Autumn Scheme of Learning

Year 3

#MathsEveryoneCan

2020-21

White Rose Maths

New for 2020/21

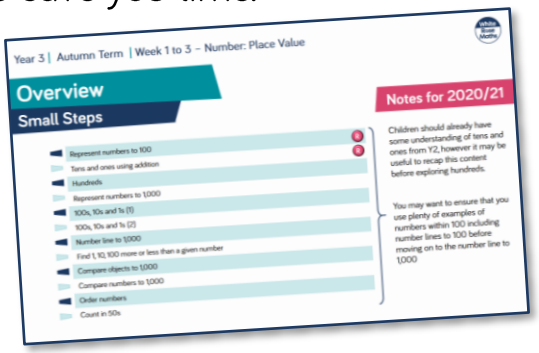
2020 will go down in history. The world has changed for all of us.

We want to do as much as we can to support children, teachers, parents and carers in these very uncertain times.

We have amended our schemes for 2020/21 to:

- ★ highlight key teaching points
- ★ recap essential content that children may have forgotten
- ★ flag any content that you might not have covered during the school closures period.

We hope these changes will add further value to the schemes and save you time.



Lesson-by-lesson overviews

We've always been reluctant to produce lesson-by-lesson overviews as every class is individual and has different needs. However, many of you have said that if blended learning becomes a key feature of school life next year, a weekly plan with linked content and videos could be really useful.

As always, we've listened! We've now produced a complete lesson-by-lesson overview for Y1 to Y9 that schools can use or adapt as they choose. Each lesson will be linked to a free-to-use home learning video, and for premium subscribers, a worksheet. This means that you can easily assign work to your class, whether they are working at home or in school.

Inevitably, this lesson-by-lesson structure won't suit everyone, but if it works for you, then please do make use of this resource as much as you wish.

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.

Supporting resources

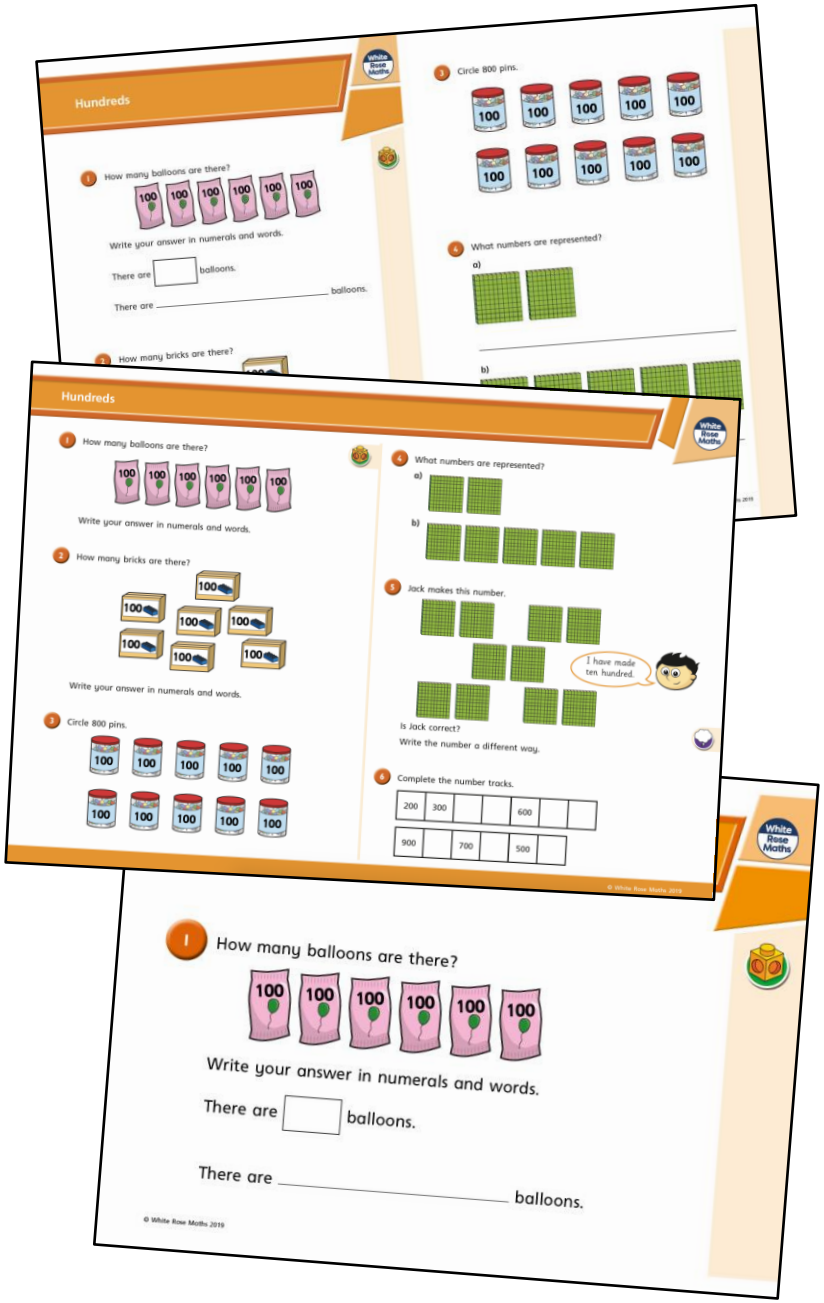
NEW for 2019-20!

