

Years 4/5

Mixed Age Schemes of Learning

WhiteRoseMaths

Welcome

Welcome to the White Rose Maths' new, more detailed schemes of learning for 2017-18.

We have listened to your feedback and as a result of this, we have made some changes to the previous WRMH primary schemes. *We believe the new schemes are bigger, bolder and more detailed than before.*

White Rose Maths' new schemes still have the *same look and feel* as the old WRMH 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 hope we can help make a difference to maths education in this country. *We all believe that every child can succeed in mathematics.* Thank you to everyone who has contributed to our work. 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, if you or your school want support with any aspect of teaching maths please do not hesitate to get in touch

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

White Rose Maths Team

#MathsEveryoneCan

What's New?

This release of our schemes includes

- New overviews, with subtle changes being made to the timings and the order of topics.
- New 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.
- This year there will also be updated assessments.
- We are also working with Diagnostic Questions to provide questions for every single objective of the National Curriculum.

Teaching notes and examples

Recognise Equal Groups Notes and Guidance

At this stage, children are describing equal groups using stem sentences to support them. It is important that children know which groups are equal and which are unequal. The addition or multiplication symbol is not used within this small step but this language will support them in understanding repeated addition and multiplication. The examples included, refer to the multiplication facts Y2 children need to know.

Mathematical Talk

Varied Fluency

1 Are these equal groups? How do you know?



2 Complete the stem sentence



Improved ordering and timing

	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 (within 10)				Number: Addition and Subtraction (within 10)				Geometry: Shape	Number: Place Value (within 20)		Consolidation	
Spring	Number: Addition and Subtraction (within 20)				Number: Place Value (within 50) (Multiples of 2, 5 and 10 to be included)					Measurement: Length and Height			Measurement: Weight and Volume
Summer	Number: Multiplication and Division (Reinforce multiples of 2, 5 and 10)		Number:		Geometry: Area and Perimeter		Number:			Measurement: Mass			

Small Steps Guidance

Overview Small Steps

- Sort objects
- Count objects
- Represent objects
- Count, read and write forwards from any number 0 to 10
- Count, read and write backwards from any number 0 to 10
- Count one more
- Count one less
- One to one correspondence to start to compare groups
- Compare groups using language such as equal, more/greater, less/fewer
- Introduce =, > and < symbols
- Compare numbers
- Order groups of objects
- Order numbers
- Ordinal numbers (1st, 2nd, 3rd ...)
- The number line

NC Objectives

Count to ten, forwards and backwards, beginning with 0 or 1, or from any given number.

Count, read and write numbers to 10 in numerals and words.

Given a number, identify one more or one less.

Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least.

Meet the Team

The schemes have been put together by a wide group of passionate and enthusiastic classroom practitioners. The development of the schemes has been led by the following people who work across Trinity MAT.



Kelsey Brown



Beth Smith



Caroline Hamilton



Stephen Monaghan



Julie Matthews



Jenny Lewis

Special Thanks

The WRM Team would 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

Chris Gordon
Beth Prottey
Rachel Wademan
Emma Hawkins
Scott Smith
Valda Varadinek-Skelton
Chloe Hall
Faye Hirst
Charlotte James
Joanne Stuart
Michelle Cornwell

Year 3 Team

Becky Stanley
Nicola Butler
Laura Collis
Richard Miller
Claire Bennett
Chris Conway

Year 4 Team

Terrie Litherland
Susanne White
Hannah Kirman
Daniel Ballard
Isobel Gabanski
Laura Stubbs

Year 5 Team

Lynne Armstrong
Laura Heath
Clare Bolton
Helen Eddie
Chris Dunn
Rebecca Gascoigne

Year 6 Team

Lindsay Coates
Kayleigh Parkes
Shahir Khan
Sarah Howlett
Emma Lucas



How to use the Small Steps

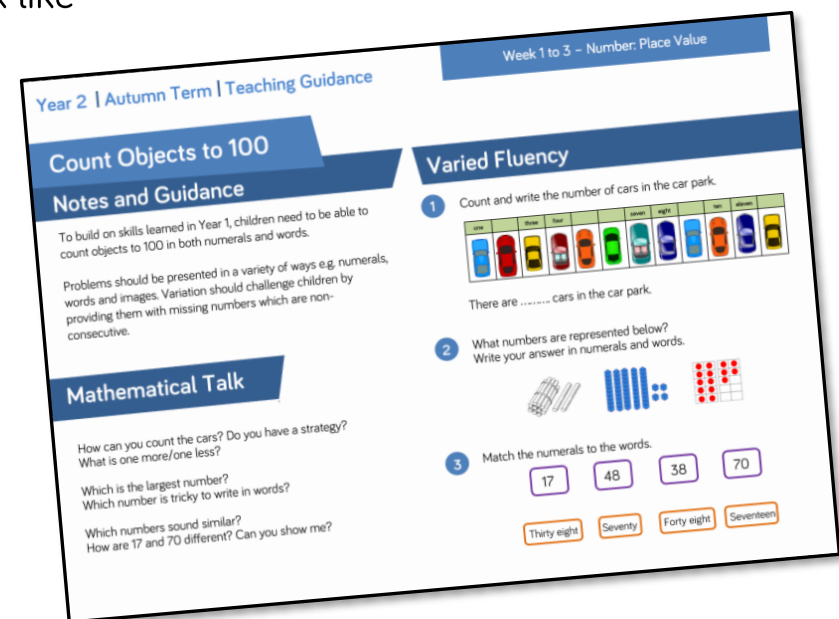
We are regularly asked how it is possible to spend so long on particular blocks of content and National Curriculum objectives. We know that breaking the curriculum down into small manageable steps should help children understand concepts better. Too often, we have noticed that teachers will try and cover 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



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

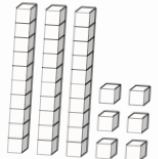
Part 2: Reasoning and problem solving based questions

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. **New assessments will be released over the course of next year.**

For each assessment we will aim to provide a summary spreadsheet so that schools can analyse their own data. We hope to work with Mathematics Mastery 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

As an organisation 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.

We have produced a CPD unit for teachers in schools;

<https://www.tes.com/teaching-resource/the-importance-of-concrete-professional-development-11476476>

Additional Materials

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

KS1 and KS2 Problem Solving Questions

For the last two years WRMH have provided a range of KS1 and KS2 problem solving questions in the run up to SATs. There are over 150 questions on a variety of different topics and year groups.

Other schemes of learning

As well as having schemes for Y1-Y6 we developed a range of other schemes of learning

- Schemes for reception
- Mixed aged schemes
- Year 7 – 9 schemes for secondary

Calculation policy/guidance

We also have our calculation policy for the four operations. This can be found on our TES page.


Shopping and Baking

1 These items are sold in a shop.



Ray buys three items.
Two of them were the same item.
He spent £23
Which items does he buy?


2 Erik bakes 5 trays of muffins.
Each tray contains 6 muffins.



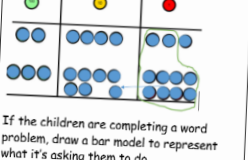
He sells 16 muffins and eats 5
How many muffins does he have left?

MathsHUBS
White Rose

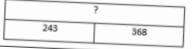
Use of place value counters to add HTO + TO, HTO + HTO etc. once the children have had practice with this, they should be able to apply it to larger numbers and the abstract



Children to represent the counters e.g. like the image below

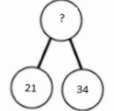


If the children are completing a word problem, draw a bar model to represent what it's asking them to do




$$\begin{array}{r} 243 \\ +368 \\ \hline 611 \\ 1 \quad 1 \end{array}$$

Fluency variation, different ways to ask children to solve $21+34$:



Sam saved £21 one week and £34 another. How much did he save in total?

$21+34=55$. Prove it! (reasoning but the children need to be fluent in representing this)



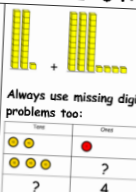
$$\begin{array}{r} 21 \\ +34 \\ \hline \end{array}$$

$21 + 34 =$

$\square = 21 + 34$

What's the sum of twenty one and thirty four?

Always use missing digit problems too:



Our Partnerships

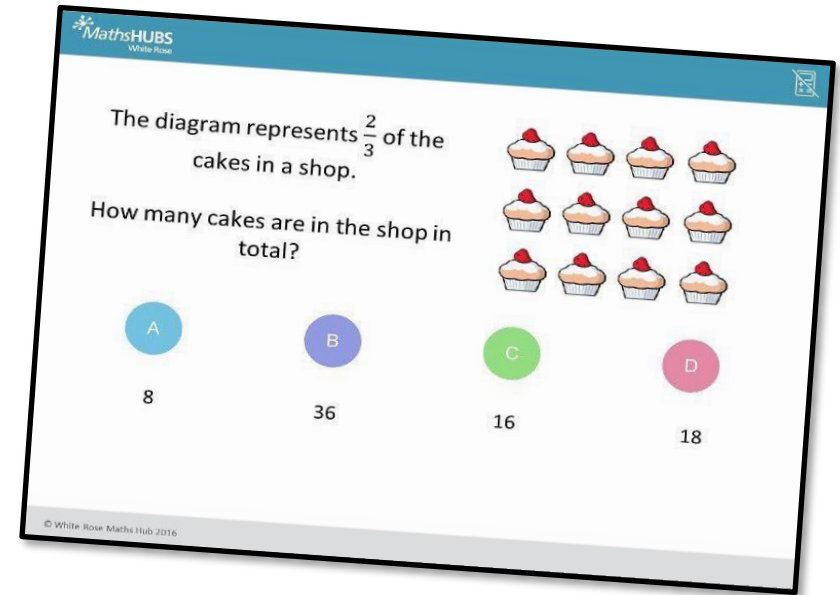
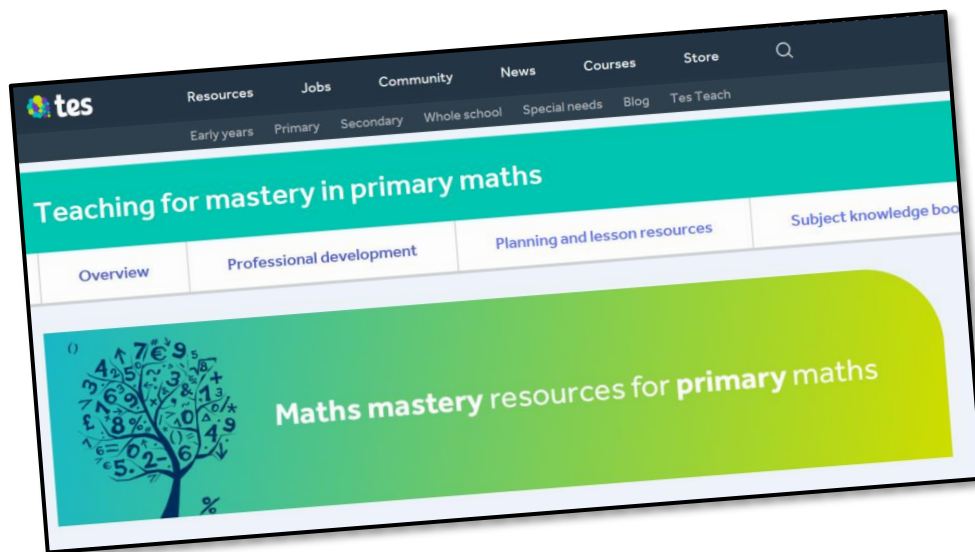
tes

www.tes.com



Over the last 12 months we have developed a partnership with tes. Working with Mathematics Mastery we have created a detailed breakdown of the National Curriculum. Watch this space for exciting developments.

