theo uses counters to make a 1-digit number.



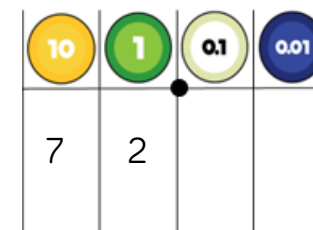
To divide the number by 100, we move the counters two columns to the right.

What is the value of the counters now?

Use this method to solve:

$$4 \div 100 = \square \quad 5 \div 100 = \square \quad \square = 6 \div 100$$

- 2 Here is a one-digit number on a place value chart.



When dividing by 100, we move the digits 2 places to the  

$$72 \div 100 = \square$$

Use this method to solve:

$$82 \div 100 = \square \quad \square = 93 \div 100 \quad 0.23 = \square \div 100$$

## Divide 1 or 2-digits by 100

### Reasoning and Problem Solving

Describe the pattern.

$$\begin{aligned}7,000 \div 100 &= 70 \\ 700 \div 100 &= 7 \\ 70 \div 100 &= 0.7 \\ 7 \div 100 &= 0.07\end{aligned}$$

Can you complete the pattern starting with 5,300 divided by 100?

Children will describe the pattern they see. Look for vocabulary describe the movement of the digits each time.

For 5,300:  
 $5,300 \div 100 = 53$   
 $530 \div 100 = 5.3$   
 $53 \div 100 = 0.53$   
 $5.3 \div 100 = 0.053$

Tobias says,

'45 divided by 100 is 0.45 so I know 0.45 is 100 times smaller than 45'

Henry says,

'45 divided by 100 is 0.45 so I know 45 is 100 times bigger than 0.45'

Who is correct?  
Explain your answer.

Tobias and Henry are both correct. Children may use a place value chart to help them explain their answer.

# Make a Whole

## Notes and Guidance

Children make a whole from any number of tenths and hundredths.

They use their number bonds to ten and a hundred to support their calculations. Children use pictorial and concrete representations to support their understanding.

## Mathematical Talk

How many tenths make one whole?

How many hundredths make one whole?

If I have \_\_\_\_ hundredths, how many more do I need to make one whole?

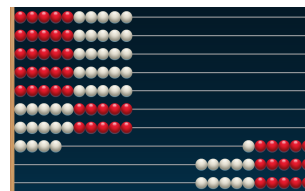
## Varied Fluency

- Here is a hundred square. How many hundredths are shaded in? How many more hundredths do you need to shade so the whole hundred square is shaded?

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

hundredths +  hundredths = 1 whole

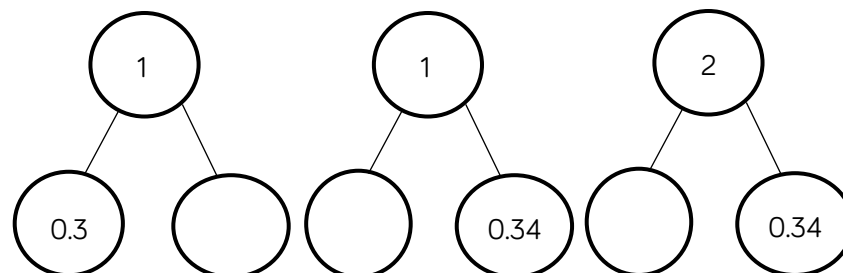
- Here is a Rekenrek with 100 beads. Each bead is one hundredth of the whole.



hundredths are on the left.  
 hundredths are on the right.

$$0.\text{} + 0.\text{} = 1$$

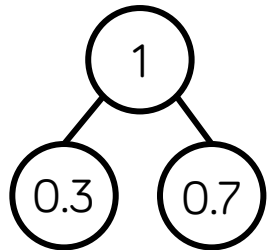
- Complete the part whole models.



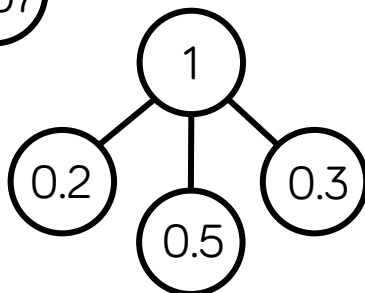
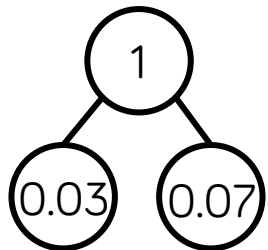
# Make a Whole

## Reasoning and Problem Solving

Which part whole model does not match the hundred square?