We have produced supporting resources for every small step from Year 1 to Year 11.

The worksheets are provided in three different formats:

- Write on worksheet – ideal for children to use the ready made models, images and stem sentences.
- Display version – great for schools who want to cut down on photocopying.
- PowerPoint version – one question per slide. Perfect for whole class teaching or mixing questions to make your own bespoke lesson.

For more information visit our online training and resources centre resources.whiterosemaths.com or email us directly at support@whiterosemaths.com



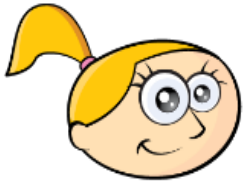
Meet the Characters

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 and Subtraction					Number: Multiplication and Division			
Spring	Number: Multiplication and Division			Measurement: Money	Statistics		Measurement: Length and Perimeter			Number: Fractions		Consolidation
Summer	Number: Fractions			Measurement: Time			Geometry: Properties of Shape		Measurement: Mass and Capacity			Consolidation

White Rose Maths

Autumn - Block 1

Place Value

Overview

Small Steps

Represent numbers to 100	R
Tens and ones using addition	R
Hundreds	
Represent numbers to 1,000	
100s, 10s and 1s (1)	
100s, 10s and 1s (2)	
Number line to 1,000	
Find 1, 10, 100 more or less than a given number	
Compare objects to 1,000	
Compare numbers to 1,000	
Order numbers	
Count in 50s	

Notes for 2020/21

Children should already have some understanding of tens and ones from Y2, however it may be useful to recap this content before exploring hundreds.

You may want to ensure that you use plenty of examples of numbers within 100 including number lines to 100 before moving on to the number line to 1,000

Represent Numbers to 100

Notes and Guidance

Children need to be able to represent numbers to 100 using a range of concrete materials, such as bead strings, straws, Base 10 equipment etc.

Children should also be able to state how a number is made up. For example, they can express 42 as 4 tens and 2 ones or as 42 ones.

Mathematical Talk

How have the beads been grouped? How does this help you count?

Can you show me the tens/ones in the number?

Which resource do you prefer to use for larger numbers? Which is quickest? Which would take a long time?

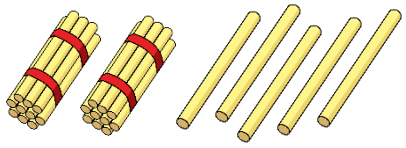
Varied Fluency

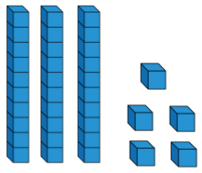
R

- Here is part of a bead string.

Complete the sentences.
There are _____tens and _____ones.
The number is _____.
Represent 45 on a bead string and complete the same sentence stems.

- Match the number to the correct representation.





One ten and five ones

Thirty-five

25

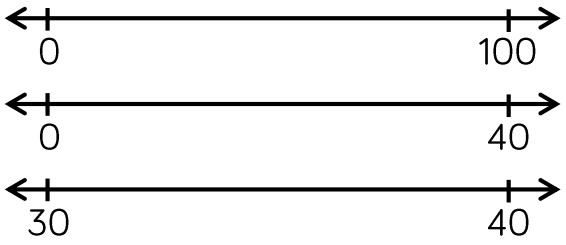
- Represent 67 in **three different** ways.

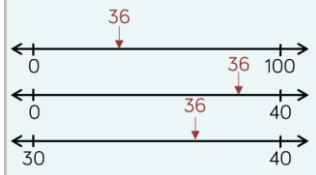
Represent Numbers to 100

Reasoning and Problem Solving

R

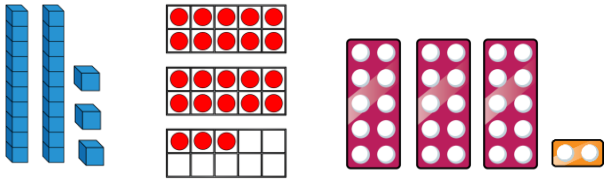
Where would 36 go on each of the number lines?





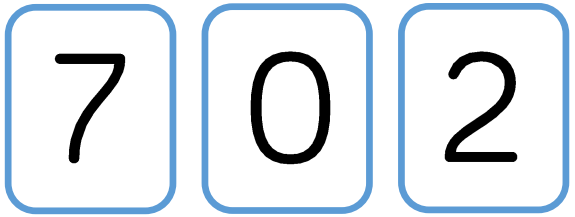
One of these images **does not** show 23
Can you explain the mistake?