<https://www.tes.com/teaching-resources/teaching-for-mastery-in-primary-maths>



Diagnostic Questions

www.diagnosticquestions.co.uk



From September 2017, we have written two sets of questions for every National Curriculum objective from Y1 to Y6. These are hosted free of charge on @mrbartonmaths Diagnostic Questions website.

Training

White Rose Maths offers paid for training to schools regionally, nationally and internationally. Over the last year we have delivered training to over 150 schools and have had over 1,000 people attend our face to face training.

As part of our 'Jigsaw' package we offer the following twilight courses:

- CPA
- Bar Modelling
- Reasoning and Problem Solving
- Mathematical Talk and Questioning
- Variation and Depth

If you would like any more information about our courses then email the team.

License Partners

We also work with a growing number of Teaching Schools around the country to deliver our training. All of our providers have been specially selected and they are as passionate about improving maths education as we are. All our providers offer our twilight bar modelling training course. If you want to see who your local provider is or would like to become a license partner then please get in touch with us.



Bar Modelling Deeper Learning Event

FAQs

We have bought one of the new textbook schemes, can we still use these curriculum plans?

Many schools are starting to make use of mastery textbooks used in places like Singapore and China. The schemes have been designed to work alongside these textbooks. We recommend that you follow the textbook order and use our materials for additional support and guidance.

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 than one lesson on a small step, depending on your class' understanding.

Will you be providing grade boundaries for your assessments?

No, we will not be releasing guidance on grade boundaries. We suggest the assessments are used to find out what children can and cannot do, which will help inform future planning.

FAQs continued ...

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.

What is same day intervention?

A growing number of schools are doing different types of same day intervention. Some schools are splitting a lesson into two parts and other schools are working with small groups of students at other times during the day. The common goal is to keep up, rather than catch up.

#MathsEveryoneCan

At White Rose Maths we believe that everyone can succeed in Maths. We encourage anyone who uses our schemes to share in this belief and do all that they can to convince the children they teach that this is the case.

How do I reinforce what children already know if I don't teach the topic again?

The scheme has been designed to give sufficient time for teachers to explore concepts in depth, rather than covering it superficially and then coming back to it several times.

We understand though that schools will rightly want to ensure that students revisit concepts and ensure fluency in number.

The schemes interleave prior content in new concepts. For example 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 throughout the year. This could be done as mental and oral starters or in additional maths time during the day.

Year 4/5 – Yearly Overview

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

Year 4/5 – Autumn Term

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12		
<p><u>Number – Place Value</u> Count in multiples of 6, 7, 9, 25 and 1000. Find 1000 more or less than a given number. Count forwards or backwards in steps of powers of 10 for any given number up to 1000000.</p> <p>Recognise the place value of each digit in a four digit number (thousands, hundreds, tens and ones) Order and compare numbers beyond 1000 Read, write, order and compare numbers to at least 1000000 and determine the value of each digit.</p> <p>Identify, represent and estimate numbers using different representations.</p> <p>Round any number to the nearest 10, 100 or 1000 Round any number up to 1000000 to the nearest 10, 100, 1000, 10000 and 100000</p> <p>Solve number and practical problems that involve all of the above and with increasingly large positive numbers. Solve number problems and practical problems that involve all of the above.</p> <p>Count backwards through zero to include negative numbers. Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero.</p> <p>Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value. Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</p>				<p><u>Number- Addition and Subtraction</u> Add and subtract numbers mentally with increasingly large numbers.</p> <p>Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.</p> <p>Estimate and use inverse operations to check answers to a calculation.</p> <p>Solve addition and subtraction two step problems in contexts, deciding which operations and methods to use and why. Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p>			<p><u>Number- Multiplication and Division</u> Count in multiples of 6, 7, 9, 25 and 1000 Recall and use multiplication and division facts for multiplication tables up to 12×12. Multiply and divide numbers mentally drawing upon known facts.</p> <p>Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. Multiply and divide whole numbers by 10, 100 and 1000.</p> <p><u>Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit</u>, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.</p> <p>Recognise and use factor pairs and commutativity in mental calculations. Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.</p> <p>Recognise and use square numbers and cube numbers and the notation for squared (2) and cubed (3) Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.</p> <p>Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19</p>				<p><u>Measurement:</u> <u>Length and Perimeter</u> Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres Measure and calculate the perimeter of composite rectilinear shapes in cm and m.</p> <p>Convert between different units of measure [for example, kilometre to metre] Convert between different units of metric measure [for example, km and m; cm and m; cm and mm]</p>		Consolidation

Year 4/5 – Spring Term



Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	
<u>Number – multiplication and division</u> Multiply two digit and three digit numbers by a one digit number using formal written layout. Multiply numbers up to 4 digits by a one or two digit number using a formal written method, including long multiplication for 2 digit numbers. Divide numbers up to 4 digits by a one digit number using the formal written method of short division and interpret remainders appropriately for the context. Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. Solve problems involving addition and subtraction, multiplication and division and a combination of these, including understanding the use of the equals sign				<u>Measurement- Area and Volume</u> Find the area of rectilinear shapes by counting squares. Calculate and compare the area of rectangles (including squares), and including using standard units, cm², m² estimate the area of irregular shapes. Estimate volume [for example using 1cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water]		<u>Fractions</u> Compare and order fractions whose denominators are multiples of the same number. Recognise and show, using diagrams, families of common equivalent fractions. Identify, name and write equivalent fractions of a given fraction, represented visually including tenths and hundredths. Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number [for example $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$] Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number. Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates. Add and subtract fractions with the same denominator. Add and subtract fractions with the same denominator and denominators that are multiples of the same number. Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.			<u>Decimals</u> Recognise and write decimal equivalents of any number of tenths or hundredths. Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ Read and write decimal numbers as fractions [for example $0.71 = \frac{71}{100}$] Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. Compare numbers with the same number of decimal places up to two decimal places. Read, write, order and compare numbers with up to three decimal places. 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 Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.		Consolidation	

Year 4/5 – Summer Term

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
<p><u>Decimals</u> Round decimals with one decimal place to the nearest whole number. Round decimals with two decimal places to the nearest whole number and to one decimal place.</p> <p><u>Solve simple measure and money problems involving fractions and decimals to two decimal places.</u> Solve problems involving number up to three decimal places. Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.</p>	<p><u>Measurement- Money</u> Estimate, compare and calculate different measures, including money in pounds and pence. Solve simple measure and money problems involving fractions and decimals to two decimal places.</p> <p><u>Number: Percentages</u> Recognise the per cent symbol (%) and understand that per cent relates to ‘number of parts per hundred’, and write percentages as a fraction with denominator 100, and as a decimal.</p> <p>Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.</p>	<p><u>Statistics</u> Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. Solve comparison, sum and difference problems using information presented in a line graph.</p> <p>Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. Complete, read and interpret information in tables including timetables.</p>	<p><u>Measurement: Time and converting units</u> Convert between different units of measure [for example,; hour to minute] Convert between different units of metric measure [for example, km and m; cm and m; cm and mm; g and kg; l and ml]</p> <p>Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.</p> <p>Read, write and convert time between analogue and digital 12- and 24-hour clocks.</p> <p>Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days. Solve problems involving converting between units of time.</p>	<p><u>Geometry: Properties of shape</u> Identify acute and obtuse angles and compare and order angles up to two right angles by size. Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.</p> <p>Draw given angles, and measure them in degrees (°)</p> <p>Identify: angles at a point and one whole turn (total 360°), angles at a point on a straight line and ½ a turn (total 180°) other multiples of 90°</p> <p>Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. Identify 3D shapes, including cubes and other cuboids, from 2D representations.</p> <p>Use the properties of rectangles to deduce related facts and find missing lengths and angles.</p> <p>Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.</p> <p>Identify lines of symmetry in 2-D shapes presented in different orientations. Complete a simple symmetric figure with respect to a specific line of symmetry.</p>	<p><u>Geometry- Position and Direction</u> Describe positions on a 2-D grid as coordinates in the first quadrant.</p> <p>Plot specified points and draw sides to complete a given polygon.</p> <p>Describe movements between positions as translations of a given unit to the left/ right and up/ down.</p> <p>Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed</p>	Consolidation					

Overview

Small Steps

Year 4	Year 5	
 Roman Numerals to 100	Roman Numerals to 1,000	Roman Numerals
 1,000s , 100s, 10s and 1s	Numbers to 10,000	
 Partitioning	Numbers to 100,000	Representing Numbers
 Number line to 10,000	Numbers to a million	
 Count in 1,000s	Counting in powers of ten	Counting and Multiples
 Count in 25s		
 1,000 more or less		More or less
 Compare numbers	Compare and order numbers to 100,000	Compare and Order
 Order numbers	Compare and order numbers to a million	
 Round to the nearest 10	Round to nearest 10, 100 and 1,000	Rounding
 Round to the nearest 100	Round numbers within 100,000	
 Round to the nearest 1,000	Round numbers to a million	Negative Numbers
 Negative numbers	Negative numbers	

Roman Numerals

Notes and Guidance

Building on their Y3 knowledge of numerals to 12 on a clock face, children explore Roman Numerals to 100.

