

Scheme of Learning

Year 6

#MathsEveryoneCan



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Welcome

Welcome to the White Rose Maths' new, more detailed schemes of learning for 2018-19.

We have listened to all the feedback over the last 2 years and as a result of this, we have made some changes to our primary schemes. *They are bigger, bolder and more detailed than before.*

The new schemes still have the *same look and feel* as the old ones, but we have tried to provide more detailed guidance. We have worked with enthusiastic and passionate teachers from up and down the country, who are experts in their particular year group, to bring you additional guidance. *These schemes have been written for teachers, by teachers.*

We all believe that every child can succeed in mathematics. Thank you to everyone who has contributed to the work of White Rose Maths. It is only with your help that we can make a difference.

We hope that you find the new schemes of learning helpful. As always, get in touch if you or your school want support with any aspect of teaching maths.

If you have any feedback on any part of our work, do not hesitate to contact us. Follow us on Twitter and Facebook to keep up-to-date with all our latest announcements.

White Rose Maths Team

#MathsEveryoneCan

White Rose Maths contact details

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 White Rose Maths

What's included?

Our schemes include:

- Small steps progression. These show our blocks broken down into smaller steps.
- Small steps guidance. For each small step we provide some brief guidance to help teachers understand the key discussion and teaching points. This guidance has been written for teachers, by teachers.
- A more integrated approach to fluency, reasoning and problem solving.
- Answers to all the problems in our new scheme.
- We have also worked with Diagnostic Questions to provide questions for every single objective of the National Curriculum.

Teaching Notes and Examples

Count Objects to 100
Notes and Guidance
To build on skills learned in Year 1, children need to be able to count objects to 100 in both numerals and words.
Problems should be presented in a variety of ways e.g. numerals, words and images. Variation should challenge children by providing them with missing numbers which are non-consecutive.

Mathematical Talk
How can you count the cars? Do you have a strategy?
What is one more/one less?
Which is the largest number?
Which is the smallest number?
Write in words.

Varied Fluency
Count and write the number of cars in the car park.
There are ____ cars in the car park.
What numbers are represented below?
Write your answer in numerals and words.
Match the numerals to the words.

Answers to Reasoning Questions

Is he correct?
Explain your reasoning.

Here are two sets of objects.
Which are easier to count?
Explain your answer.

The strawberries are easier to count because they are set out on ten frames.

Jack is incorrect. He has 16 not 61.

Each jar contains 10 cookies.
How many cookies are there altogether?
Write your answer in numerals and words.
What strategy did you use?
Did your partner...

There are 48 (forty-eight) cookies altogether.
Children may count in 10s and 1s or know that there are 4 tens which are equal to 40 and then count on 8 more.

Small Steps Guidance

Overview
Small Steps

- Count objects to 100 and read and write numbers in numerals and words
- Represent numbers to 100
- Tens and ones with a part-whole model
- Tens and ones using addition
- Use a place value chart
- Compare objects
- Compare numbers
- Order objects and numbers
- Count in 2s, 5s and 10s
- Count in 3s

NC Objectives
Read and write numbers to at least 100 in numerals and in words.
Recognise the place value of each digit in a two-digit number (tens, ones).
Identify, represent and estimate numbers using different representations including the number line.
Compare and order numbers from 0 up to 100, use < and > signs.
Use place value and number facts to solve problems.
Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward and backward.

Meet the Team

The schemes have been developed by a wide group of passionate and enthusiastic classroom practitioners.



Caroline Hamilton



Beth Smith



Kelsey Brown



Mary-Kate Connolly



James Clegg



Jane Brown



Sam Shutkever



Kate Henshall

Special Thanks

The White Rose Maths team would also like to say a huge thank you to the following people who came from all over the country to contribute their ideas and experience. We could not have done it without you.

Year 2 Team

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Year 6 Team

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How to use the small steps

We were regularly asked how it is possible to spend so long on particular blocks of content and National Curriculum objectives.

We know that breaking the curriculum down into small manageable steps should help children understand concepts better. Too often, we have noticed that teachers will try and cover too many concepts at once and this can lead to cognitive overload. In our opinion, it is better to follow a small steps approach.

As a result, for each block of content we have provided a “Small Step” breakdown. We recommend that the steps are taught separately and would encourage teachers to spend more time on particular steps if they feel it is necessary. Flexibility has been built into the scheme to allow this to happen.

Teaching notes

Alongside the small steps breakdown, we have provided teachers with some brief notes and guidance to help enhance their teaching of the topic. The “Mathematical Talk” section provides questions to encourage mathematical thinking and reasoning, to dig deeper into concepts.

We have also continued to provide guidance on what varied fluency, reasoning and problem solving should look like.

Year 2 | Autumn Term | Week 1 to 3 - Number: Place Value

Count Objects to 100

Notes and Guidance

To build on skills learned in Year 1, children need to be able to count objects to 100 in both numerals and words.