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



Explain your answer.

$0.03 + 0.07$  does not equal one whole so this one does not match.

Three bead strings are 0.84 m long altogether.

Would four bead strings be longer or shorter than a metre?

Explain how you know.

One bead string is 28 cm long.

$$28 \text{ cm} = 0.28 \text{ m}$$

$$0.84 \text{ m} + 0.28 \text{ m} > 1 \text{ m}$$

Therefore four bead strings will be longer than one metre.

## Write Decimals

### Notes and Guidance

Children use place value counters and a place value grid to make numbers with up to two decimal places.

They read and write decimal numbers and understand the value of each digit.

They show their understanding of place value by partitioning decimal numbers in different ways.

### Mathematical Talk

How many ones/tenths/hundredths are in the number?

How do we write this as a decimal? Why?

What is the value of the     in the number       ?

When do we need to use zero as a place holder?

How can we partition decimal numbers in different ways?

## Varied Fluency

- 1 What number is represented on the place value chart?

Ones	Tenths	Hundredths
	●	● ● ●
0	1	3

There are  ones,  
 tenths and   
hundredths.

The number is

- 2 Make the numbers on a place value chart and write down the value of the underlined digit.

3.47

2.15

0.6

25.03

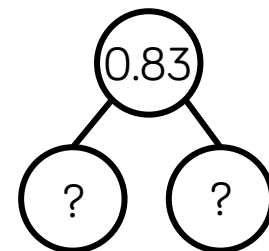
- 3 Fill in the missing numbers.

$$0.83 = \boxed{\phantom{00}} + 0.03$$

$$= \boxed{\phantom{00}} \text{ and 3 hundredths.}$$

$$0.83 = 0.7 + \boxed{\phantom{00}}$$

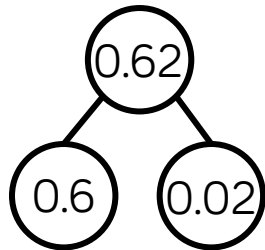
$$= 7 \text{ tenths and } \boxed{\phantom{00}}$$



## Write Decimals

## Reasoning and Problem Solving

Sally says there is only one way to partition 0.62



Prove Sally wrong by finding at least 3 different ways to partition 0.62

$$\begin{aligned}0.62 &= 0.5 + 0.12 \\0.62 &= 0.4 + 0.22 \\0.62 &= 0.3 + 0.32 \\0.62 &= 0.2 + 0.42 \\0.62 &= 0.1 + 0.52 \\0.62 &= 0 + 0.62\end{aligned}$$

Match each description to the correct number.



Charlie

My number has the same amount of tens as tenths.



Dylan

My number has one decimal place.



Megan

My number has two hundredths.



Jess

My number has six tenths.

46.2

2.64

46.02

40.46

Charlie: 40.46  
Dylan: 46.2  
Megan: 46.02  
Jess: 2.64

# Compare Decimals

## Notes and Guidance

Children apply their understanding of place value to compare decimals with up to two decimal places.

They will consolidate and deepen their understanding of 0 as a place holder and the exchange between one tenth for ten hundredths.

## Mathematical Talk

How many tenths does it have? What if you exchanged the one, how many tenths would it have then?

There are \_\_\_ tenths and \_\_\_ hundredths

The number is \_\_\_ . \_\_\_

\_\_\_ . \_\_\_ is \_\_\_\_\_ than \_\_\_ . \_\_\_ because ...

Can you use the digit cards to create two numbers which would have the greatest difference?

## Varied Fluency

- Write the decimals and compare using  $<$  or  $>$

Ones	Tenths	Hundredths
	• • • • •	• • • • •



Ones	Tenths	Hundredths
	• • • • •	• • • • •

- Complete the place value chart so that the statements are correct.

Ones	Tenths	Hundredths
• • • • •	• • • • •	• • • • •



Ones	Tenths	Hundredths

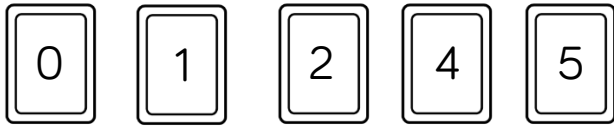
- Fill in the blanks

- 3.32  $\bigcirc$  3.23
- 0.14  $\bigcirc$  0.29
- 1.14  $\bigcirc$  0.64
- 5.5  $\bigcirc$  5.7
- 0.37  $<$  0. \_\_\_ 7
- 2.22  $>$  2. \_\_\_ 2
- 1. \_\_\_ 1  $>$  1. \_\_\_ 1
- 9.9\_\_\_  $<$  9.9\_\_\_

## Compare Decimals

## Reasoning and Problem Solving

Use each digit card once to complete the statement:



3.     >   .    

