Year 4

Small Steps Guidance and Examples

Block 4 – Number: Decimals

White Rose Maths

Year 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			Measurement - Length and Perimeter	Number- Multiplication and Division			Consolidation
Spring	Number- Multiplication and Division			Measurement - Area	Fractions				Decimals			Consolidation
Summer	Decimals		Measurement- Money		Time	Statistics		Geometry- Properties of Shape			Geometry- Position and Direction	Consolidation

Overview

Small Steps

- Recognise tenths and hundredths
- 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

NC Objectives

Decimals
Recognise and write decimal equivalents of any number of tenths or hundredths.

Find the effect of dividing a one or two digit number by 10 or 100, identifying the value of the digits in the answer as ones, tenths and hundredths

Solve simple measure and money problems involving fractions and decimals to two decimal places.

Convert between different units of measure [for example, kilometre to metre]

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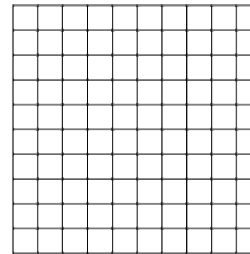
If each square is one square out of one hundred equal squares, what fraction does this represent?

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 $\dfrac{\square}{\square}$
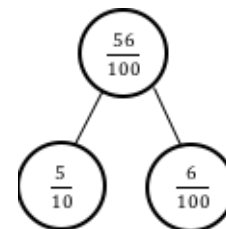
Each row is ___ out of ___ equal rows.

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

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.

$\frac{56}{100}$

$\frac{5}{10}$ $\frac{6}{100}$

Partition:
- 65 hundredths
- 31 hundredths
- 82 hundredths

Tenths & Hundredths

Reasoning and Problem Solving

Who is correct? Explain why.
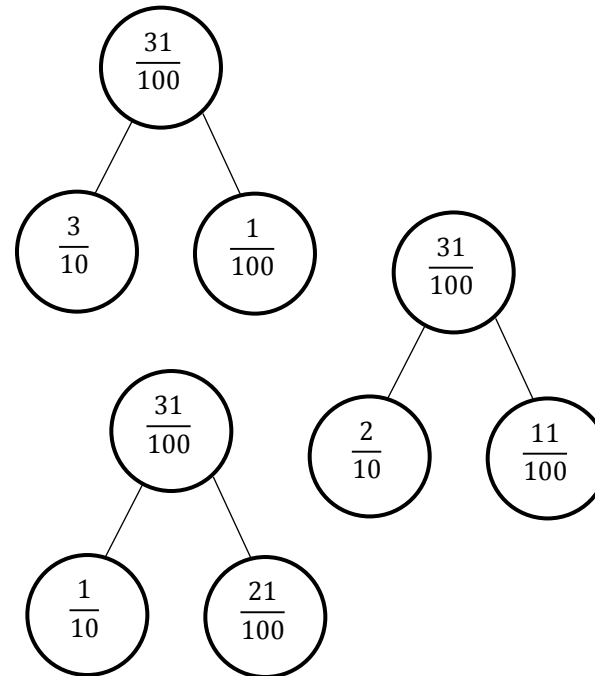
Lydia

5 hundredths is equivalent to 50 tenths.

Owen

50 hundredths is equivalent to 5 tenths.

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.

$\frac{31}{100}$

$\frac{3}{10}$ $\frac{1}{100}$ $\frac{31}{100}$

$\frac{31}{100}$ $\frac{2}{10}$ $\frac{11}{100}$

$\frac{1}{10}$ $\frac{21}{100}$

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

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.
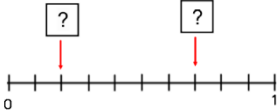
Mathematical Talk

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.

Jemima

1.2 is equivalent to 1 whole and 2 tenths.

Oscar

1.2 is equivalent to 12 tenths.

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

What is the difference between six tens and six tenths?

Show me.

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

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.
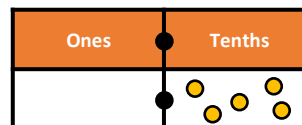
Mathematical Talk

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.