A B C



C does not show 23, it shows 32
They have reversed the tens and ones.

How many two digit numbers can you make using the digit cards?



What is the largest number?
Prove it by using concrete resources.

What is the smallest number?
Prove it by using concrete resources.

Why can't the 0 be used as a tens number?

70, 20, 72, 27

The largest number is 72

The smallest number is 20

Because it would make a 1 digit number.

Tens and Ones (2)

Notes and Guidance

Children continue to use a part-whole model to explore how tens and ones can be partitioned and recombined to make a total.
Children will see numbers partitioned in different ways. For example, 39 written as 20 + 19
This small step will focus on using the addition symbol to express numbers to 100. For example, 73 can be written as 70 + 3 = 73

Mathematical Talk

What clues are there in the calculations? Can we look at the tens number or the ones number to help us?

What number completes the part-whole model?

What is the same/different about the calculations?

What are the key bits of information? Can you draw a diagram to help you?

Varied Fluency

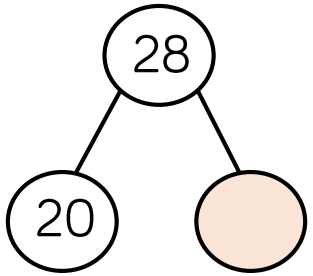
R

- Match the number sentence to the correct number.

20 + 19	10 + 4	40 + 0	80 + 1

40	14	81	39

- Complete the part-whole model and write four number sentences to match.



_____ + _____ = _____
_____ + _____ = _____
_____ = _____ + _____
_____ = _____ + _____

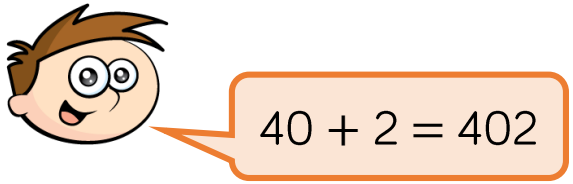
- Dora has 20 sweets and Amir has 15 sweets.
  Represent the total number of sweets:
  - With concrete resources.
  - In a part-whole model.
  - As a number sentence.

Tens and Ones (2)

Reasoning and Problem Solving

R

Teddy thinks that,



Explain the mistake he has made.

Can you show the correct answer using concrete resources?

40 + 2 = 42
Teddy has just combined the numbers to make 402 without thinking about their place value.

Fill in the missing numbers.

1 ten + 3 ones = 13

2 tens + ___ ones = 23

3 tens + 3 ones = ____

___ tens + 3 ones = 43

What would the next number in the pattern be?

1 ten + 3 ones = 13
2 tens + 3 ones = 23
3 tens + 3 ones = 33
4 tens + 3 ones = 43

5 tens + 3 ones = 53

Hundreds

Notes and Guidance

Children build on their understanding of tens and link this to 100

This is the first time they explore 100 explicitly. It is crucial children understand that ten tens make 100 and a hundred ones make 100

They use a variety of concrete equipment to see this relationship. Once children understand the concept of 100, they will count objects and numbers in multiples of 100 up to 1,000

Mathematical Talk

How many tens have you made? How else can we say this?

What do these digits represent?

How many ones have you made? How else can you say this?

If we continue counting in tens, what do we say after 100?

What numbers wouldn't we say?

Varied Fluency

- Use bundles of straws in tens, bead strings and Base 10 to explore how many tens make a hundred. Children use the equipment to count up and down in tens to make 100

There are 3 tens this is thirty.
There are _____ this is _____ .
There are _____ tens in one hundred.

- There are 100 sweets in each jar.

How many sweets are there altogether?
Write your answer in numerals and words.

- Complete the number tracks.

200	300		500			800	

	900	800			500		

Hundreds

Reasoning and Problem Solving

True or False?

If I count in 100s from zero, all of the numbers will be even.
Convince me.

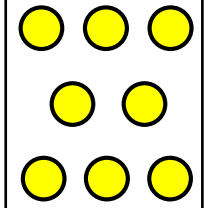
True, because if you start with zero and add 100 you get an even number, and you are adding another even so the number will always be even.

Sort these statements into always, sometimes or never.

- When counting in hundreds, the ones column changes.
- When counting in hundreds, the hundreds column changes.
- To count in hundreds we use 3-digit numbers.

- Never
- Always
- Sometimes

Whitney thinks the place value grid is showing the number eight.

Hundreds	Tens	Ones
		

Do you agree? Explain why.

Using all of the counters, what is the smallest number you can make?

What other numbers could you make?

Whitney is incorrect because there are eight counters in the hundreds column so they represent eight hundreds. The number is 800

The smallest number that can be made is 8

Other possible numbers include:
80
170
350
etc.

Numbers to 1,000

Notes and Guidance

In this small step, children will primarily use Base 10 to become familiar with any number up to 1,000

Using Base 10 will emphasise to children that hundreds are bigger than tens and tens are bigger than ones.