Problems should be presented in a variety of ways e.g. numerals, words and images. Variation should challenge children by providing them with missing numbers which are non-consecutive.

Mathematical Talk

How can you count the cars? Do you have a strategy?
What is one more/one less?

Which is the largest number?
Which number is tricky to write in words?

Which numbers sound similar?
How are 17 and 70 different? Can you show me?

Varied Fluency

Count and write the number of cars in the car park.

There are _____ cars in the car park.

What numbers are represented below?
Write your answer in numerals and words.

Match the numerals to the words.

17	48	38	70
Thirty-eight	Seventy	Forty-eight	Seventeen

Assessments

Alongside these overviews, our aim is to provide an assessment for each term's plan. Each assessment will be made up of two parts:

Part 1: Fluency based arithmetic practice

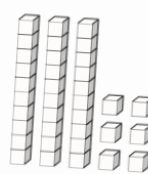
Part 2: Reasoning and problem solving based questions

Teachers can use these assessments to determine gaps in children's knowledge and use them to plan support and intervention strategies.

The assessments have been designed with new KS1 and KS2 SATs in mind.

For each assessment we provide a summary spread sheet so that schools can analyse their own data. We hope to develop a system to allow schools to make comparisons against other schools. Keep a look out for information next year.


16 Here are some cubes.



2 boys receive 8 cubes each.
The rest of the cubes are shared equally between 4 girls.
How many cubes does each girl receive?

Show your method

12 Marla spends $\frac{2}{7}$ of her weekly wage on a £120 bag.



How much does she earn in a week?

Show your method

2 marks

Teaching for Mastery

These overviews are designed to support a mastery approach to teaching and learning and have been designed to support the aims and objectives of the new National Curriculum.

The overviews:

- have number at their heart. A large proportion of time is spent reinforcing number to build competency
- ensure teachers stay in the required key stage and support the ideal of depth before breadth
- ensure students have the opportunity to stay together as they work through the schemes as a whole group
- provide plenty of opportunities to build reasoning and problem solving elements into the curriculum

For more guidance on teaching for mastery, visit the NCETM website:

<https://www.ncetm.org.uk/resources/47230>

Concrete - Pictorial - Abstract

We believe that all children, when introduced to a new concept, should have the opportunity to build competency by taking this approach.

Concrete – children should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.

Pictorial – alongside this children should use pictorial representations. These representations can then be used to help reason and solve problems.

Abstract – both concrete and pictorial representations should support children's understanding of abstract methods.

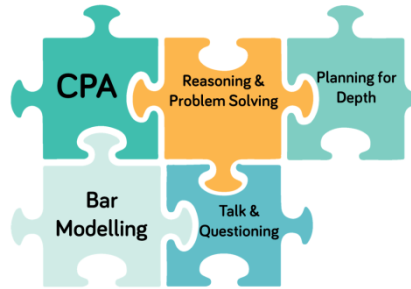
Need some CPD to develop this approach? Visit www.whiterosemaths.com for find a course right for you.

Training

White Rose Maths offer a plethora of training courses to help you embed teaching for mastery at your school.

Our popular JIGSAW package consists of five key elements:

- CPA
- Bar Modelling
- Mathematical Talk & Questioning
- Planning for Depth
- Reasoning & Problem Solving



For more information and to book visit our website www.whiterosemaths.com or email us directly at support@whiterosemaths.com

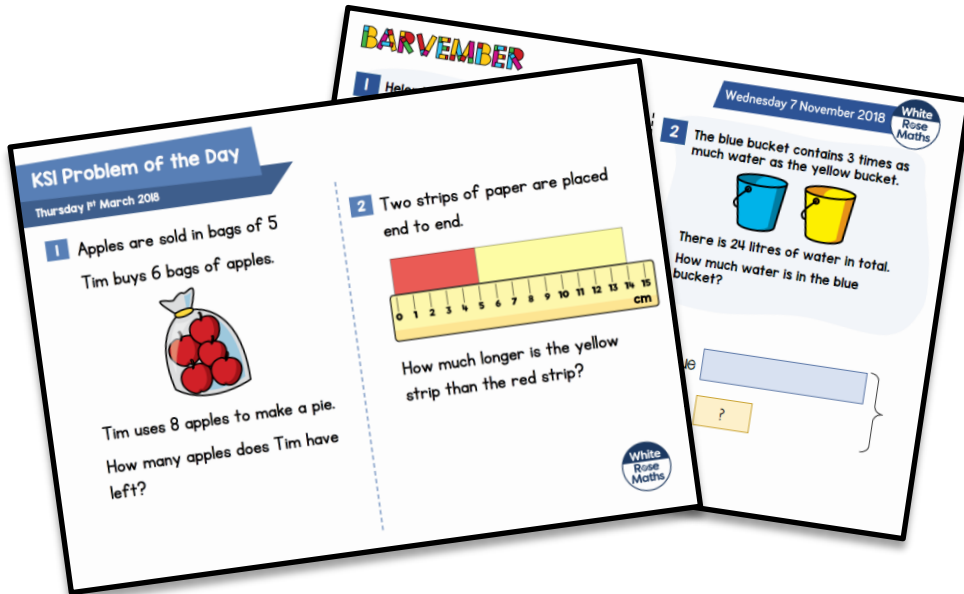


Additional Materials

In addition to our schemes and assessments we have a range of other materials that you may find useful.