They explore what is the same and what is different between the number systems, for example there is no zero.

Mathematical Talk

Why is there no zero in the Roman numerals? What might it look like?

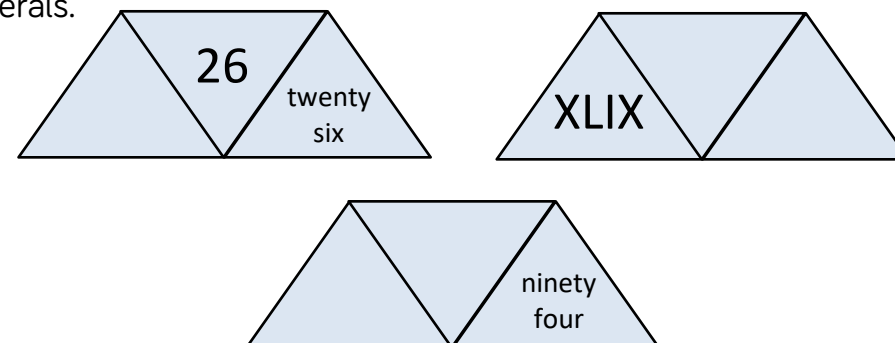
Do you notice any patterns? If 20 is XX what might 200 be?

How can you check you have represented the Roman numeral correctly?

Varied Fluency

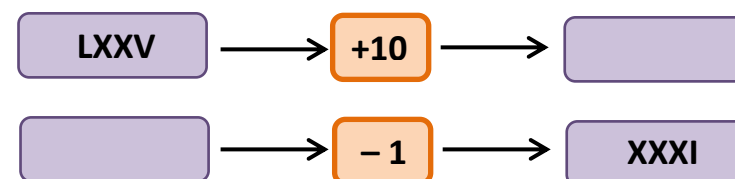
- 1 Lollipop stick activity.
The teacher shouts out a number and the children make it with lollipop sticks.
Children could also do this in pairs or groups, and for a bit of fun they could test the teacher!

- 2 Each diagram shows a number in numerals, words and roman numerals.



Complete the diagrams.

- 3 Complete the function machines.



Roman Numerals

Reasoning and Problem Solving

Solve the following calculation:

$$XIV + XXXVI = \boxed{}$$

How many other calculations, using Roman numerals, can you write to get the same total?

$$C \div II = L$$
$$L \div I = L$$

$$X \times V = L$$
$$XXV \times II = L$$

$$LXV - XV = L$$
$$C - L = L$$

$$XX + XX + X = L$$

Bobby says:



In the 10 times table, all the numbers have a zero. Therefore, in Roman numerals all multiples of 10 have an X.

Research and give examples to prove whether or not Bobby is correct

Bobby is incorrect. A lot of multiples of 10 have an X in them but the X can mean different things.

For example X in 10 just means one ten but X in 40 (XL) means 10 less than 50

X in 60 (LX) means 10 more than 50

The numbers 50 has no X and neither does 100

Roman Numerals

Notes and Guidance

Building on their Y4 knowledge of Roman Numerals to 100, children explore Roman Numerals to 1,000. They explore what is the same and what is different between the number systems, for example there is no zero.

Teachers could introduce writing the date in Roman Numerals to revise the concept on a daily basis.

Mathematical Talk

Why is there no zero in the Roman Numerals? What might it look like?

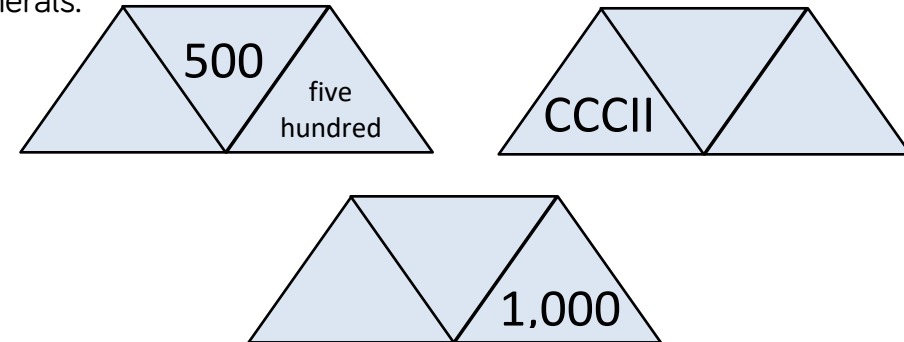
Do you notice any patterns? Look at 30 and 300.

How can you check you have represented the Roman Numeral correctly?

Varied Fluency

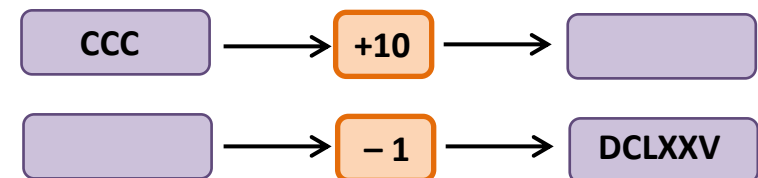
- 1 Lollipop stick activity.
The teacher shouts out a number and the children make it with lollipop sticks.
Children could also do this in pairs or groups, and for a bit of fun they could test the teacher!

- 2 Each diagram shows a number in numerals, words and Roman Numerals.



Complete the diagrams.

- 3 Complete the function machines.



Roman Numerals

Reasoning and Problem Solving

Solve

$$\text{CCCL} + \text{CL} =$$

How many calculations, using Roman Numerals, can you write to get the same total?

Possible answers:

$$\text{CD} + \text{C} = \text{D}$$

$$\text{M} \div \text{II} = \text{D}$$

$$\text{C} + \text{CC} + \text{CC} = \text{D}$$

$$\text{C} \times \text{V} = \text{D}$$

Here is part of a Roman Numeral hundred square.

Complete the missing values.

XLIV	XLV		XLVII
		LVI	LVII
LXIV		LXVI	LXVII

What patterns do you notice?

XLIV	XLV	XLVI	XLVII
LIV	LV	LVI	LVII
LXIV	LXV	LXVI	LXVII

1,000s, 100s, 10s, 1s

Notes and Guidance

Children represent numbers to 9,999 on a place value grid and understand that a 4 digit number is made up of 1,000s, 100s, 10s and 1s.

Moving on from Base 10 blocks, children start to unitise by using place value counters and digits.

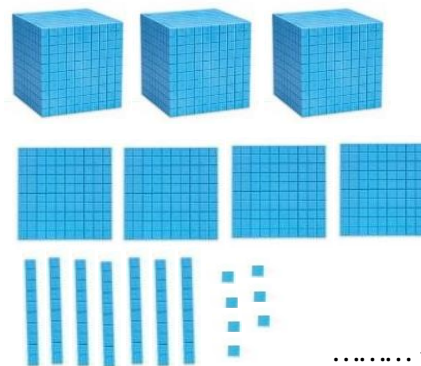
Mathematical Talk

How is the value of zero represented within a number?

How do you know you have formed the number correctly? What could you use to help you?

Varied Fluency

1 Complete the sentences.

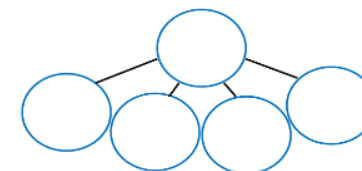
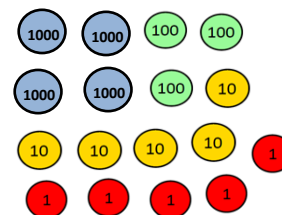


There are thousands,
..... hundreds, tens
and ones.

The number is

..... + + + =

2 Complete the part-whole model for the number represented.



3 What is the value of the underlined digit in each number?

6,983

9,021

789

6,570

1,000s, 100s, 10s, 1s

Reasoning and Problem Solving

Create 5 four digit numbers where the tens number is 3 and the digits add up to 12

3,333
4,431
6,132
2,730
5,232

Use the clues to find the missing digits.



The thousands and tens digit multiply together to make 36

The hundreds and tens digit have a digit total of 9

The ones digit is double the thousands.

The whole number has a digit total of 21

4,098

Numbers to 10,000

Notes and Guidance

Children use concrete manipulatives and pictorial diagrams to recap representing numbers up to 10,000.

Within this step, ensure children revise adding and subtracting 10, 100 and 1,000, and discuss what is happening to the place value columns.

Mathematical Talk

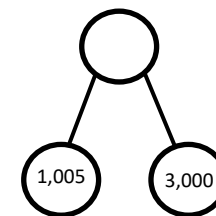
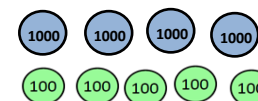
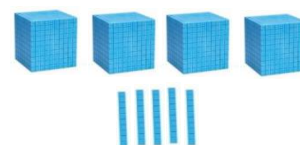
Show me 8,045 in three different ways.

Do you prefer to use concrete objects or draw an image pictorially? Why?

Make 1,500 and explain why you chose to make it this way (use this to see what concrete objects children choose to use).

Varied Fluency

1 Match the diagram to the number.

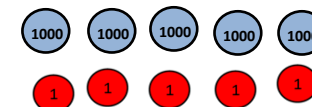
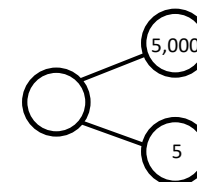
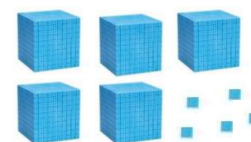


4,005

4,500

4,050

2 Which diagram is the odd one out?



3 Complete the table.

	Add 10	Add 100	Add 1,000
2,506			
7,999			
		6,070	

Numbers to 10,000

Reasoning and Problem Solving

Harriet has made five numbers, using the digits 1, 2, 3 and 4

She has changed each number into a letter.