Children need to see numbers with zeros in different columns, and show them with concrete and pictorial representations.

Mathematical Talk

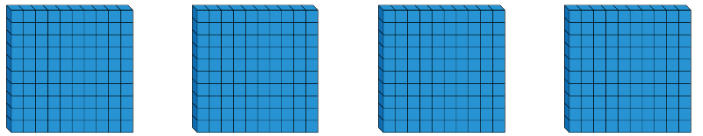
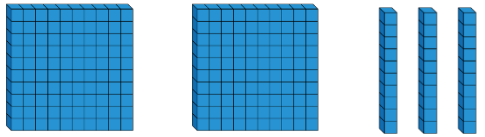
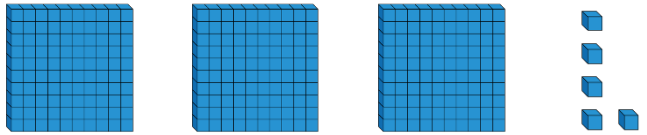
Does it matter which order you build the number in?

Can you have more than 9 of the same type of number e.g. 11 tens?

Can you create a part-whole model using or drawing Base 10 in each circle?

Varied Fluency

Write down the number represented with Base 10 in each case.

Representation	Number
	
	
	

Use Base 10 to represent the numbers.

700 120 407 999

Mo is drawing numbers. Can you complete them for him?

246 

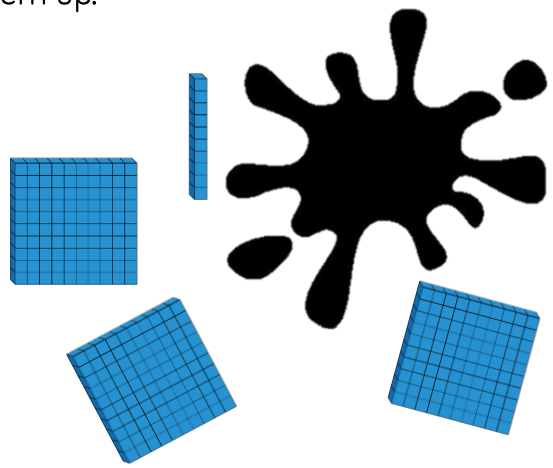
390 

706 

Numbers to 1,000

Reasoning and Problem Solving

Teddy has used Base 10 to represent the number 420. He has covered some of them up.



Work out the amount he has covered up.

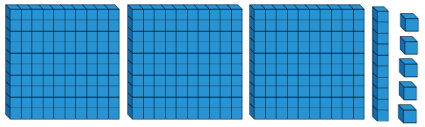
How many different ways can you make the missing amount using Base 10?

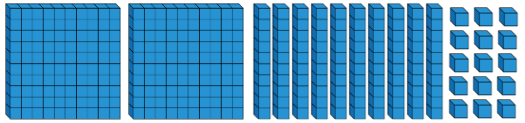
110 is the missing amount.

Possible ways:

- 1 hundred and 1 ten
- 11 tens
- 110 ones
- 10 tens and 10 ones
- 50 ones and 6 tens etc.

Which child has made the number 315?

Dora 

Mo 

Explain how you know.

Dora and Mo have both made the number 315, but represented it differently.

3 hundreds, 1 ten and 5 ones is the same as 2 hundreds, 10 tens and 15 ones.

100s, 10s and 1s (1)

Notes and Guidance

Children should understand that a 3-digit number is made up of 100s, 10s and 1s.

They read numbers shown in different representations on a place value grid, and write them in numerals.

They should be able to represent different 3-digit numbers in various ways such as Base 10 or numerals.

Mathematical Talk

What is the value of the number shown on the place value chart?

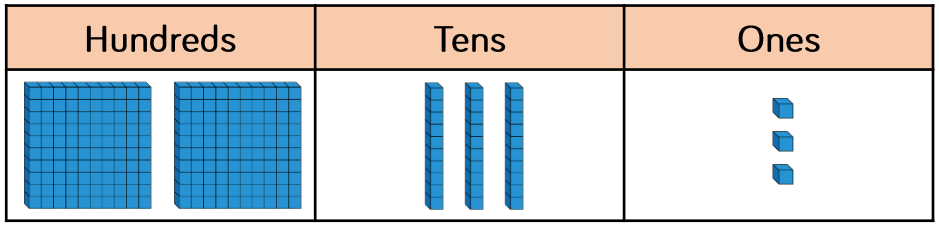
Why is it important to put the values into the correct column on the place value chart?

How many more are needed to complete the place value chart?

Can you make your own numbers using Base 10? Ask a friend to tell you what number you have made.