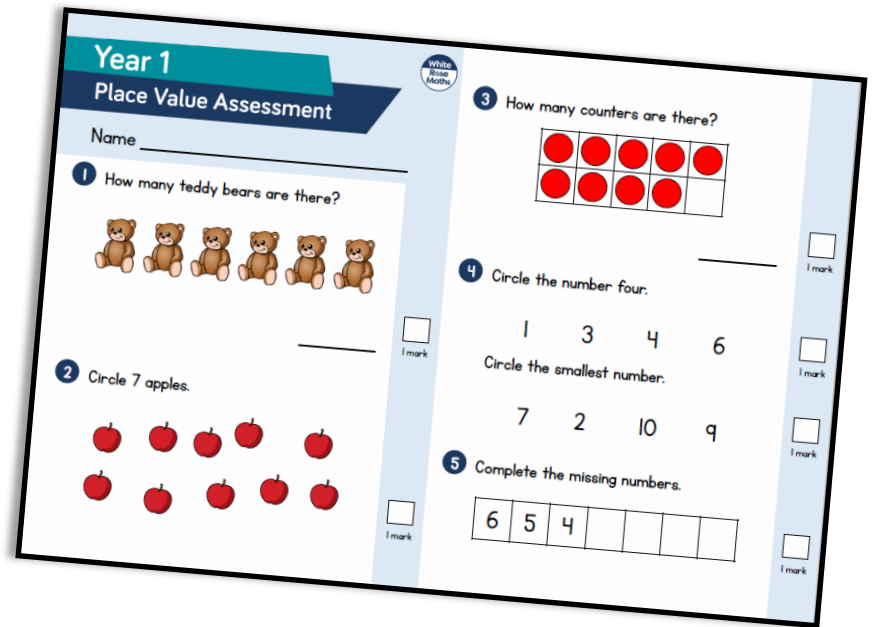
KS1 and KS2 Problem Solving Questions

For the last three years, we have provided a range of KS1 and KS2 problem solving questions in the run up to SATs. There are over 200 questions on a variety of different topics and year groups. You will also find more questions from our Barvember campaign.



End of Block Assessments

New for 2018 we are providing short end of block assessments for each year group. The assessments help identify any gaps in learning earlier and check that children have grasped concepts at an appropriate level of depth.



FAQs

If we spend so much time on number work, how can we cover the rest of the curriculum?

Children who have an excellent grasp of number make better mathematicians. Spending longer on mastering key topics will build a child's confidence and help secure understanding. This should mean that less time will need to be spent on other topics.

In addition, schools that have been using these schemes already have used other subjects and topic time to teach and consolidate other areas of the mathematics curriculum.

Should I teach one small step per lesson?

Each small step should be seen as a separate concept that needs teaching. You may find that you need to spend more time on particular concepts. Flexibility has been built into the curriculum model to allow this to happen. This may involve spending more or less than one lesson on a small step, depending on your class' understanding.

How do I use the fluency, reasoning and problem solving questions?

The questions are designed to be used by the teacher to help them understand the key teaching points that need to be covered. They should be used as inspiration and ideas to help teachers plan carefully structured lessons.

How do I reinforce what children already know if I don't teach a concept again?

The scheme has been designed to give sufficient time for teachers to explore concepts in depth, however we also interleave prior content in new concepts. E.g. when children look at measurement we recommend that there are lots of questions that practice the four operations and fractions. This helps children make links between topics and understand them more deeply. We also recommend that schools look to reinforce number fluency through mental and oral starters or in additional maths time during the day.

Meet the Characters

Children love to learn with characters and our team within the scheme will be sure to get them talking and reasoning about mathematical concepts and ideas. Who's your favourite?



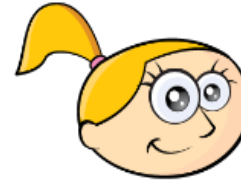
Teddy



Rosie



Mo



Eva



Alex



Jack



Whitney



Amir



Dora



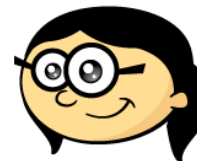
Tommy



Dexter



Ron



Annie

	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, Subtraction, Multiplication and Division				Number: Fractions				Geometry: Position and Direction	Consolidation
Spring	Number: Decimals		Number: Percentages		Number: Algebra		Measurement: Converting Units	Measurement: Perimeter, Area and Volume		Number: Ratio		Consolidation
Summer	Geometry: Properties of Shape		Problem Solving			Statistics		Investigations				Consolidation

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Spring - Block 1

Decimals

Overview

Small Steps

NC Objectives

- ▶ Three decimal places
- ▶ Multiply by 10, 100 and 1,000
- ▶ Divide by 10, 100 and 1,000
- ▶ Multiply decimals by integers
- ▶ Divide decimals by integers
- ▶ Division to solve problems
- ▶ Decimals as fractions
- ▶ Fractions to decimals (1)
- ▶ Fractions to decimals (2)

Identify the value of each digit in numbers given to 3 decimal places and multiply numbers by 10, 100 and 1,000 giving answers up to 3 decimal places.