Her numbers are:

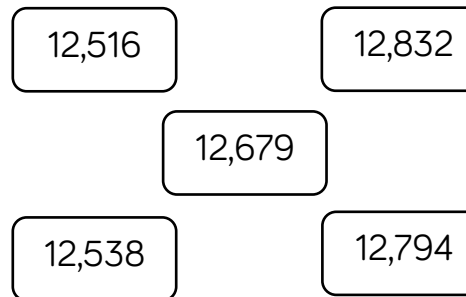
- 1) aabdc
- 2) acdbc
- 3) dcaba
- 4) cdadc
- 5) bdaab

Here are three clues to work out her numbers:

- Number 1 is the greatest number.
- The digits in number 4 total 12
- Number 3 is the smallest number.

- 1) 44,213
- 2) 43,123
- 3) 13,424
- 4) 31,413
- 5) 21,442

Simon says he can order the following numbers by only looking at the first three digits.



Is he correct?

Explain your answer.

He is incorrect because two of the numbers start with twelve thousand, five hundred therefore you need to look at the tens to compare and order.

Partitioning

Notes and Guidance

This small step builds on basic partitioning. Children will explore how numbers can be broken apart in more than one way.

This step is particularly important later on, when children begin to exchange. Understanding that $5000 + 300 + 20 + 9$ is equal to $4000 + 1300 + 10 + 19$ is crucial, and this small step enables children to explore this explicitly.

Mathematical Talk

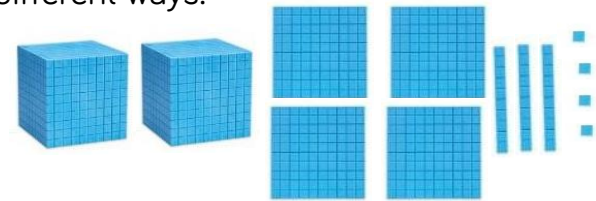
What number is being shown?

If we have 10 hundreds can we exchange them for something?

If you know ten 100s are equal to 1000 and ten 10s are equal to 100, how can you use this to make different exchanges?

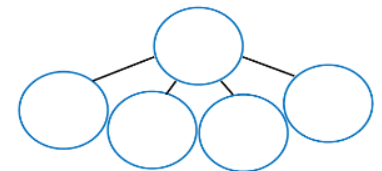
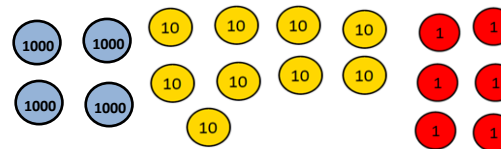
Varied Fluency

- 1 Move the Base 10 around and make exchanges to represent the number in different ways.



$$\begin{array}{rclcl} 2000 & + & 400 & + & \boxed{} & + & 4 \\ 1000 & + & \boxed{} & + & \boxed{} & + & 14 \\ 1000 & + & 1300 & + & \boxed{} & + & \boxed{} \end{array}$$

- 2 Represent the number in two different ways in a part whole model.



- 3 Lily describes a number. She says,
“My number has 4 thousands and 301 ones”

What is Lily's number?

Can you describe it in a different way?

Partitioning

Reasoning and Problem Solving

Which is the odd one out?

3,500

3,500 ones

2 thousands
and 15 hundreds

35 tens

35 tens is the odd one out because it does not make 3500, it make 350

Jeff says:



My number has five
thousands, three
hundreds and 64
ones

John says:



My number has fifty
three hundreds, 6
tens and 4 ones

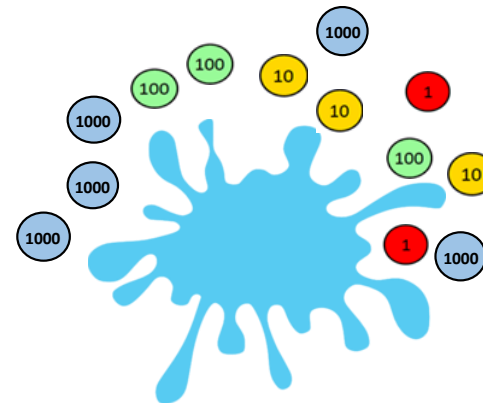
They both have the same number because 53 hundreds is equal to 5 thousand and 3 hundred. Jeff and John both have 5364

Who has the largest number?
Explain.

Some place value counters are hidden.
The total is six thousand, four hundred
and thirty two.

Which place value counters could be
hidden?

Think of at least three solutions.



Could be one 1,000 counter and one 100 counter.
Could be ten 100 counters and ten 10 counters.
Could be eleven 100 counters.

Numbers to 100,000

Notes and Guidance

Children focus on numbers up to 100,000. They represent numbers on a place value grid, read and write numbers and place them on a number line to 100,000.

Using a number line, they find numbers between two points, place a number and estimate where larger numbers will be.

Mathematical Talk

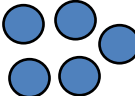

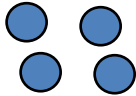
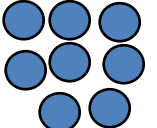
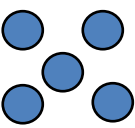
How can we estimate a number on a number line if there are no divisions?

How many digits change when you add 10, 100 or 1000?

Do you need to count forwards and backwards to find out if a number is in a number sequence? Explain.

Varied Fluency

- 1 A number is shown in the place value chart.

10,000s	1,000s	100s	10s	1s
				

Write the number in figures and in words.

- Ashy adds 10 to this number
- Zack adds 100 to this number
- Isobel adds 1,000 to this number

Write each of their new numbers in figures and in words.

- 2 Complete the grid to show the same number in different ways.

Counters	Part whole model
Bar model	Number line

- 3 Complete the missing numbers.

$$59,000 = 50,000 + \dots\dots\dots$$

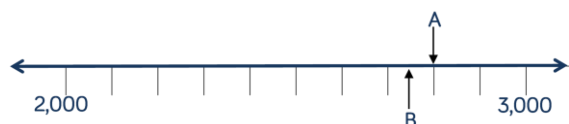
$$\dots\dots\dots = 30,000 + 1,700 + 230$$

$$75,480 = \dots\dots\dots + 300 + \dots\dots\dots$$

Numbers to 100,000

Reasoning and Problem Solving

Here is a number line.



What is the value of A?

$$A = 2,700$$

B is 40 less than A.

What is the value of B?

$$B = 2,660$$

C is 500 less than B.

Add C to the number line.



Here are three ways of partitioning 27,650

27 thousands, 650 ones
27 thousands, 5 hundreds and 150 ones
27 thousands and 65 tens

Write three more ways

Possible answers:
27 thousands, 6
hundreds and 5 tens

27 thousands, 7
thousands and 650
ones

20 thousands, 7
thousands and 650
ones

Jennie counts forwards and backwards in 10s from 317

Circle the numbers Jennie will count.

427

997

507

1,666

3,210

5,627

-23

7

-3

Explain why Jennie will not say the other numbers.

427
997
5,627
7
-3
-23

Any positive number will
always have to end in a
7
Any negative number
will always have to end
in a 3

Number Line to 10,000

Notes and Guidance

This step focuses only on the number line. Children are expected to estimate, work out and draw numbers on a number line to 10,000.

Discuss being able to count in steps from both sides.

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

Mathematical Talk

Which side of the number line did you start from? Why?

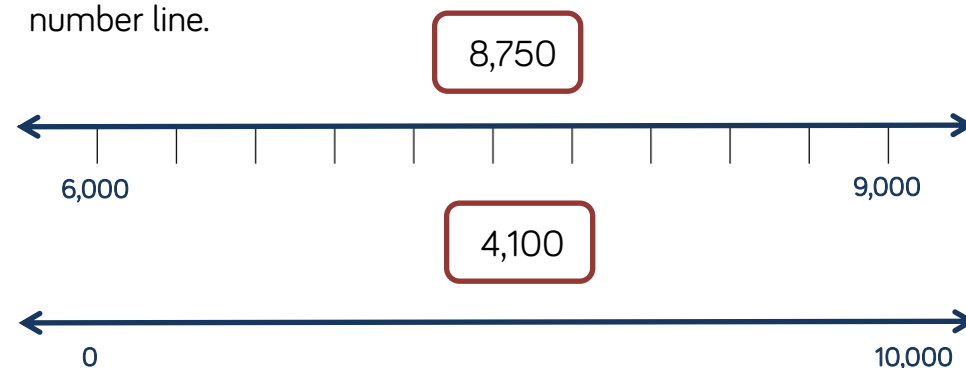
When estimating where a number should be placed, what facts can help you?

Can you use your knowledge of place value to prove that you are correct?

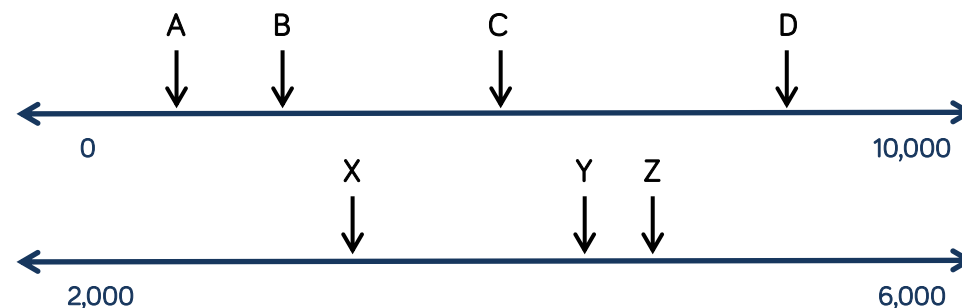
When a number line has no values at the end, what strategies could you use to help you figure out the missing value? Could there be more than one answer?

Varied Fluency

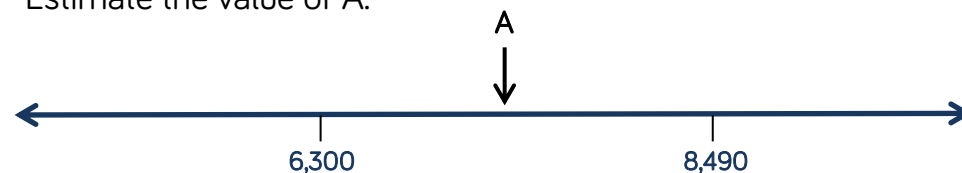
- 1 Draw arrows to show where the numbers would be on the number line.