Ones	Tenths

Ones	Tenths

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
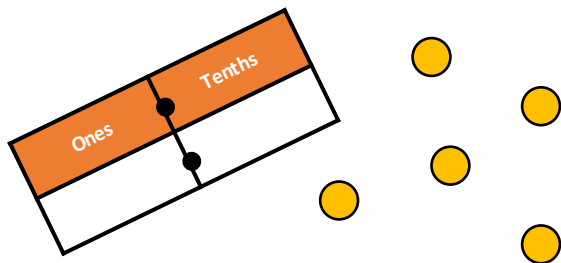
Reasoning and Problem Solving

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.
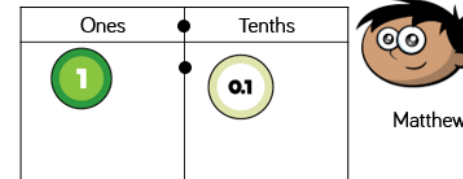
⬜ ones + ⬜ tenths = ⬜

Children can make:
0.5
1.4
2.3
3.2
4.1
5.0
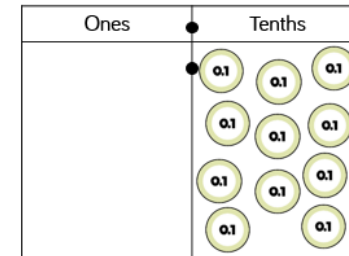
Two children built eleven tenths.

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
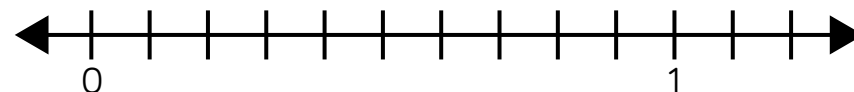
How many equal parts is the number line split into?

What are the jumps between each number?
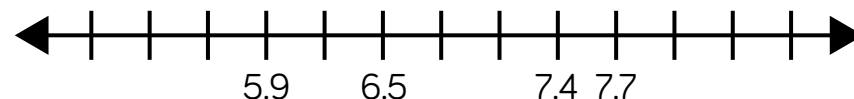
How many tenths are in one whole?

What is 0.1 metres in centimetres?

Varied Fluency

1 Fill in the missing decimals.

0 ———————————————— 1

2 Complete the number lines.

4 4.2 4.4   5 5.2   5.8

5.9   6.5   7.4 7.7

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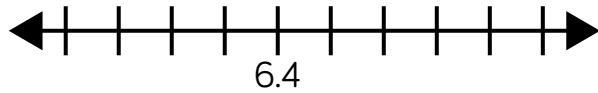

0   1

The ribbon is ☐ metres long.

Tenths on a Number Line

Reasoning and Problem Solving

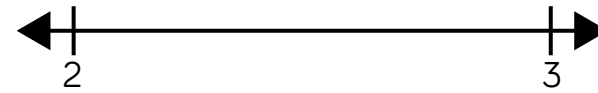What could the start and end numbers on the number line be?

6.4

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   3

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.
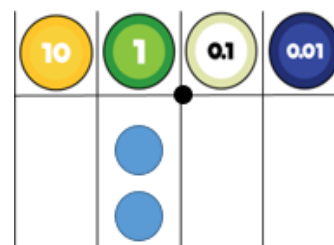
Mathematical Talk

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:

$3 \div 10 = \boxed{}$ $7 \div 10 = \boxed{}$ $\boxed{} = 4 \div 10$

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

When dividing by 10, we move the digits 1 place to the $\boxed{}$

$5 \div 10 = \boxed{}$

Use this method to solve:

$8 \div 10 = \boxed{}$ $\boxed{} = 9 \div 10$ $0.2 = \boxed{} \div 10$

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.