Multiply 1-digit numbers with up to 2 decimal places by whole numbers.

Use written division methods in cases where the answer has up to 2 decimal places.

Solve problems which require answers to be rounded to specified degrees of accuracy.

Three Decimal Places

Notes and Guidance

Children recap their understanding of numbers with up to 3 decimal places. They look at the value of each place value column and describe its value in words and digits.

Children use concrete resources to investigate exchanging between columns e.g. 3 tenths is the same as 30 hundredths.

Mathematical Talk

How many tenths are there in the number? How many hundredths? How many thousandths?

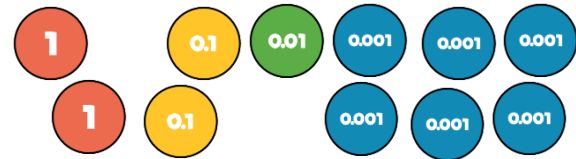
Can you make the number on the place value chart?

How many hundredths are the same as 5 tenths?

What is the value of the zero in this number?

Varied Fluency

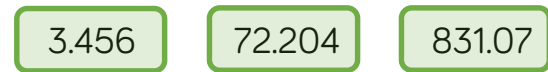
Complete the sentences.



There are ___ ones, ___ tenths, ___ hundredths and ___ thousandths.

The number in digits is _____

Use counters and a place value chart to represent these numbers.



Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths

Write down the value of the 3 in the following numbers.

0.53 362.44 739.8 0.013 3,420.98

Three Decimal Places

Reasoning and Problem Solving

Tommy says,



The more decimal places a number has, the smaller the number is.

Do you agree?
Explain why.

Possible answer:

I do not agree with this as the number 4.39 is smaller than the number 4.465, which has more decimal places.

Alex says that 3.24 can be written as 2 ones, 13 tenths and 4 hundredths.

Do you agree?

How can you partition 3.24 starting with 2 ones?

How can you partition 3.24 starting with 1 one?

Think about exchanging between columns.

Possible answer:

I disagree; Alex's numbers would total 3.34. I could make 3.24 by having 2 ones, 12 tenths and 4 hundredths or 1 one, 22 tenths and 4 hundredths.

Four children are thinking of four different numbers.

3.454	4.445
4.345	3.54

Teddy: "My number has four hundredths."

Alex: "My number has the same amount of ones, tenths and hundredths."

Dora: "My number has less ones than tenths and hundredths."

Jack: "My number has 2 decimal places."

Match each number to the correct child.

Teddy: 4.345

Alex: 4.445

Dora: 3.454

Jack: 3.54

Multiply by 10, 100 and 1,000

Notes and Guidance

Children multiply numbers with up to three decimal places by 10, 100 and 1,000

They discover that digits move to the left when they are multiplying and use zero as a place value holder. The decimal point does not move.

Once children are confident in multiplying by 10, 100 and 1,000, they use these skills to investigate multiplying by multiples of these numbers e.g. 2.4×20

Mathematical Talk

What number is represented on the place value chart?

Why is 0 important when multiplying by 10, 100 and 1,000?

What patterns do you notice?

What is the same and what is different when multiplying by 10, 100, 1,000 on the place value chart compared with the Gattegno chart?

Varied Fluency

Identify the number represented on the place value chart.

Thousands	Hundreds	Tens	Ones	Tenths	Hundredths
			● ●	●	

Multiply it by 10, 100 and 1,000 and complete the sentence stem for each.

When multiplied by ____ the counters move ____ places to the ____.

Use a place value chart to multiply the following decimals by 10, 100 and 1,000

6.4

6.04

6.004

Fill in the missing numbers in these calculations

$$32.4 \times \boxed{} = 324$$

$$1.562 \times 1,000 = \boxed{}$$

$$\boxed{} \times 100 = 208$$

$$4.3 \times \boxed{} = 86$$

Multiply by 10, 100 and 1,000

Reasoning and Problem Solving

Using the digit cards 0-9 create a number with up to 3 decimal places e.g. 3.451
 Cover the number using counters on your Gattegno chart.

10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
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

Explore what happens when you multiply your number by 10, then 100, then 1,000

What patterns do you notice?

Children will be able to see how the counter will move up a row for multiplying by 10, two rows for 100 and three rows for 1,000. They can see that this happens to each digit regardless of the value. For example, 3.451×10 becomes 34.51 Each counter moves up a row but stays in the same column.