- 2 Estimate the value of each letter.



- 3 Estimate the value of A.



Number Line to 10,000

Reasoning and Problem Solving

Place 6,750 on each of the number lines

6,000 7,000



6,500 8,000



0 10,000



Are they in the same place? Why?

No

Each line has different numbers at the start and end so the position of 6,750 changes.

Line 1: 6,500 at half way so 6,720 is past the mid- point

Line 2: 7,250 at half way so 6,750 is before the mid-point.

Line 3: 5,000 in the middle, so 6,750 is past the mid-point.

If the number on the line is 9,200, what could the start and end numbers be?
Find three different ways.



Possible answers:

8,400 – 9,500
5,000 – 10,000
9,120 – 9,220

Numbers to a Million

Notes and Guidance

Children read, write and represent numbers to 1,000,000.

Children need to see numbers represented with counters on a place value grid, as well as drawing the counters.

Mathematical Talk

If one million is the whole, what could the parts be?

Show me 800,500 in three different ways.

Where do the commas go in the numbers?

How else can the numbers be represented?

Varied Fluency

1

100,000s	10,000s	1,000s	100s	10s	1s

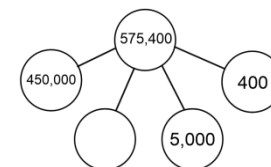
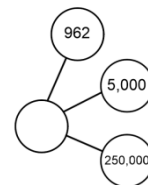
Use counters to make these numbers on the place value chart.

- 32,651
- 456,301
- 50,030

Can you say the numbers out loud?

2

Complete the part whole diagrams.



3

Katya has the following number.

10,000s	1,000s	100s	10s	1s

She adds 4 counters to the hundreds column.
What is her new number?

Numbers to a Million

Reasoning and Problem Solving

Show the value of the digit 7 in each of these numbers.

407,338

7,100,491

25,571

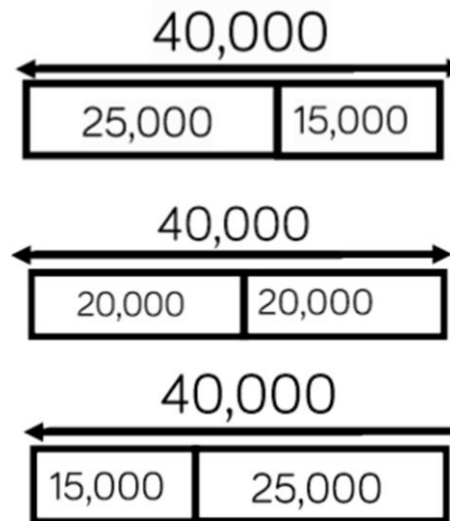
Explain how you know.

407,338: the value is 7 thousand. It is to the left of the hundreds column.

7,100,491: the value is 7 million. It is a 7-digit number and it is on the far left. This is where the millions column is.

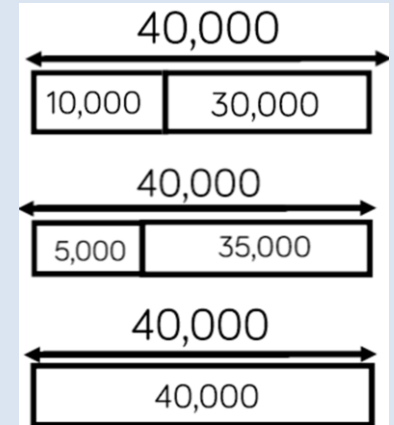
25,571; the value is 7 tens. It is second from the right, next to the ones column.

The bar models are showing a pattern.



Draw the next three.

Create your own pattern of bar models for a partner to continue.



Count in 1,000s

Notes and Guidance

Looking at four digit numbers for the first time, children explore what a thousand is through concrete and pictorial representations.

They count in multiples of 1,000 combining numerals and words.

Mathematical Talk

How is counting in thousands similar to counting in 1s?

When counting in thousands, which digit changes?

Varied Fluency

- 1 How many sweets are there altogether?



There are three jars of sweets.

There are sweets altogether.

- 2 What numbers are represented below?



Write them in numerals and words.

- 3 Complete the number tracks.

3,000	4,000		6,000			9,000	
	9,000		7,000			4,000	

Count in 1,000s

Reasoning and Problem Solving

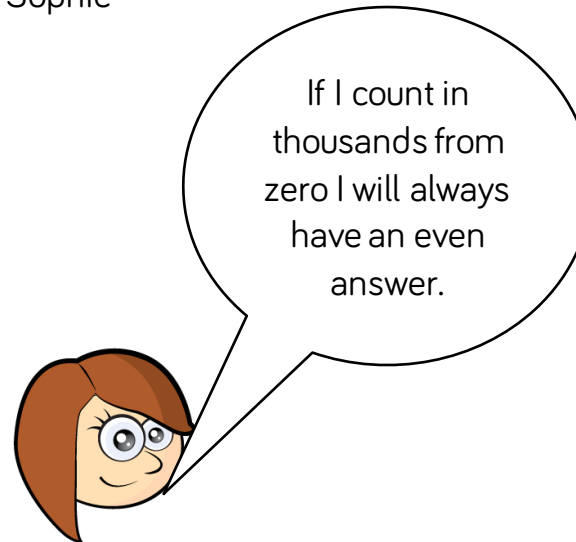
Sort these statements into **sometimes**, **always**, **never**.

- When counting in hundreds, the ones digit changes.
- The thousands column changes every time you count in thousands.
- To count in thousands, we use 4 digit numbers.

When counting in hundreds, the ones digit changes. **NEVER**
The thousands column changes every time you count in thousands. **ALWAYS**
To count in thousands, we use 4 digit numbers. **SOMETIMES**

True or false?

Sophie



True because they all end in zero which are multiples of 10 and multiple of 10 are even

Count in Powers of Ten

Notes and Guidance

Children complete number sequences and can describe the term to term rule in a sequence e.g. add ten each time.

They count forwards and backwards in powers of ten up to 1,000,000

Mathematical Talk

What happens to the pattern when you move into negative?

What do you notice to the pattern when you compare sequences in 10's, 100's 1000's etc?

Can you create a rule for the sequence?

Varied Fluency

1 Complete the sequence.

.....,, 2,, 22,, 32,,, 62

The rule for this sequence is:

2 Circle and correct the mistake in each sequence.

7,875, 8,875, 9,875, 11,875, 12,875, 13,875....

864,664, 764,664, 664,664, 554,664, 444,664....

3 Here is a Gattegno chart showing 32, 450

1	2	3	4	5	6	7	8	9	Cards	
10	20	30	40	50	60	70	80	90	+10	-10
100	200	300	400	500	600	700	800	900	+100	-100
1000	2000	3000	4000	5000	6000	7000	8000	9000	+1,000	-1,000
10000	20000	30000	40000	50000	60000	70000	80000	90000	+10,000	-10,000

Give children a target number to make then let them choose a card. Children then need to adjust their number on the Gattegno chart.

Count in Powers of Ten

Reasoning and Problem

Daniel writes the first five numbers of a sequence.

They are
3,666, 4,666, 5,666, 6,666, 7,666

The 10th term will be
15,332 because I will
double the 5th term.

Daniel



Is he correct?
Explain why.

The answer would be
12,666 because it is
adding 1,000 each
time.
He should have added
5,000 not double the
5th term.

I am counting in 10s
from 184
I will include 224



Max

I am counting in 100s
from 604
I will include 1,040



Ella

I am counting in 1,000s
from 13
I will include 130,000



Henry

One person has made a mistake.

Identify who has made the mistake and
explain how you know.

Ella has made a mistake.
She is counting in 100s
therefore the ones
column should never
change.

Count in 25s

Notes and Guidance

Focusing on patterns, children count in 25s. They use their knowledge of counting in 50s and 100s to become fluent in 25s.

Children should recognise and use the fact that there are four 25s in 100.

Mathematical Talk

Can you notice a pattern as the numbers increase?

What digit do multiples of 25 end in?

What's the same and what's different when counting in 50s and 25s?

Varied Fluency

1 Complete the number tracks.

25		75		125	150				250
----	--	----	--	-----	-----	--	--	--	-----

	725	700		650		600			
--	-----	-----	--	-----	--	-----	--	--	--

2 Circle the mistake in each sequence.

2,275, 2,300, 2,325, 2,350, 2,400...

1,000, 975, 925, 900, 875....

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

25	50	75	100	125	150
----	----	----	-----	-----	-----

50	100	150	200	250	300
----	-----	-----	-----	-----	-----

Count in 25s

Reasoning and Problem Solving

Hayley is counting in 25s and 1,000s.
She says:

- Multiples of 1,000 are also multiples of 25
- Multiples of 25 are therefore multiples of 1,000
-

Are these statements always, sometimes or never true?

Possible answers

Multiples of 1,000 are multiples of 25 because 25 goes into 1,000 exactly.

Not all multiples of 25 are multiples of 1,000. i.e 1,075.

Jeff is counting down in 25s from 790, will he say 725?

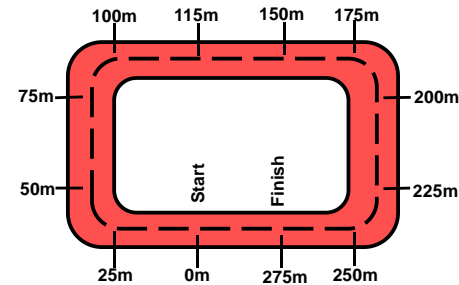
Explain with an example.

Possible answer:
No, he will not say 725 because:

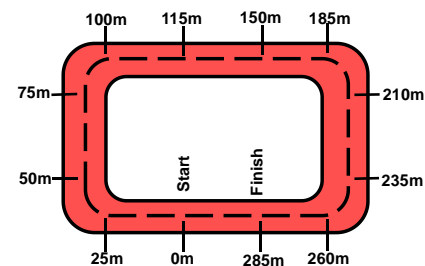
790, 765, 740, 715, 690, 665

Two race tracks have been split into 25m intervals.

