Block 1 – Place Value

Year 5/6

#MathsEveryoneCan

2019-20

White Rose Maths

How to use the mixed-age SOL

In this document, you will find suggestions of how you may structure a progression in learning for a mixed-age class.

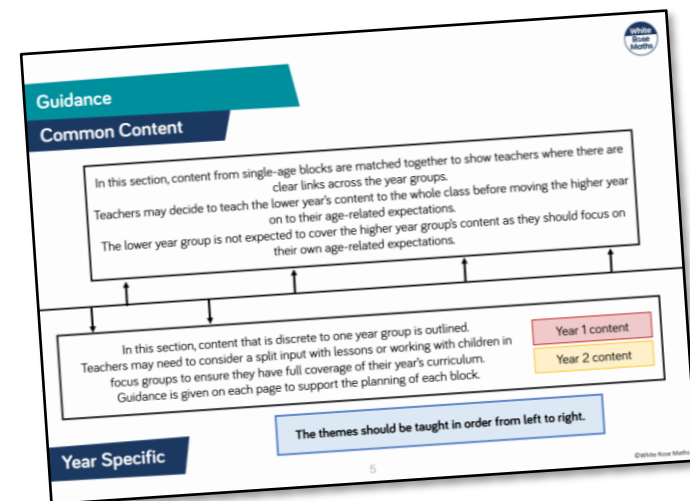Firstly, we have created a yearly overview.

	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 Y1 – Numbers to 20 Y2 – Numbers to 100			Number: Addition and Subtraction Year 1- Numbers within 20 (including recognising money) Year 2- Numbers within 100 (including money)						Number: Year 1: Place Value to 50 and Multiplication Year 2: Multiplication		
Spring	Number: Year 1: Division & consolidation Year 2: Division		Year 1: Place Value to 100 Year 2: Statistics		Measurement: Length and Height	Geometry: Year 1: Shape and Consolidation Year 2: Properties of Shape			Number: Year 1: Fractions and Consolidation Year 2: Fractions			Consolidation
Summer	Geometry: Position and Direction	Measurement: Time		Problem solving and efficient methods		Measurement: Year 1: Weight and Volume Year 2: Mass, Capacity and Temperature		Consolidation and Investigations				

Each term has 12 weeks of learning. We are aware that some terms are longer and shorter than others, so teachers may adapt the overview to fit their term dates.

The overview shows how the content has been matched up over the year to support teachers in teaching similar concepts to both year groups. Where this is not possible, it is clearly indicated on the overview with 2 separate blocks.

For each block of learning, we have grouped the small steps into themes that have similar content. Within these themes, we list the corresponding small steps from one or both year groups. Teachers can then use the single-age schemes to access the guidance on each small step listed within each theme.

The themes are organised into common content (above the line) and year specific content (below the line). Moving from left to right, the arrows on the line suggest the order to teach the themes.

Guidance

Common Content

In this section, content from single-age blocks are matched together to show teachers where there are clear links across the year groups.

Teachers may decide to teach the lower year's content to the whole class before moving the higher year on to their age-related expectations.

The lower year group is not expected to cover the higher year group's content as they should focus on their own age-related expectations.

In this section, content that is discrete to one year group is outlined.

Teachers may need to consider a split input with lessons or working with children in focus groups to ensure they have full coverage of their year's curriculum.

Guidance is given on each page to support the planning of each block.

Year 1 content
Year 2 content

The themes should be taught in order from left to right.

Year Specific

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How to use the mixed-age SOL

Here is an example of one of the themes from the Year 1/2 mixed-age guidance.

Subtraction

Year 1 (Aut B2, Spr B1)
- How many left? (1)
- How many left? (2)
- Counting back
- Subtraction - not crossing 10
- Subtraction - crossing 10 (1)
- Subtraction - crossing 10 (2)

Year 2 (Aut B2, B3)
- Subtract 1-digit from 2-digits
- Subtract with 2-digits (1)
- Subtract with 2-digits (2)
- Find change - money

In order to create a more coherent journey for mixed-age classes, we have re-ordered some of the single-age steps and combined some blocks of learning e.g. Money is covered within Addition and Subtraction.

The bullet points are the names of the small steps from the single-age SOL. We have referenced where the steps are from at the top of each theme e.g. Aut B2 means Autumn term, Block 2. Teachers will need to access both of the single-age SOLs from our website together with this mixed-age guidance in order to plan their learning.

Points to consider
- Use the mixed-age schemes to see where similar skills from both year groups can be taught together. Learning can then be differentiated through the questions on the single-age small steps so both year groups are focusing on their year group content.
- When there is year group specific content, consider teaching in split inputs to classes. This will depend on support in class and may need to be done through focus groups .
- On each of the block overview pages, we have described the key learning in each block and have given suggestions as to how the themes could be approached for each year group.
- We are fully aware that every class is different and the logistics of mixed-age classes can be tricky. We hope that our mixed-age SOL can help teachers to start to draw learning together.