Dora says,



When you multiply by 100, you should add two zeros.

Do you agree?
 Explain your thinking.

Children should explain that when you multiply by 100 the digits move two places to the left.

For example:
 $0.34 \times 100 = 0.3400$ is incorrect as 0.34 is the same as 0.3400

Also:
 $0.34 + 0 + 0 = 0.34$

Children show
 $0.34 \times 100 = 34$

Divide by 10, 100 and 1,000

Notes and Guidance

Once children understand how to multiply decimals by 10, 100 and 1,000, they can apply this knowledge to division, which leads to converting between units of measure.

It is important that children continue to understand the importance of 0 as a place holder. Children also need to be aware that 2.4 and 2.40 are the same. Similarly, 12 and 12.0 are equivalent.

Mathematical Talk

What happens to the counters/digits when you divide by 10, 100 or 1,000?

Why is zero important when dividing by 10, 100 and 1,000?

What is happening to the value of the digit each time it moves one column to the right?

What are the relationships between tenths, hundredths and thousandths?

Varied Fluency

Use the place value chart to divide the following numbers by 10, 100 and 1,000

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths

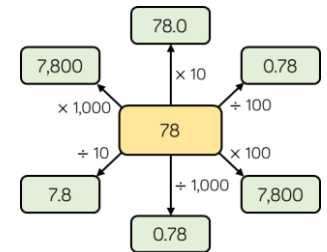
44

1.36

107

5

Tick the correct answers. Can you explain the mistakes with the incorrect answers?



Complete the table.

	÷ 10	÷ 100	÷ 1,000
30			
3 kg			
	0.9		
			9.0
		9.09	

Divide by 10, 100 and 1,000

Reasoning and Problem Solving

Using the following rules, how many ways can you make 70?

- Use a number from column A
- Use an operation from column B.
- Use number from column C.

A	B		C
0.7	×	÷	0.1
7			1
70			10
700			100
7,000			1,000

Possible answers:

- 0.7×100
- 7×10
- 70×1
- $700 \div 10$
- $7,000 \div 100$
- $70 \div 1$

Can you find a path from 6 to 0.06?
You cannot make diagonal moves.

6	× 10	× 10	÷ 100
÷ 10	× 100	× 100	÷ 10
× 10	÷ 10	÷ 1,000	÷ 100
÷ 1,000	× 1,000	× 100	0.06

Is there more than one way?

6	× 10	× 10	÷ 100
÷ 10	× 100	× 100	÷ 10
× 10	÷ 10	÷ 1,000	÷ 100
÷ 1,000	× 1,000	× 100	0.06

(Note: Red arrows in the original image show a path from 6 to 0.06: 6 → ÷ 10 → × 100 → ÷ 10 → ÷ 1,000 → × 100 → 0.06)

Eva says,

When you divide by 10, 100 or 1,000 you just take away the zeros or move the decimal point.



Do you agree?
Explain why.

Eva is wrong, the decimal point never moves. When dividing, the digits move right along the place value columns.

Possible examples to prove Eva wrong:

$$24 \div 10 = 2.4$$

$$107 \div 10 = 10.7$$

This shows that you cannot just remove a zero from the number

Multiply Decimals by Integers

Notes and Guidance

Children use concrete resources to multiply decimals and explore what happens when you exchange with decimals.

Children use their skills in context and make links to money and measures.

Mathematical Talk

Which is bigger, 0.1, 0.01 or 0.001? Why?

How many 0.1s do you need to exchange for a whole one?

Can you draw a bar model to represent the problem?

Can you think of another way to multiply by 5? (e.g. multiply by 10 and divide by 2).

Varied Fluency

- Use the place value counters to multiply 1.212 by 3. Complete the calculation alongside the concrete representation.

Tens	Ones	Tenths	Hundredths	Thousandths
	1	0.1 0.1	0.01	0.001 0.001
	1	0.1 0.1	0.01	0.001 0.001
	1	0.1 0.1	0.01	0.001 0.001

- A jar of sweets weighs 1.213 kg. How much would 4 jars weigh?



- Rosie is saving her pocket money. Her mum says,

“Whatever you save, I will give you five times the amount.”

If Rosie saves £2.23, how much will her mum give her?
 If Rosie saves £7.76, how much will her mum give her? How much will she have altogether?

Multiply Decimals by Integers

Reasoning and Problem Solving

Whitney says,

When you multiply a number with 2 decimal places by an integer, the answer will always have more than 2 decimal places.



Do you agree?
Explain why.

Possible answer:

I do not agree because there are examples such as 2.23×2 that gives an answer with only two decimal places.