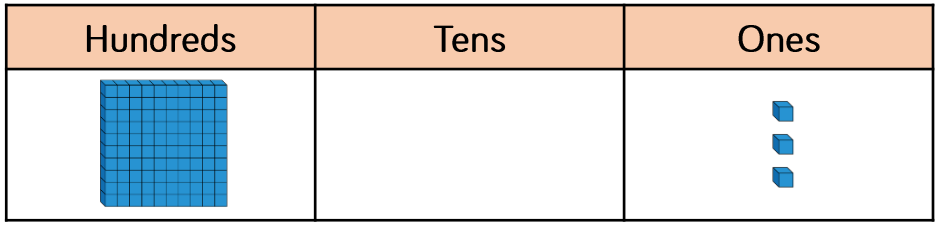
Varied Fluency

- What is the value of the number represented in the place value chart?



Write your answer in numerals and in words.

- Complete this place value chart so that it shows the number 354



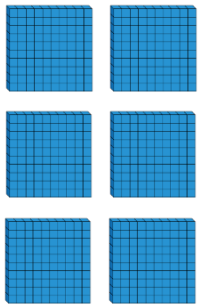
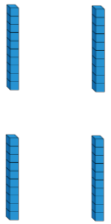
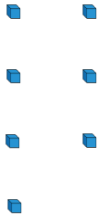
Represent the number using a part-whole model.

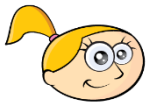
- How many different ways can you make the number 452?
Can you write each way in expanded form? (e.g. 400 + 50 + 2)

Compare your answer with a partner.

100s, 10s and 1s (1)

Reasoning and Problem Solving

Hundreds	Tens	Ones
		



Eva

The place value grid shows the number 467

Is Eva correct? Explain your reasoning.

What do you notice about the number shown?

Possible answers:

I disagree because there are six hundreds, four tens and seven ones so the number is 647.

I notice that 647 and 467 have the same digits but in a different order so the digits have different values.

Using each digit card, which numbers can you make?

Use the place value grid to help.

Hundreds	Tens	Ones

Compare your answers with a partner.

The numbers that can be made are:

- 503
- 530
- 305
- 350
- (0)35
- (0)53

100s, 10s and 1s (2)

Notes and Guidance

Children use place value counters to represent different numbers and understand how a number is made.

Their work with Base 10 should help them understand that the hundreds counter is worth more than the tens counter and the tens counter is worth more than the ones counter.

Mathematical Talk

What is the same and what is different about Base 10 and place value counters?

Why do we not call this number 300506?

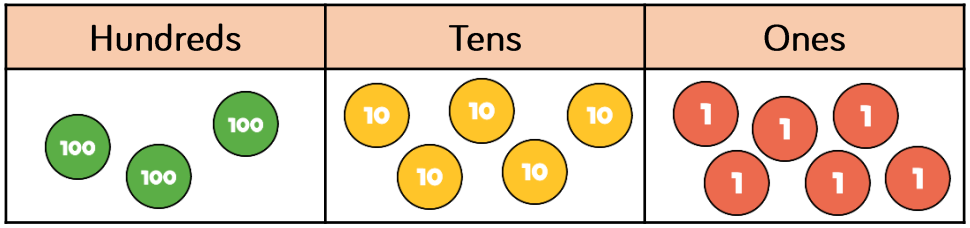
What number would be shown if 1/10/100 was added?

Why is it important to put the values into the correct column on the place value grid?

What do we need to do if there is a zero in the number we are representing?

Varied Fluency

- What number is shown on the place value chart?

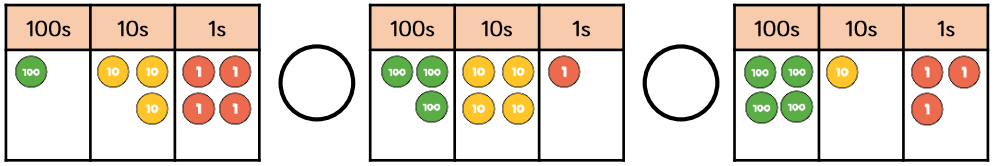


If one more 10 is added, what number would be shown?

- Use place value counters and a place value grid to represent the numbers:

615 208 37

- Use <, > or = to make the statement correct.



100s, 10s and 1s (2)

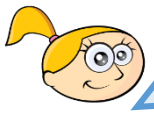
Reasoning and Problem Solving

Using place value counters, how many different ways can you make four hundred and fifty?

Show your solutions as a calculations.

e.g. four hundreds counters and 5 tens counters. As a calculation this would be:
450 = 100 + 100 + 100 + 100 + 10 + 10 + 10 + 10 + 10

Eva



The number in the place value grid is the greatest number you can make with 8 counters.

100s	10s	1s
● ● ● ● ● ●	●	●

Do you agree? Explain your answer.

Eva is incorrect because you could make 800 which is greater than 611 She thinks you need to have at least one counter in each column.

100s	10s	1s
● ● ● ● ● ●		● ● ● ● ● ● ●

Dora

The place value chart shows 607

Jack

I think it shows 670

Who is correct? Explain your reasoning.

Dora is correct because there are six counters in the hundreds column, none in the tens column and seven in the ones column.

If it was 670 there would be seven counters in the tens column and none in the ones column.