Race track A



Race track B



What errors have been made?

Possible answers:

Race track A has miscounted when adding 25m to 100m. After this they have continued to count in 25s correctly from 150

Race track B has miscounted when adding 25m to 150m. They have then correctly added 25m from this point.

1,000 More or Less

Notes and Guidance

Building on Year 3 where they explored finding 1, 10 and 100 more or less, children now move onto finding 1,000 more or less than a given number.

Show children that they can represent their answer in a number of ways, for example using numerals or Base 10

Mathematical Talk

What is 1,000 more than/less than a number? Which column changes?

What happens when I subtract 1,000 from 9,209?

Can you show me two different ways of showing 1,000 more/less than e.g. pictures, place value charts, equipment.

Complete this sentence: I know that 1000 more than ____ is ____ because..... I can prove this by_____.

Varied Fluency

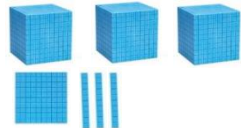
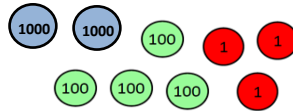
- 1 Fill in the missing values.

$$9,523 + 10 = \boxed{}$$

$$\boxed{} + 3,589 = 3,689$$

$$3,891 + \boxed{} = 4,891$$

- 2 Complete the table.

1,000 less	Number	1,000 more
		
		

- 3 Find 1,000 more and 1,000 less than each number.

5,000

7,500

2,359

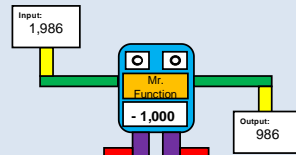
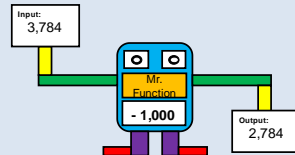
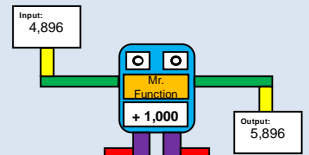
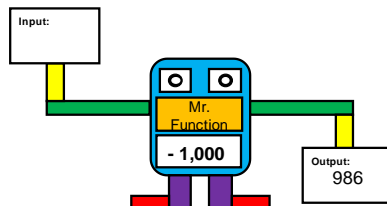
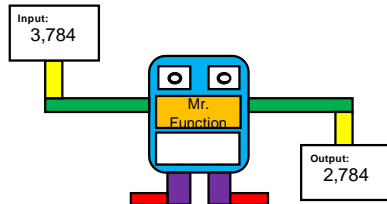
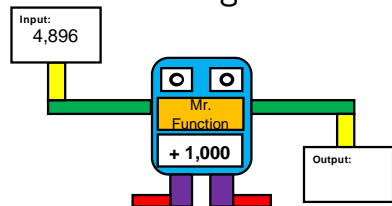
8,999

Use concrete resources to prove you are correct.

1,000 More or Less

Reasoning and Problem Solving

Complete the missing boxes:



10 less than my number is 1000 more than 5300. What is my number?

Can you write your own problem similar to this?

6310

Henry says:



When I add 1,000 to 4,325 I only have to change 1.

Is he correct?

Which digit does he need to change?

Fill in the boxes by finding the patterns:

3,210		1,210	
3,110			
			6,010

Yes he is correct. He will need to change to thousands digit (4).

3,210	2,210	1,210	210
3,110			
3,010	4,010	5,010	6,010
2,910			

Compare 4-digit Numbers

Notes and Guidance

In this small step, children should compare 4 digit numbers using comparison language and symbols to determine which is greater and which is smaller.

Mathematical Talk

Do you start counting the thousands, hundreds, tens or ones first? Why?

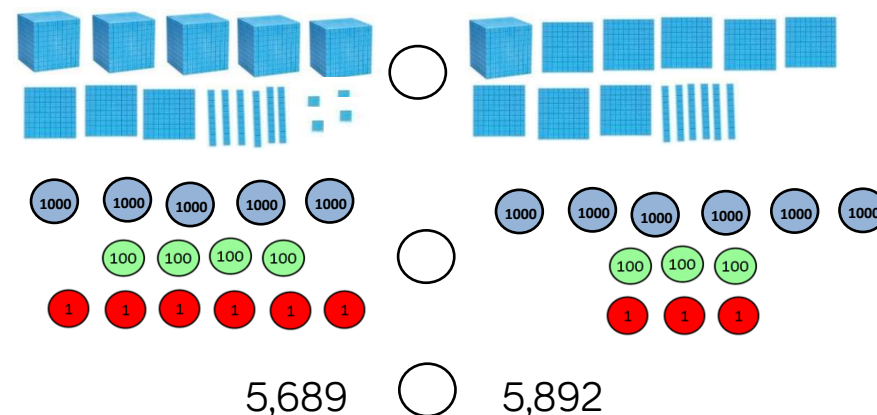
Which column do you start comparing from? Why?

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

How many answers can you find?

Varied Fluency

- 1 Fill in the circle using $<$, $>$ or $=$



- 2 Circle the smallest amount.

Two thousand, three hundred and ninety seven 3,792

6,000 + 400 + 50 + 6 6,455

9 thousands, 2 hundreds and 6 ones 9,602

- 3 Complete the statements.

1,985 >

4,203 < 4,000 + + 4

Compare 4-digit Numbers

Reasoning and Problem Solving

I am thinking of a number. It is greater than 3,000 but smaller than 5,000

The digits add up to 15.
What could the number be?

Write down as many possibilities as you can.

The difference between the largest and smallest digit is 6- how many numbers do you now have?

Possible answers:

3,822
3,741
4,560

Write a sensible number story to compare each pair of numbers:

3,650 and 2,345

9,999 and 2,893

Possible answer:

Stephen and Charlotte play a video game. Stephen scores 3,650 points. Charlotte scores 2,345 points. Who has the most points?

Compare and Order

Notes and Guidance

Building on their learning from Year 4 children will compare and order numbers up to 100,000

Children should be able to do this with numbers presented in a variety of ways.

Mathematical Talk

In order to compare numbers, what do we need to know?

What is the value of each digit?

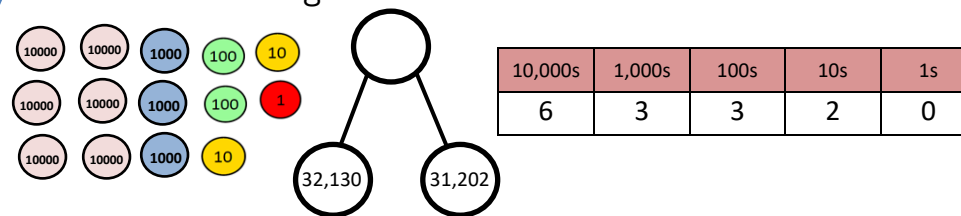
What is the value of in this number?

What is the value of the whole? Can you suggest other parts that make the whole?

Can you write a story to support your part whole model?

Varied Fluency

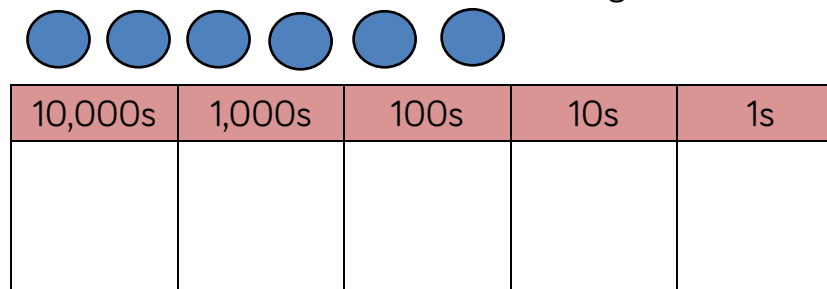
1 Order the following.



2 Add the symbols $<$, $>$ and $=$ to make the statements correct.



3 Use 6 counters to make **five** different 6 digit numbers.



Order your numbers from greatest to smallest.

Compare and Order

Reasoning and Problem Solving

Turn over digit cards 0-9 and select five.

Make the greatest number possible and the smallest number possible.

How do you know this is the greatest or smallest?

Totally dependent on what cards are chosen
e.g. 4, 9, 1, 3, 2

Smallest: 12,349
Greatest: 94,321

Using digit cards 0-9, create three different five-digit numbers that fit the following clues:

- The digit in the hundreds column and ones column has a difference of 2
- The digit in the hundreds column and the ten thousands column has a difference of 2
- The sum of all the digits totals 19

Possible answers:

81,604
41,608
58,321
18,325

Order Numbers

Notes and Guidance

Children explore ordering a set of numbers in ascending and descending order.

Children can then find the largest or smallest number from a set.

Mathematical Talk

Which number is the greatest? Which number is the highest/lowest?

Why have you chosen to order the numbers this way?

What strategy did you use to solve this problem?

Varied Fluency

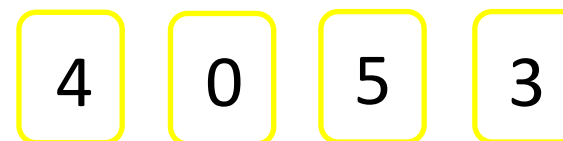
- Put the numbers in order starting with the smallest.

2,764



XXVII

- Here are four digit cards.



Arrange them to make as many different 4 digit numbers as you can and put them in ascending order.

- Rearrange four counters in the place value chart to make different numbers.



1000s	100s	10s	1s

Record all your numbers and write them in descending order.

Order Numbers

Reasoning and Problem Solving

Lola has ordered five 4-digit numbers.
The smallest number is 3,450, the largest number is 3,650

All the other numbers have digit totals of 20

What could the other three numbers be?

Explain the mistake.



3,476

3,584

3,593

The number 989 is in the wrong place. A common misconception could be that the first digit is a high number the whole number must be large. They have forgotten to check how many digits there are in the number before ordering.

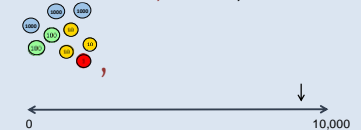
Order these amounts:

Half of 2,400

LXXXVI



LXXXVI,
Half of 2,400 ,



Put one number in each box so that the list of numbers is ordered largest to smallest.