Fill in the blanks

$$\begin{array}{r}
 3.45 \\
 \times \quad \square \\
 \hline
 0.30 \\
 \square.40 \\
 1\square.00 \\
 \hline
 \square\square.\square\square
 \end{array}$$

$$\begin{array}{r}
 3.45 \\
 \times \quad 6 \\
 \hline
 0.30 \\
 2.40 \\
 18.00 \\
 \hline
 20.70
 \end{array}$$

Chocolate eggs can be bought in packs of 1, 6 or 8
What is the cheapest way for Dexter to buy 25 chocolate eggs?

1 chocolate egg
52p

6 chocolate eggs
£2.85

8 chocolate eggs
£4

£11.92
He should buy four packs of 6 plus an individual egg.

Divide Decimals by Integers

Notes and Guidance

Children continue to use concrete resources to divide decimals and explore what happens when exchanges take place.

Children build on their prior knowledge of sharing and grouping when dividing and apply this skill in context.

Mathematical Talk

Are we grouping or sharing?

How else could we partition the number 3.69? (For example, 2 ones, 16 tenths and 9 hundredths.)

How could we check that our answer is correct?

Varied Fluency



Divide 3.69 by 3

Use the diagrams to show the difference between grouping and by sharing?

Ones	Tenths	Hundredths
1 1	0.1 0.1	0.01 0.01
1	0.1 0.1	0.01 0.01
1	0.1 0.1	0.01 0.01

Ones	Tenths	Hundredths
1	0.1 0.1	0.01 0.01 0.01
1	0.1 0.1	0.01 0.01 0.01
1	0.1 0.1	0.01 0.01 0.01

Use these methods to complete the sentences.

3 ones divided by 3 is _____ ones.

6 tenths divided by 3 is _____ tenths.

9 hundredths divided by 3 is _____ hundredths.

Therefore, 3.69 divided by 3 is _____



Decide whether you will use grouping or sharing and use the place value chart and counters to solve:

$$7.55 \div 5$$

$$8.16 \div 3$$

$$3.3 \div 6$$



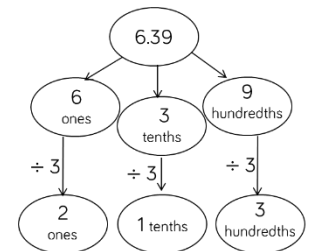
Amir solves $6.39 \div 3$ using a part whole method.

Use this method to solve

$$8.48 \div 2$$

$$6.9 \div 3$$

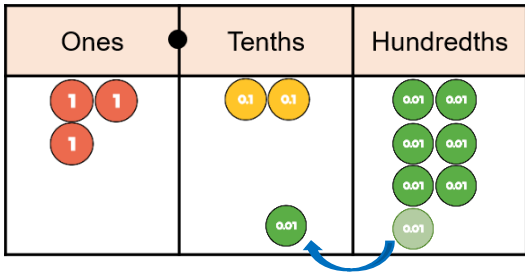
$$6.12 \div 3$$



Divide Decimals by Integers

Reasoning and Problem Solving

When using the counters to answer 3.27 divided by 3, this is what Tommy did:



Tommy says,



I only had 2 counters in the tenths column, so I moved one of the hundredths so each column could be grouped in 3s.

Do you agree with what Tommy has done? Explain why.

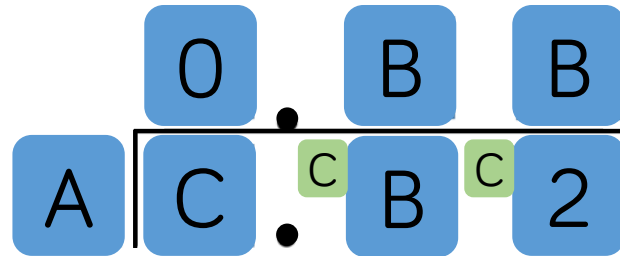
Possible answer:

Tommy is incorrect because he cannot move a hundredth to the tenths. He should have exchanged the 2 tenths for hundredths to get an answer of 1.09

$$C \text{ is } \frac{1}{4} \text{ of } A$$

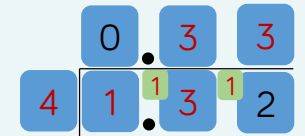
$$B = C + 2$$

Use the clues to complete the division.



Children may try A as 8 and C as 2 but will realise that this cannot complete the whole division.

Therefore A is 4, B is 3 and C is 1



Division to Solve Problems

Notes and Guidance

Children will apply their understanding of division to solve problems in cases where the answer has up to 2 decimal places.

Children will continue to show division using place value counters and exchanging where needed.

Mathematical Talk


How can we represent this problem using a bar model?


How will we calculate what this item costs?


How will we use division to solve this?

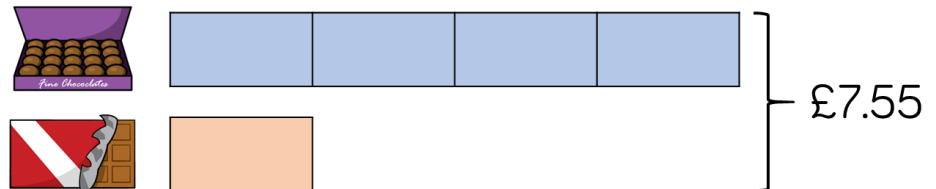
How will we label our bar model to represent this?