$4 \div 10 = 8 \div \boxed{} \div 10$

$15 \div 3 \div 10 = \boxed{} \div 10$

$64 \div \boxed{} \div 10 = 32 \div 4 \div 10$

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.
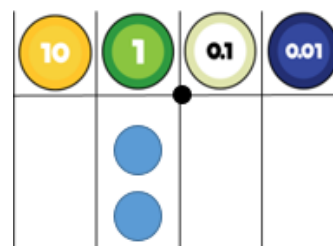
Mathematical Talk

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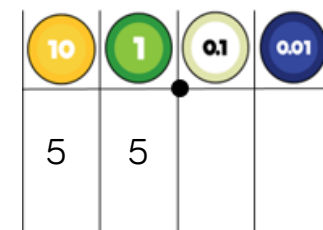
1. Tim uses counters to make a 2-digit number.

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:

$42 \div 10 = \boxed{}$ $35 \div 10 = \boxed{}$ $\boxed{} = 26 \div 10$

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

10	1	0.1	0.01
5	5		

When dividing by 10, we move the digits 1 place to the $\boxed{}$

$55 \div 10 = \boxed{}$

Use this method to solve:

$82 \div 10 = \boxed{}$ $\boxed{} = 93 \div 10$ $2.3 = \boxed{} \div 10$

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.
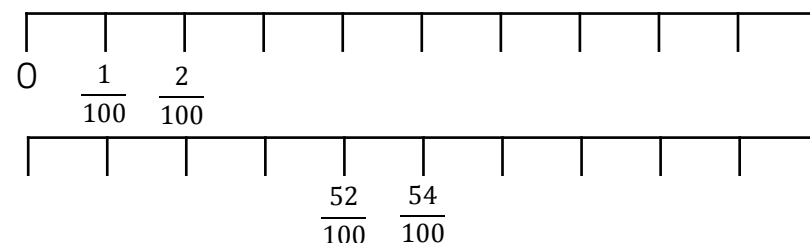
Mathematical Talk

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?
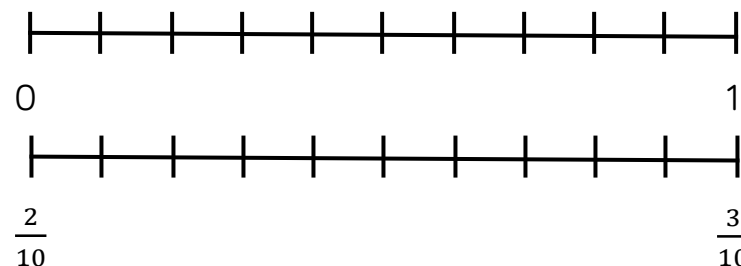
Varied Fluency

1. Complete the number lines.

$0 \quad \dfrac{1}{100} \quad \dfrac{2}{100}$

$\dfrac{52}{100} \quad \dfrac{54}{100}$

2. Complete the sequences.

- $\dfrac{27}{100}, \dfrac{28}{100}, \dfrac{29}{100}, \dfrac{30}{100}$ □, □, □

- $\dfrac{52}{100}, \dfrac{51}{100}, \dfrac{5}{10}$ □, □, □

3. Use fractions to complete the number lines.

$0 \qquad\qquad\qquad\qquad 1$

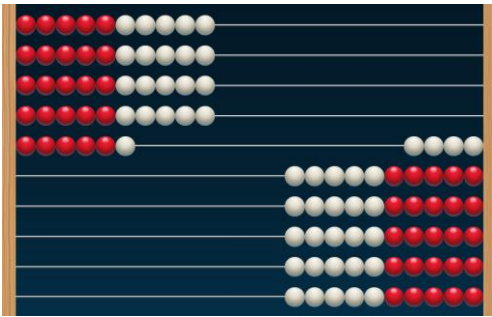$\dfrac{2}{10} \qquad\qquad\qquad\qquad \dfrac{3}{10}$

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

14 hundredths and 3 tenths = 4 tenths and ☐ hundredths

5 tenths and 1 hundredth < 5 tenths and ☐ hundredths

5 tenths and 1 hundredth > ☐ tenths and 5 hundredths

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

12

4

Anything more than 1

0, 1, 2, 3 or 4

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.
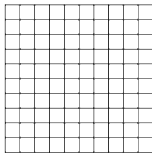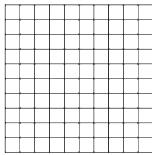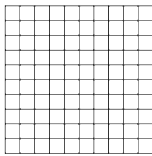
Mathematical Talk

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.