Can you find eight different possible solutions?

Some possible solutions:

$$3.12 > 0.45$$

$$3.24 > 1.05$$

$$3.45 > 1.02$$

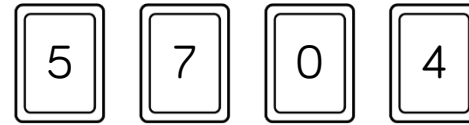
$$3.01 > 2.45$$

$$3.42 > 2.01$$

$$3.45 > 0.12$$

$$3.02 > 1.45$$

$$3.24 > 1.05$$



Use the digit cards to make the greatest possible number.

  .    

Use the digit cards to make the smallest possible number.

  .    

The greatest:

7.54

The smallest:

0.45



# Order Decimals

## Notes and Guidance

Children apply their understanding of place value to order decimals with up to two decimal places.

They will consolidate and deepen their understanding of 0 as a place holder, the inequality symbols and language such as ascending and descending.

## Mathematical Talk

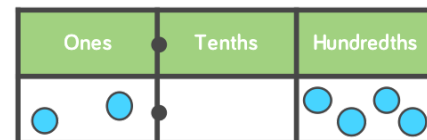
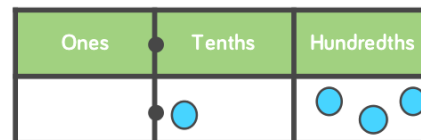
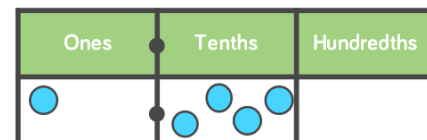
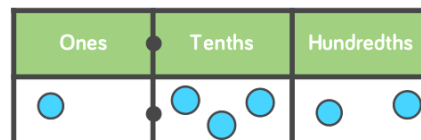
Which digit do you look at first when ordering decimals?

If two numbers with one decimal place are made with the same digits, will they always be equal? Prove it.

\_\_\_ . \_\_\_ \_\_\_ is \_\_\_\_\_ than \_\_\_ . \_\_\_ \_\_\_ because ...

## Varied Fluency

- Write the decimals, then place them in ascending order.



- Place the numbers in descending order.

46.2

2.64

46.02

40.46

- Fill in the blanks

• 3.32 ○ 3.23 ○ 2.32

• 0.1\_\_ &lt; 0.1\_\_ &lt; 0.15

• 1.11 ○ 1.12 ○ 1.13

• 1.9\_\_ &lt; 1.9\_\_ &lt; 2.01

• 4.44 ○ 4.34 ○ 4.04

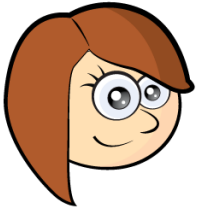
• 6.67 &gt; 6.\_\_7 &gt; 6.37

## Order Decimals

### Reasoning and Problem Solving

#### Spot the Mistake

Tallulah is ordering some numbers in ascending order:



$1.2 < 0.21 < 0.32 < 0.69 < 0.84$

Can you explain her mistake?

1.2 is the largest because it has 1 one.  
Tallulah has ignored the digit in the ones column because the rest of them are in ascending order.

Some children have planted sunflowers and they are measuring their heights.

Child	Height
Beth	1.23 m
Tony	0.95 m
Rachel	1.02 m
Kate	1.2 m
Faye	99 cm
Emma	0.97 m

Order the children based on their heights in both ascending and descending order.



Ascending:  
Tony, Emma, Faye,  
Rachel, Kate, Beth

Descending:  
Beth, Kate, Rachel,  
Faye, Emma, Tony

## Round Decimals

### Notes and Guidance

Children round decimals with 1 decimal place to the nearest whole number.

They look at the position of a decimal on a number line to help them see which whole numbers the decimal lies between.

Children look at the digit in the tenths column to help understand the rule of whether to round a number up or down.

### Mathematical Talk

Which whole numbers does the decimal lie between?