Number Line to 1,000

Notes and Guidance

Children estimate, work out and write numbers on a number line.

Number lines should be shown with or without start and end numbers, and with numbers already placed on it.

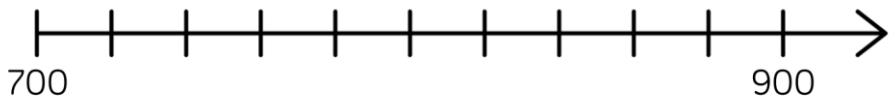
Children may still need Base 10 and/or place values to work with as they develop their understanding of the number line.

Mathematical Talk

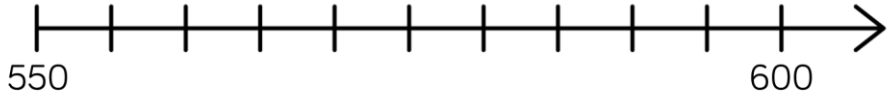
What is the value of each interval on the number line?
Which side of the number line did you start from? Why?
When estimating where a number should be placed, what facts can help you?
Can you draw a number line where 600 is the starting number, and 650 is half way along?
What do you know about the number that A is representing? A is more/less than _____
What value can A definitely not be? How do you know?

Varied Fluency

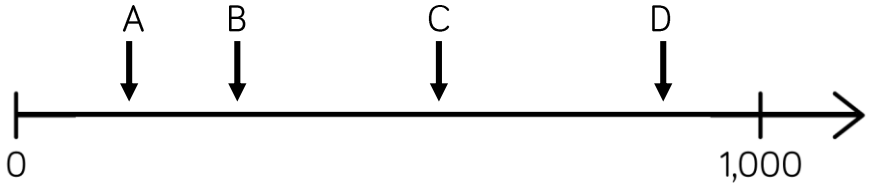
- Draw an arrow to show the number 800



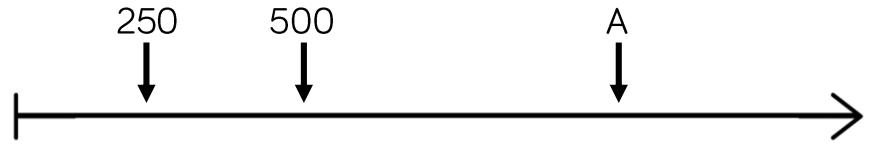
Draw an arrow to show the number 560



- Which letter is closest to 250?



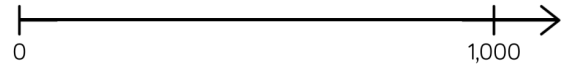
- Estimate the value of A.

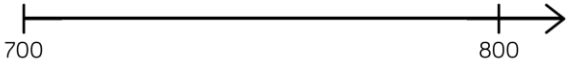


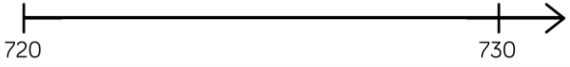
Number Line to 1,000

Reasoning and Problem Solving

Estimate where seven hundred and twenty-five will go on each of the number lines.







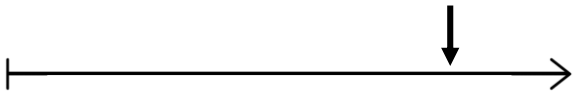
Explain why it is not in the same place on each number line.

725 is in different places because each line has different numbers at the start and end so the position of 725 changes.

All three of the number lines have different scales and therefore the difference between 725 and the starting and finishing number is different on all three number lines.

If the arrow is pointing to 780, what could the start and end numbers be?

Find three different ways and explain your reasoning.



Example answers:

Start 0 and end 1,000 because 500 would be in the middle and 780 would be further along than 500

Start 730 and end 790

Start 700 and end 800

etc.

1, 10, 100 More or Less

Notes and Guidance

Building on children's learning in Year 2 where they explored finding one more/less, children now move onto finding 10 and 100 more or less than a given number.

Show children that they can represent their answer in a variety of different ways. For example, as numerals or words, or with concrete manipulatives.

Mathematical Talk

What is 10 more than/less than ____?

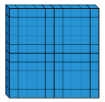
What is 100 more than/less than ____?

Which column changes? Can more than one column change?

What happens when I subtract 10 from 209?
Why is this more difficult?

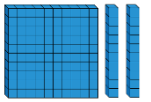
Varied Fluency

Put the correct number in each box.



10 less

Number



10 more

100 less

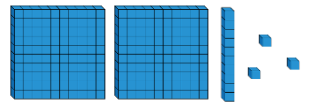
Number

100 more

Show ten more and ten less than the following numbers using Base 10 and place value counters.

550 724 302

Complete the table.

100 less	Number	100 more
		
		

1, 10, 100 More or Less

Reasoning and Problem Solving

10 more than my number is the same as 100 less than 320

What is my number?

Explain how you know.

Write your own similar problem to describe the original number.