0.01 0.01 0.01 0.01

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.

The decimal represented is ___

2 Make the decimals on a place value grid.

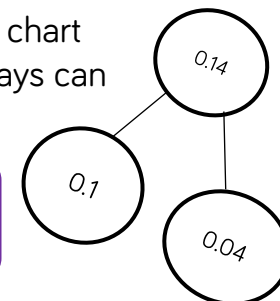| 0.34	0.43	0.03	0.11

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

0.14

0.1

0.04

Hundredths on a Place Value Grid
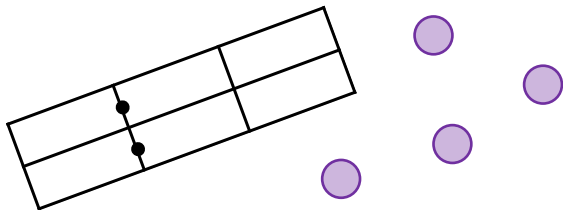
Reasoning and Problem Solving

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.
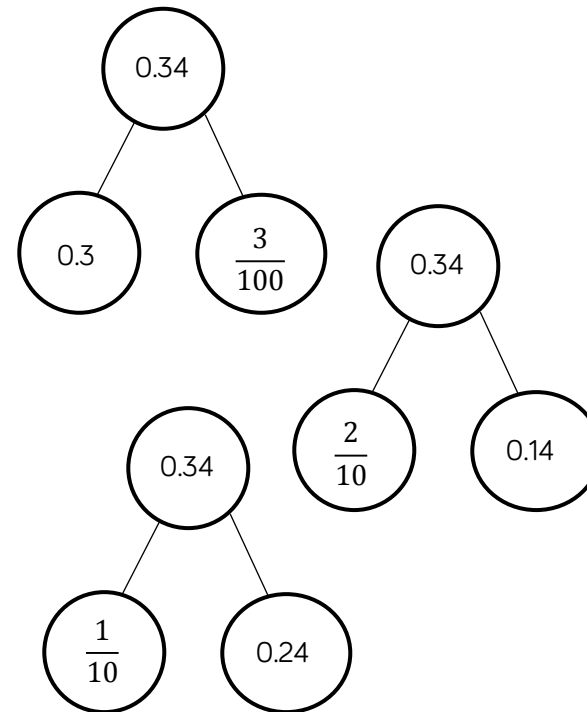
☐ ones + ☐ tenths + ☐ hundredths = ☐

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

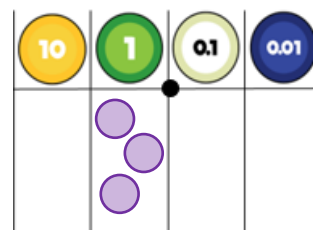What number is represented on the place value chart?
Why is 0 important when dividing a one or two-digit number by 100?
What is the same and what is different when dividing by 100 on a Gattegno chart compared to a place value chart?
What happens to the value of each digit when you divide by 10 and/or 100?

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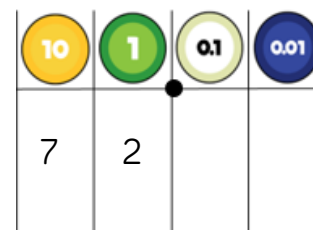
1 Theo uses counters to make a 1-digit number.

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:

$4 \div 100 = \boxed{}$ $5 \div 100 = \boxed{}$ $\boxed{} = 6 \div 100$

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

When dividing by 100, we move the digits 2 places to the $\boxed{}$

$72 \div 100 = \boxed{}$

Use this method to solve:

$82 \div 100 = \boxed{}$ $\boxed{} = 93 \div 100$ $0.23 = \boxed{} \div 100$

Divide 1 or 2-digits by 100

Reasoning and Problem Solving

Describe the pattern.

$$7,000 \div 100 = 70$$
$$700 \div 100 = 7$$
$$70 \div 100 = 0.7$$
$$7 \div 100 = 0.07$$

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.