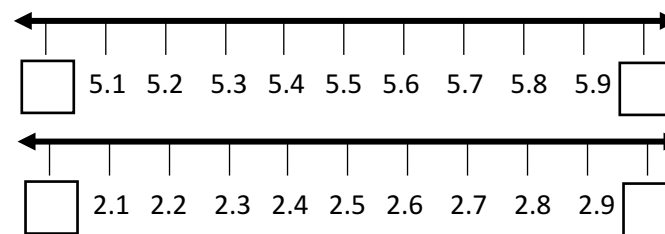
Which whole number is the decimal closer to on the number line?

Which column do we focus on when rounding to the nearest whole number?

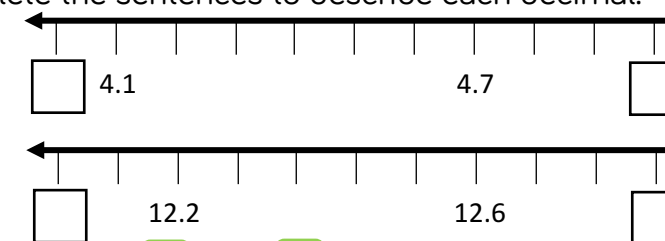
Which digits in the tenths column round down to the nearest whole number? Which digits in the tenths column round up to the nearest whole number?

### Varied Fluency

- 1 Which whole numbers do the decimals lie between?



- 2 Complete the sentences to describe each decimal.



is closer to  than

rounds to  to the nearest whole number.

- 3 Circle the numbers that round up to the nearest whole number.

4.5   3.7   2.3   4.2   16.8   1.9

## Round Decimals

### Reasoning and Problem Solving

Two numbers with 1 decimal place round to 23 to the nearest whole number. The numbers add together to make 46.

What could the two numbers be?

The numbers could be:

22.6 and 23.4  
22.7 and 23.3  
22.8 and 23.2  
22.9 and 23.1

A number with one decimal place rounded to the nearest whole number is 45.

What could the number be?

The number could be:

44.5, 44.6, 44.7,  
44.8, 44.9, 45.1,  
45.2, 45.3 or 45.4

# Halves and Quarters

## Notes and Guidance

Children write  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{3}{4}$  as decimals. They use concrete and pictorial representations to support the conversion.

Children use their knowledge of equivalent fractions to write fractions as hundredths and then write the fractions as halves or quarters.

## Mathematical Talk

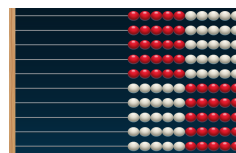
How would you record your answer as a decimal and a fraction?

Can you represent one quarter using decimal place value counters?

Can you represent three quarters using counters on a place value grid?

## Varied Fluency

- 1 Here is a Rekenrek with 100 beads.

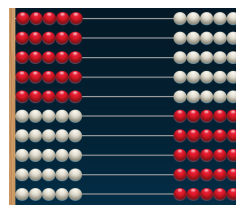


out of 100 beads are red.  
 out of 100 beads are white.  
 are red, and  are white.

Half of the beads are red and half are white.

$\frac{1}{2} = \frac{50}{100} = \frac{5}{10} = 0.5$  so  $\frac{1}{2}$  is  as a decimal.

- 2 The beads are split equally on each side of the Rekenrek.



There are 4 equal groups.  
 1 out of 4 equal groups =  beads.  
 1 out of 4 equal groups =   $\frac{\quad}{100}$

$\frac{1}{4} = \frac{\quad}{100} = \quad$

What fraction is represented by 3 out of the 4 groups?

Can you write this as a decimal?

$\frac{3}{4} = \frac{\quad}{100} = \quad$

## Halves and Quarters

### Reasoning and Problem Solving

Louisa says:

If I know  $\frac{1}{2}$  is 0.5 as a decimal, I also know  $\frac{3}{6}$ ,  $\frac{4}{8}$  and  $\frac{6}{12}$  are equivalent to 0.5 as a decimal.

Explain Louisa's thinking.

Louisa has used her knowledge of equivalent fractions to find other fractions that are equivalent to 0.5

True or False?

$$\frac{1}{2} = 1.2, \frac{1}{4} = 1.4 \text{ and } \frac{3}{4} = 3.4$$

Explain your answer.

False. The numerator and denominator have been placed either side of the decimal point rather than dividing the numerator by the denominator to find the decimal equivalent.