The number described is 210 because 100 less than 320 is 220, which means 220 is 10 more than the original number.

I think of a number, add ten, subtract one hundred and then add one.

My answer is 256

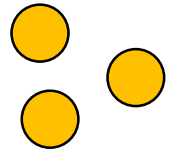
What number did I start with?

Explain how you know.

What can you do to check?

The start number was 345 because one less than 256 is 255, one hundred more than 255 is 355 and ten less than 355 is 345
To check I can follow the steps back to get 256

A counter is missing on the place value chart.

Hundreds	Tens	Ones
		

What number could it have been?

Possible answers:
401
311
302

Compare Objects

Notes and Guidance

Children use objects to represent numbers to 1,000
When given two numbers represented by objects, they use comparative language and symbols to determine which is greatest/smallest. Children can make the numbers using concrete manipulatives and draw them pictorially.
Use stem sentences to ensure the correct vocabulary is being used e.g. _____ is greater than _____.

Mathematical Talk

How do you know which number is greater?
Do you start counting hundreds, tens or ones first? Why?

What strategy did you use to compare the two numbers?
Is this the same or different to your partner?

Are the Base 10 and place value counters showing the same amount? How do you know?

Is there only one answer?

Varied Fluency

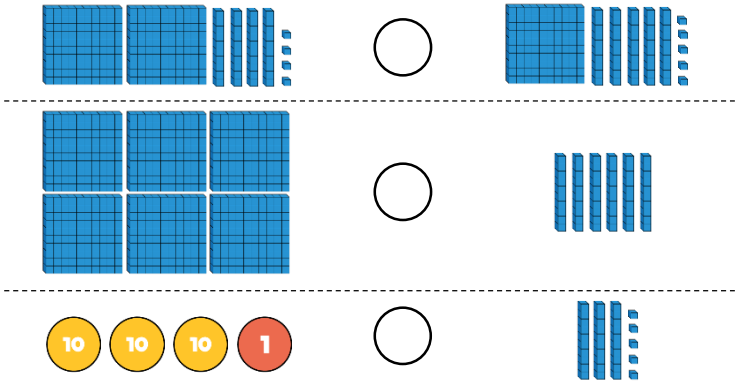
Represent and compare the numbers using place value counters.

100s	10s	1s

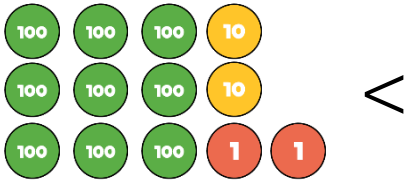
452 542

_____ is greater than _____

Use <, > or = to make the statements correct.



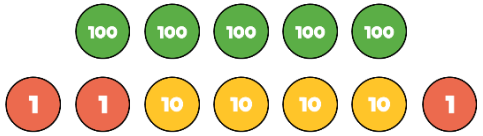
Draw objects to make the statement true.

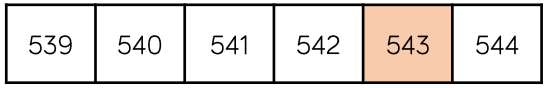


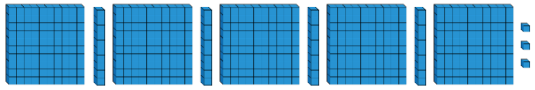
Compare Objects

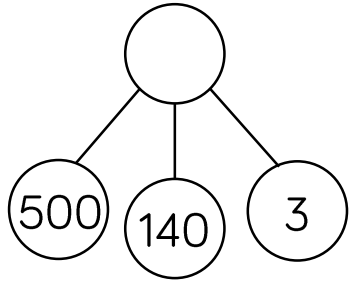
Reasoning and Problem Solving

Which image is the odd one out?







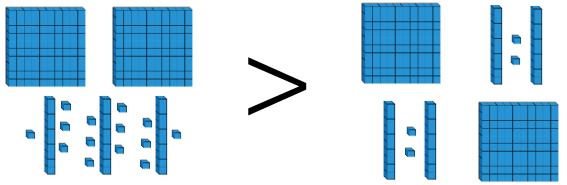


Explain why.
How else can you represent the number?

The part-whole model is the odd one out because it shows 643 whereas all the other images show 543

Children could show 543 in a part-whole model correctly, in Base 10 a different way or with place value counters in a different way.

True or False?



Explain your answer.

The image is not correct because the number 244 is represented on both sides of the inequality symbol.

An equal sign should have been used.

The number on the left must be made larger or the number on the right must be made smaller, to make this true.

Compare Numbers

Notes and Guidance

Children compare numbers presented as numerals rather than objects.
They need to be encouraged to use previous learning to choose an efficient method to compare the numbers. For example, children may choose to place the numbers on a number line, make them using concrete manipulatives or draw them in a place value chart to compare.

Mathematical Talk

What strategy did you use to compare the numbers?

What materials would be useful to help you compare the numbers?

How do you know which number is the smallest /greatest?
Which column do you start comparing from? Why?