Th	H	T	O
1	1		3
1		2	7
1	2	5	
1		5	9
1	3	8	
1		1	5

Can you find more than one way?

Th	H	T	O
1	1	1	3
1	1	2	7
1	2	5	8
1	3	5	9
1	3	8	4
1	4	1	5

Compare and Order

Notes and Guidance

Children compare and order numbers up to 1,000,000 using comparison vocabulary and symbols.

They use a number line to compare numbers, and look at the importance of focusing on the column with the highest place value when comparing numbers.

Mathematical Talk

In order to compare what do we need to know?

What is the value of each digit?

What is the value of in this number?

What is the value of the whole? Can you suggest other parts that make the whole?

Can you write a story to support your part whole model?

Varied Fluency

- Put the number cards in order of size.

13,010

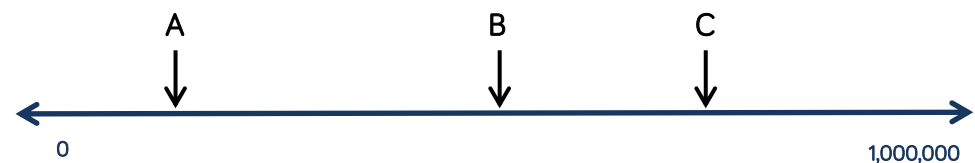
13,100

13,011

13,110

13,111

- Estimate the value of A, B and C.



- Here is a table showing the population in areas of Yorkshire.

Halifax	88,134
Brighouse	32,360
Leeds	720,492
Huddersfield	146,234
Wakefield	76,886
Bradford	531,200

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

The population of Halifax is than the population of Wakefield.
Double the population of Brighouse is than the population of Halifax.

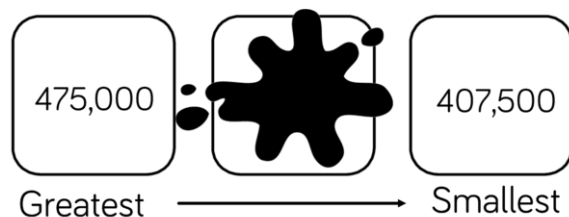
Compare and Order

Reasoning and Problem Solving

The number covered by the splat is an odd number.

When rounded to the nearest 10,000 it is 440,000

The sum of the digits is 23



What could the number be?

Can you find three possibilities?

Possible answers:

444,812

435,812

439,502

Here are four number cards.

42,350	43,385
56,995	56,963

Four children take one each and say a clue.

My number is 57,000 when rounded to the nearest 100



Max



Ella

My number has exactly three hundreds in it



Henry

My number is 44,000 when rounded to the nearest thousand



Kyra

My number is exactly 100 less than 57,043

Which card did each child have?

Max: 56,995

Ella: 42,350

Henry: 43,385

Kyra: 56,963

Round to the nearest 10

Notes and Guidance

Starting with 2 digit numbers, children look at the position of a number on a number line. They then apply their understanding to three digit numbers, focusing on the number of ones rounding up or down.

Highlight the importance of five here and the idea that although it is in the middle of the two numbers it always rounds up.

Mathematical Talk

Which column do we look at when rounding to the nearest 10?

What is a multiple of 10? Which multiples of 10 does this number sit between?

Which number is being represented? Will we round it up or down? Why?

Varied Fluency

- 1 Which multiples of 10 do the numbers sit between?



- 2 Say whether each number on the number line is closer to 160 or 170



Round 163, 166 and 167 to the nearest 10

- 3 Complete the table.

Start number	Rounded to the nearest 10
851	
XCVIII	

Round to the nearest 10

Reasoning and Problem Solving

A number is rounded to 370
What could all the possibilities be?

370

365
366
367
368
369
370
371
372
373
374

Two different two-digit numbers both
round to 40 when rounded to the nearest
10

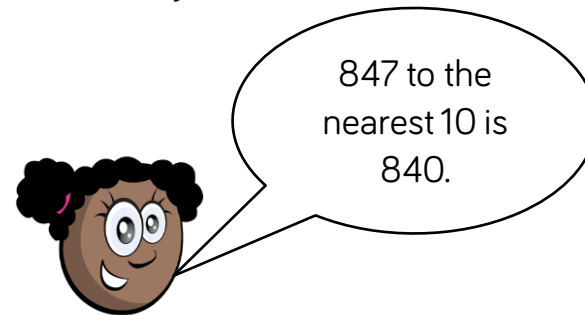
The sum of the 2 numbers is 79

What could the two numbers be?

Is there more than one possibility?

$35 + 44 = 79$
 $36 + 43 = 79$
 $37 + 42 = 79$
 $38 + 41 = 79$
 $39 + 40 = 79$

Jasmine says:



847 to the
nearest 10 is
840.

Do you agree with Jasmine?

Explain why.

I don't agree with
Jasmine because 847
rounded to the nearest
10 is 850. I know this
because ones ending in
5, 6, 7, 8 and 9 round
up.

Round to 10, 100, 1,000

Notes and Guidance

Children build on their Year 4 knowledge of rounding to 10, 100 and 1,000. They need to experience rounding up to and within 10,000.

They need to understand that the column from the question and the column to the right of it are used e.g. round 1,450 to the nearest hundred – look at the hundred and tens column.

Mathematical Talk

Which place value column do we need to look at when we round the nearest 1,000?

When is it best to round to 10? 100? 1,000?

Can you give an example of this?


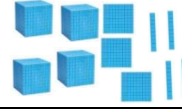
Can you justify your reasoning?

Is there more than one solution?

Will the answers to the nearest 100 and 1,000 be the same or different for the different start numbers?

Varied Fluency

1 Complete the table.

Start number	Rounded to the nearest 10	Rounded to the nearest 100	Rounded to the nearest 1,000
			
			
DCCLXIX			

2 For each number, find five numbers that round to it when rounding to the nearest 100

300

10,000

8,900

3 Complete the table.

Start number	Nearest 10	Nearest 100	Nearest 1,000
365			
1,242			
	4,770		

Round to 10, 100, 1,000

Reasoning and Problem Solving

Nathan

My number rounded to the nearest 10 is 1,150
Rounded to the nearest 100 it is 1,200
Rounded to the nearest 1,000 it is 1,000

1,150
1,151
1,152
1,153
1,154

What could Nathan's number be?

Can you find all of the possibilities?

Alya

2,567 to the nearest 100 is 2,500

Do you agree with Alya?

Explain why.

Regan

4,725 to the nearest 1,000 is 5,025

Explain the mistake Regan has made.

I do not agree with Alya because 2,567 rounded to the nearest 100 is 2,600
I know this because the rule of a tens ending in 5, 6, 7, 8 and 9 round up.

Regan has correctly changed four thousand to five thousand but has added the tens and ones back on.
When rounded to the nearest thousand, the hundreds, tens and ones will be zeros.

Round to the nearest 100

Notes and Guidance

Building on the previous step, children compare rounding to the nearest 10 (looking at the ones column) to rounding to the nearest 100 (looking at the tens column).

Children use their knowledge of multiples of 100, and understanding of which hundreds a number sits between, to help them round.

Mathematical Talk

How is rounding to the nearest 100 similar and different to the nearest 10?

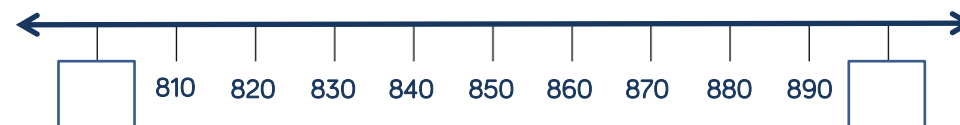
Which column do we need to look at when rounding to the nearest 100?

Why do numbers up to 49 round down to the nearest 100 and numbers 50 to 99 round up?

When rounding to 10 our number has one zero and when rounding to 100 it has two zeros. Why?

Varied Fluency

- 1 Which multiples of 100 do the numbers sit between?



- 2 Say whether each number on the number line is closer to 500 or 600



Round 537, 555 and 568 to the nearest 100

- 3 Complete the table.

Start number	Rounded to the nearest 10
400 50 7	
994	
XLV	

Round to the nearest 100

Reasoning and Problem Solving

Are the statements always, sometimes or never true?

Explain your reasons for each statement.

- A number with a five in the tens column rounds up to the nearest hundred.
- A number with a five in the ones column rounds up to the nearest hundred
- A number with a five in the hundreds column rounds up to the nearest hundred.

Always- a number with a five in the tens column will be 50 or above so will always round up.

Sometimes- a number with a five in the ones column might have 0-4 in the tens column and round down or might have 5-9 in the tens column and round up.

Sometimes- a number with a five in the hundreds column might have 0-4 in the tens column and round down or might have 5-9 in the tens column and round up.

When a number is rounded to the nearest 100 it is 200

When the same number is rounded to the nearest 10 it is 250

What could the number be?

249 because when rounded to the nearest 10 it round to 250 and when rounded to the nearest 100 it rounds to 200

Other numbers include: 248, 247, 246, 245

Using the digit cards 0-9, can you make numbers that fit the following rules? You can only use each digit once

1. When rounded to the nearest 10, I round to 20
2. When rounded to the nearest 10, I round to 10
3. When rounded to the nearest 100, I round to 1000

To 20 it could be: 15-24

To 10 it could be: 5-14

To 500 it could be 650-749

Only each digit once: 5, 24, 679 or 9, 17, 653 etc.

Round within 100,000

Notes and Guidance

Children continue with work on rounding, now using numbers up to 100,000. They round to the nearest 10, 100, 1,000 and 10,000.

Children use their knowledge of multiples to work out which two numbers the number they are rounding sits between.

Mathematical Talk

Which place value column do we need to look at when we round the nearest 1000?

When is it best to round to 10? 100? 1,000?

Can you give an example of this?

Can you justify your reasoning?

Varied Fluency

1

Round 85,617

- To the nearest 10
- To the nearest 100
- To the nearest 1,000
- To the nearest 10,000

2

Round the distances to the nearest 1,000 miles.