Varied Fluency

-  Mrs Forbes has saved £4,960
 She shares the money between her 15 grandchildren.
 How much do they each receive?

-  Modelling clay is sold in two different shops.
 Shop A sells four pots of clay for £7.68
 Shop B sells three pots of clay for £5.79
 Which shop has the better deal?
 Explain your answer.

-  A box of chocolates costs 4 times as much as a chocolate bar.
 Together they cost £7.55



How much does each item cost?
 How much more does the box of chocolates cost?

Division to Solve Problems

Reasoning and Problem Solving

Each division sentence can be completed using the digits below.



$$\square . 3 \div \square = 0.26$$

$$12 . \square \div \square = 4.2$$

$$4 . \square 8 \div \square = 1.07$$

$$1.3 \div 5 = 0.26$$

$$12.6 \div 3 = 4.2$$

$$4.28 \div 4 = 1.07$$

Jack and Rosie are both calculating the answer to $147 \div 4$

Jack says,



The answer is 36 remainder 3

Rosie says,



The answer is 36.75

Who do you agree with?

They are both correct.

Rosie has divided her remainder of 3 by 4 to get 0.75 whereas Jack has recorded his as a remainder.

Decimals as Fractions

Notes and Guidance

Children explore the relationship between decimals and fractions. They start with a decimal and use their place value knowledge to help them convert it into a fraction.

Children will use their previous knowledge of exchanging between columns, for example, 3 tenths is the same as 30 hundredths.

Once children convert from a decimal to a fraction, they simplify the fraction to help to show patterns.

Mathematical Talk

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

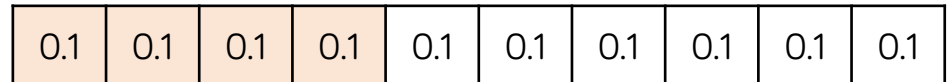
How would you convert the tenths to hundredths?

What do you notice about the numbers that can be simplified in the table?

Can you have a unit fraction that is larger than 0.5? Why?

Varied Fluency

- What decimal is shaded?
Can you write this as a fraction?



- Complete the table.

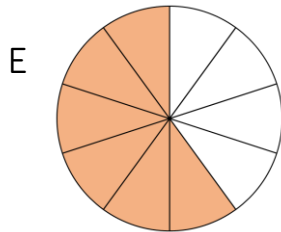
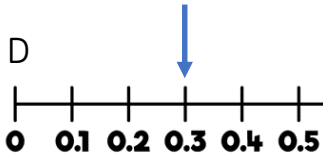
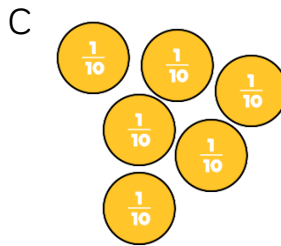
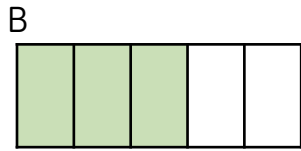
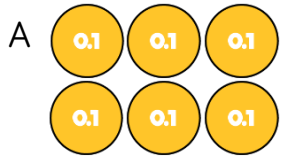
Decimal	Fraction in tenths or hundredths	Simplified fraction
0.6	$\frac{6}{10}$	$\frac{3}{5}$
0.95		

- Three friends share a pizza. Sam ate 0.25 of the pizza, Mark ate 0.3 of the pizza and Jill ate 0.35 of the pizza.
 - Can you write the amount each child ate as a fraction?
 - What fraction of the pizza is left?

Decimals as Fractions

Reasoning and Problem Solving

Odd one out.



F 0.2×3

Which is the odd one out and why?

Possible response:

D is the odd one out because it shows 0.3

Explore how the rest represent 0.6

Alex says,



0.84 is equivalent to $\frac{84}{10}$

Do you agree?
Explain why.

Possible response:

Alex is wrong because 0.84 is 8 tenths and 4 hundredths and $\frac{84}{10}$ is 84 tenths.

Fractions to Decimals (1)

Notes and Guidance

At this point children should know common fractions, such as thirds, quarters, fifths and eighths, as decimals.

Children explore how finding an equivalent fraction where the denominator is 10, 100 or 1,000 makes it easier to convert from a fraction to a decimal.

They investigate efficient methods to convert fractions to decimals.

Mathematical Talk

How many hundredths are equivalent to one tenth?

How could you convert a fraction to a decimal?

Which is the most efficient method? Why?

Which equivalent fraction would be useful?