Can you find more than one way to complete the statements?

Varied Fluency

Circle the greatest number in each pair.

Nine hundred and two	920
500 and 63	568
7 hundreds and 6 ones	76 tens

Use <, > or = to make the statements correct.

399 ◯ 501

800 ◯ 80 tens

Complete the statements.

600 + 70 + 4 > 600 + _____ + 4

Two hundred and five < _____

Compare Numbers

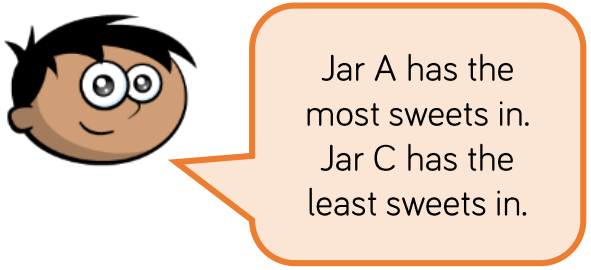
Reasoning and Problem Solving

Amir has 3 jars of sweets.

A B C

Jar A contains 235 sweets.

Jar C contains 175 sweets.



How many sweets could be in jar B?
Explain how you know.

Jar B could contain any number of sweets between 176 and 234 inclusive.

Discussion point: Could B contain 175 or 235 sweets? Why?

I am thinking of a number.

It is between 300 and 500

The digits add up to 14

The difference between the greatest digit and the smallest digit is 2

What could my number be?

Is there only one option?

Explain each step of your working.

446 or 464

The only possibilities to go in the hundreds column are 3 and 4
If it was 3, the other two digits would have to total 11 and none of these pairs give the correct difference between the greatest and smallest digit, so the number has to have 4 in the hundreds column.

Order Numbers

Notes and Guidance

Children explore ordering a set of numbers from smallest to greatest and greatest to smallest. They need to be able to explain their reasoning throughout. They could still use Base 10 or other concrete materials to help them to make decisions about ordering.

At this point, children are introduced to the words ascending and descending.

Mathematical Talk

How do you know you have created the greatest/smallest number?

What number is being represented by the place value counters/Base 10?

What does the word ascending/descending mean?

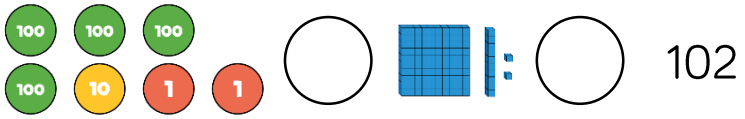
Can you find more than one way to order your numbers?

Varied Fluency

- Here are three digit cards.

What is the greatest number you can make?
What is the smallest number you can make?

- Use the symbols <, > or = to make the statement correct.



- Here is a list of numbers.

312, 321, 123, 132, 213, 231

Place the numbers in ascending order.
Now place them in descending order.
What do you notice?

Order Numbers

Reasoning and Problem Solving

Whitney has six different numbers.

She put them in ascending order then accidentally spilt some ink onto her page. Two of her numbers are now covered in ink.

214,  243, 256,  289

What could the hidden numbers be? Explain how you know.

The first number could be anything between 215 and 242

The second hidden number could be anywhere between 257 and 288

True or False?

When ordering numbers you only need to look at the place value column with the highest value.

False.
For example, if you are ordering numbers in the hundreds you should start by looking at the hundreds column, but sometimes two numbers will have the same number of hundreds and so you will also need to look at other columns.

Count in 50s

Notes and Guidance

Children use their knowledge of the patterns in the 5 times table to count in steps of 50

They should start from any given multiple of 50 and be able to count both forwards and backwards.

Mathematical Talk

What is the same and what is different between counting in 5s and counting in 50s?

Hence, what is the connection between the 5 times table and the 50 times table?

Can you notice a pattern as the numbers increase/decrease?

Can you correct the mistakes in each?

Varied Fluency

- Look at the number patterns.
What do you notice?

5	10	15	20	25	30
50	100	150	200	250	300

- Complete the number tracks.

50		150	200			350		450	
	750	700	650			500			350

- Circle and explain the mistake in each sequence.

50, 100, 105, 200, 250, 300 ...

990, 950, 900, 850, 800 ...

Count in 50s

Reasoning and Problem Solving

Odd One Out

100, 150, 200, 215, 300

Circle the odd one out. Explain how you know.

215 is the odd one out because it is not a multiple of 50
If we were counting up in 50s from 100, it should have been 250 not 215

Which is quicker: counting to 50 in 10s or counting to 150 in 50s?

Explain your answer.

It is quicker to count to 150 in 50s as it would only be 3 steps whereas counting to 50 in 10s would be 5 steps.

Always, Sometimes, Never

Sort the statements into always, sometimes or never.

- When counting in 50s starting from 0, the numbers are all even.
- There are only two digits in a multiple of 50
- Only the hundreds and tens column changes when counting in 50s.

- Always
- Sometimes
- Sometimes