Destination	Miles from Manchester airport	Miles to the nearest 1,000
New York	3,334	
Sydney	10,562	
Hong Kong	5,979	
New Zealand	11,550	

3

Complete the table.

Rounded to the nearest 100	Start number	Rounded to the nearest 1,000
	15,999	
	28,632	
	55,555	

Round within 100,000

Reasoning and Problem Solving

Round 59,996 to the nearest 1,000
Round 59,996 to the nearest 10,000

What do you notice about the answers?

Can you think of three more numbers where the same thing would happen?

Both numbers round to 60,000

Other examples:

19,721 to the nearest 1,000 and 10,000

697 to the nearest 10 and 100

22,982 to the nearest 100 and 1,000

Two five-digit numbers have a difference of 5

When they are both rounded to the nearest thousand, the difference is 1,000

What could the numbers be?

Two numbers with a difference of two where the last three digits are between 495 and 504 e.g. 52,498 and 52,503

Round to the nearest 1,000

Notes and Guidance

Within this small step, children are rounding to the nearest thousand for the first time, building on their knowledge of rounding to the nearest 10 and 100.

Children must understand which thousands number a number sits between.

When rounding to the nearest 1000, children should look at the digits in the hundreds column.

Mathematical Talk

Which place value column do we need to look at when we round the nearest 1000?

What does approximately mean?

The word approximately means 'not exact, but close enough to be used'.

When is it best to round to 10? 100? 1,000?

Can you give an example of this? Can you justify your reasons?

Varied Fluency

- Say whether each number on the number line is closer to 3,000 or 4,000



Round 3,280, 3,591 and 3,700 to the nearest thousand.

- Round these numbers to the nearest 1,000
 - Eight thousand and fifty six
 - 5 thousands, 5 hundreds, 5 tens and 5 ones.
 -

- Complete the table.

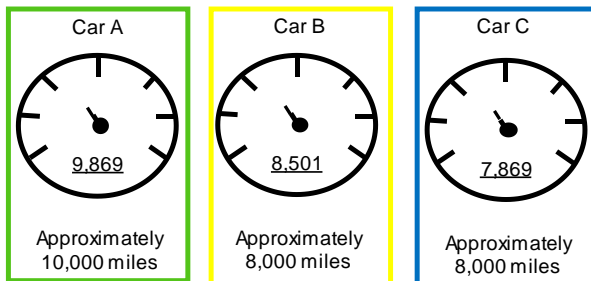
Start number	Rounded to the nearest 10	Rounded to the nearest 100	Rounded to the nearest 1000
4,999			
LXXXII			

Round to the Nearest 1,000

Reasoning and Problem Solving

David's mum and dad are buying a car.

They look at the following cars:



Car B is incorrectly advertised - it should be rounded up to 9,000

True or false?

All of the cars are correctly advertised.

Explain your reasoning.

A number is rounded to the nearest thousand.

The answer is 7,000.

What could the original number have been?

Give 5 possibilities.

What is the greatest number possible?

What is the smallest number possible?

Possible answers:

6,678

7,423

7,192

6,991

Greatest: 7,499

Smallest: 6,500

Round within a Million

Notes and Guidance

Children use up to 6 digit numbers to recap previous rounding, and learn the new skill of rounding to nearest 100,000.

They look at cases when rounding a number for a purpose, and in certain contexts, goes against the general rules of rounding.

Mathematical Talk

How many digits does a million have?

Partition these numbers. Show me.

Which digits do you need to look at when rounding to the nearest 10? 100? 1000? 10,000? 100,000?

How do you know which is the greatest value? Show me.

Varied Fluency

- 1 Round these populations to the nearest 100,000

City	Population	Rounded to the nearest 100,000
Leeds	720,492	
Durham	87,599	
Sheffield	512,827	
Birmingham	992,000	

- 2 Round 450,985 to the nearest

- 10
- 100
- 1,000
- 10,000
- 100,000

- 3 At a festival, 218,712 people attend across the weekend. Tickets come in batches of 100,000

How many batches should the organisers buy?
Explain why this goes against the rounding rule.

Round within a Million

Reasoning and Problem Solving

The difference between two 3-digit numbers is two.

499 and 501
498 and 500

When each number is rounded to the nearest 1,000 the difference between them is 1,000

What could the two numbers be?

The difference between A and B rounded to the nearest 100 is 700

The difference between B and C rounded to the nearest 100 is 400

A, B and C are not multiples of 10

What could A, B and C be?

A – B = in the range of and including
650 – 749

B has to be greater than 400 to complete
 $B - C = 400$

Possible answer:

A = 1,240
B = 506
C = 59

Negative Numbers

Notes and Guidance

Children in Year 4 need to recognise that there are numbers below zero. It is essential that this concept is linked to real life situations such as temperature, water depth, money etc.

Children should be able to count back through zero. This can be supported through the use of number squares, number lines or other visual aids.

Mathematical Talk

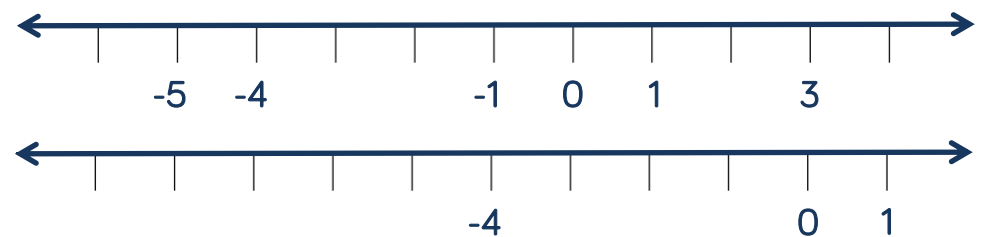
Can you use the words positive and negative in a sentence to describe numbers?

What do you notice about positive and negative numbers on the number line? Can you see any symmetry?

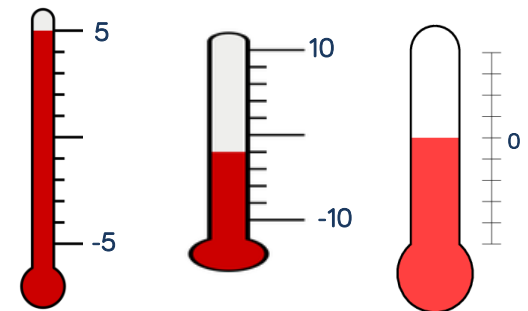
Is -1 degrees warmer or colder than -4 degrees? Can you research the coldest ever recorded temperature on Earth?

Varied Fluency

- 1 Complete the number lines.



- 2 Fill in the temperatures on the different thermometers.



- 3 Zak is counting backwards out loud. He says,

“two, one, minus one, minus two, minus three...”

What mistake has Zak made?

Negative Numbers

Reasoning and Problem Solving

Can you spot the mistake in these number sequences?

- a) 2, 0, 0, -2, -4
- b) 1, -2, -4, -6, -8
- c) 5, 0, -5, -15, -25

Explain how you found the mistake and convince me you are correct.

a) 0 is incorrect as it is written twice

b) 1 is incorrect. The other numbers have a difference of 2 but 1 -2 has a difference of 3

c) -25 is incorrect. The other numbers have a difference of 5 and -15 and -25 have a difference of 10

Sam counted down in 3's until he reached -18.

He started at 21.

What was the tenth number he said?

Prove it.

-9
 $3 \times 10 = 30$. Then subtract 30 from 21 to get to -9

Anna is counting down from 11 in fives.

Does she say -11?

Prove it.

No
11, 6, 1, -2, -7, -12

Negative Numbers

Notes and Guidance

Children continue to explore negative numbers and their position on a number line.

They need to see and use negative numbers in context, and be able to count back through zero.

Mathematical Talk

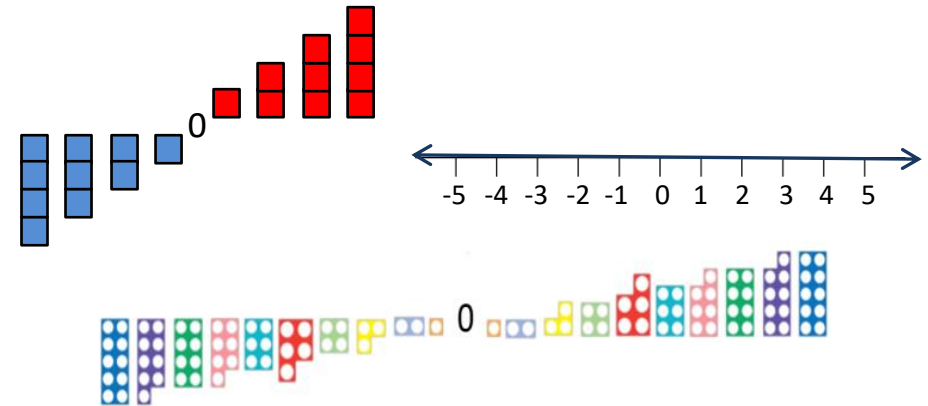
Do we include zero when counting backwards?

Which is the coldest? Warmest?

What was the temperature increase? Decrease?

Varied Fluency

- 1 Here are three representations for negative numbers.



What is the same and what is different about each representation?

- 2 Estimate and label where 0, -12 and -20 will be on the number line.



- 3 Jane visits a zoo.
The rainforest room has a temperature of 32°C
The artic room has a temperature of -24°C
Show the difference in the room temperatures on a number line.

Negative Numbers

Reasoning and Problem Solving

True or False?

- The temperature outside is -5 degrees, the temperature inside is 25 degree.
The difference is 20 degrees.
- Four less than minus six is minus two.
- 15 more than -2 is 13

Explain how you know if each statement is true or false.

False – the difference is 30 degrees because it is 5 degrees from -5 to 0. Added to 25 totals 30

False – it is minus 10 because the steps are going further away from zero

True

Children may use concrete or pictorial resources to explain.

Put these statements in order so that the answers are from smallest to greatest

The difference between -24 and -76

52

The even number that is less than -18 but greater -22

-20

The number that is half way between 40 and -50

-5

The difference between -6 and 7

13

Ordered:
 $-20, -5, 13, 52$