Varied Fluency

Match the fractions to the equivalent decimals.

$$\frac{2}{5}$$

$$0.04$$

$$\frac{1}{25}$$

$$0.4$$

$$\frac{1}{4}$$

$$0.25$$

Use your knowledge of known fractions to convert the fractions to decimals. Show your method for each one.

$$\frac{7}{20}$$

$$\frac{3}{4}$$

$$\frac{2}{5}$$

$$\frac{6}{200}$$

Mo says that $\frac{63}{100}$ is less than 0.65


Do you agree with Mo?
Explain your answer.

Fractions to Decimals (1)

Reasoning and Problem Solving


Amir says,

The decimal 0.42 can be read as ‘four tenths and two hundredths’.



Teddy says,

The decimal 0.42 can be read as ‘forty-two hundredths’.



Who do you agree with?
Explain your answer.

True or False?

0.3 is bigger than $\frac{1}{4}$

Explain your reasoning.

Both are correct. Four tenths are equivalent to forty hundredths, plus the two hundredths equals forty-two hundredths.

True because $\frac{1}{4}$ is 25 hundredths and 0.3 is 30 hundredths. Therefore, 0.3 is bigger.

Dora and Whitney are converting $\frac{30}{500}$ into a decimal.

- Dora doubles the numerator and denominator, then divides by 10
- Whitney divides both the numerator and the denominator by 5
- Both get the answer $\frac{6}{100} = 0.06$

Which method would you use to work out each of the following?

$\frac{25}{500}$

$\frac{125}{500}$

$\frac{40}{500}$

$\frac{350}{500}$

Explain why you have used a certain method.

Possible response:

$\frac{25}{500}$ - divide by 5, known division fact.

$\frac{125}{500}$ - double, easier than dividing 125 by 5

$\frac{40}{500}$ - divide by 5, known division fact.

$\frac{350}{500}$ - double, easier than dividing 350 by 5

Fractions to Decimals (2)

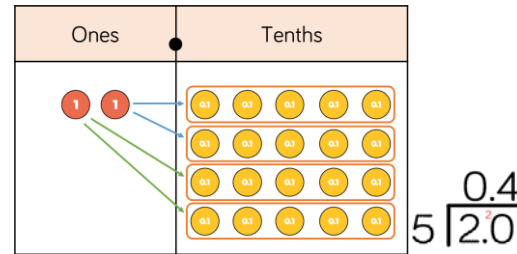
Notes and Guidance

It is important that children recognise that $\frac{3}{4}$ is the same as $3 \div 4$. They can use this understanding to find fractions as decimals by then dividing the numerator by the denominator.

In the example provided, we cannot make any equal groups of 5 in the ones column so we have exchanged the 2 ones for 20 tenths. Then we can divide 20 into groups of 5

Varied Fluency

- Deena has used place value counters to write $\frac{2}{5}$ as a decimal. She has divided the numerator by the denominator.



Use this method to convert the fractions to decimals. Give your answers to 2 decimal places.

$$\frac{1}{2}$$

$$\frac{3}{4}$$

Mathematical Talk

Do we divide the numerator by the denominator or divide the denominator by the numerator? Explain why.

When do we need to exchange?

Are we grouping or are we sharing? Explain why.

Why is it useful to write 2 as 2.0 when dividing by 5?

Why is it not useful to write 5 as 5.0 when dividing by 8?

- Use the short division method to convert the fractions to decimals. Write the decimals to three decimal places.

$$\frac{5}{8} \quad \frac{4}{5} \quad \frac{8}{5}$$

- 8 friends share 7 pizzas. How much pizza does each person get? Give your answer as a decimal and as a fraction.

Fractions to Decimals (2)

Reasoning and Problem Solving

Rosie and Tommy have both attempted to convert $\frac{2}{8}$ into a decimal.



I converted $\frac{2}{8}$ into 0.25

I converted $\frac{2}{8}$ into 4

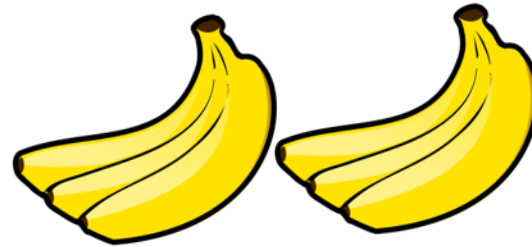


Who is correct?
Prove it.

Rosie is correct and Tommy is incorrect.

Tommy has divided 8 by 2 rather than 2 divided by 8 to find the answer.

Mo shares 6 bananas between some friends.



Each friend gets 0.75 of a banana.

How many friends does he share the bananas with?

Show your method.

Mo shares his 6 bananas between 8 friends because 6 divided by 8 equals 0.75

Children may show different methods:

Method 1: Children add 0.75 until they reach 6. This may involve spotting that 4 lots of 0.75 equals 3 and then they double this to find 8 lots of 0.75 equals 6

Method 2: Children use their knowledge that 0.75 is equivalent to $\frac{3}{4}$ to find the equivalent fraction of $\frac{6}{8}$