Common Content

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Teachers may decide to teach the lower year's content to the whole class before moving the higher year on to their age-related expectations.
The lower year group is not expected to cover the higher year group's content as they should focus on their own age-related expectations.

In this section, content that is discrete to one year group is outlined.
Teachers may need to consider a split input with lessons or working with children in focus groups to ensure they have full coverage of their year's curriculum.
Guidance is given on each page to support the planning of each block.

Year 5 content

Year 6 content

Year Specific

The themes should be taught in order from left to right.

WRM – Year 5/6 – Scheme of Learning 2.0s

	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: Four Operations						Number: Fractions			
Spring	Number: Decimals and Percentages			Y5: Number: Decimals		Measurement: Converting Units	Measurement: Perimeter, Area and Volume		Y5: Consolidation		Statistics	
				Y6: Number: Algebra					Y6: Number: Ratio			
Summer	Geometry: Properties of Shape		Geometry: Position and Direction	Y6: SATS		Investigations and Consolidation						

Place Value

Common Content

Representing numbers

Year 5 (Aut B1)
- Numbers to 10,000
- Numbers to 100,000
- Numbers to a million

Year 6 (Aut B1)
- Numbers to ten million

Compare and order

Year 5 (Aut B1)
- Compare and order numbers to 100,000
- Compare and order numbers to one million

Year 6 (Aut B1)
- Compare and order any number

Rounding

Year 5 (Aut B1)
- Round to nearest 10, 100 and 1,000
- Round numbers within 100,000
- Round numbers to one million

Year 6 (Aut B1)
- Round any number

Negative numbers

Year 5 (Aut B1)
- Negative numbers

Year 6 (Aut B1)
- Negative numbers

Roman Numerals

Year 5 (Aut B1)
- Roman Numerals to 1,000

Within this block, there are good opportunities for Year 6 to revise place value and ordering of numbers up to a million before take taking this further up to ten million. Pupils have rounded to 10, 100 and 1,000 in Year 4; Year 5 can extend this to rounding to 10,00 and 100,000 and Year 6 also to rounding to the nearest million.

Counting

Year 5 (Aut B1)
- Counting in 10s, 100s, 1,000s, 10,000s and 100,000s

Year Specific

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Block 1 - Place Value

Theme 1 – Roman numerals

Roman Numerals

Notes and Guidance

Building on their knowledge of Roman Numerals to 100, from Year 4, children explore Roman Numerals to 1,000

They explore what is the same and what is different about the number systems, for example there is no zero in the Roman system.

Writing the date in Roman Numerals could be introduced and so this concept can be revisited every day.

Mathematical Talk

Why is there no zero in Roman Numerals?

Do you notice any patterns in the Roman number system?

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

Can you use numbers you know, such as 1, 10 and 100 to help you?

Varied Fluency

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, or for a bit of fun they could test the teacher!

Each diagram shows a number in digits, words and Roman Numerals.
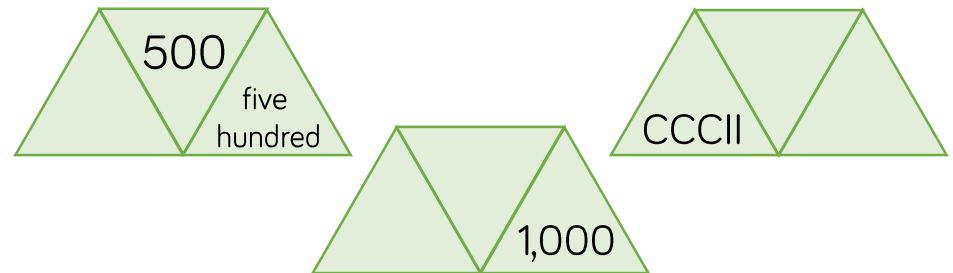
Complete the diagrams.

Complete the function machines.

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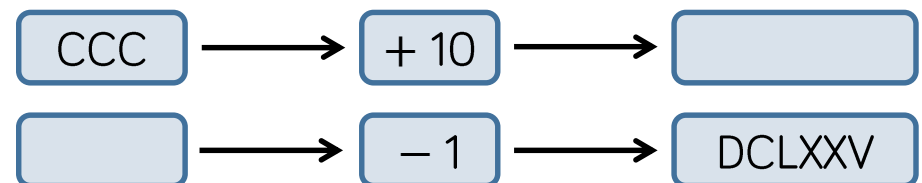
Roman Numerals

Reasoning and Problem Solving

Solve

CCCL + CL =

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

Possible answers:

CD + C
M ÷ II
C + CC + CC
C × V

Here is part of a Roman Numerals hundred square.

Complete the missing values.

XLIV	XLV		XLVII
		LVI	LVII
LXIV		LXVI	LXVII

What patterns do you notice?

Missing Roman Numerals from the top row and left to right:

- XLVI
- LIV
- LV
- LXV

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Block 1 - Place Value

Theme 2 – Representing numbers

Numbers to 10,000

Notes and Guidance

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

Within this step, children must revise adding and subtracting 10, 100 and 1,000

They discuss what is happening to the place value columns, when carrying out each addition or subtraction.

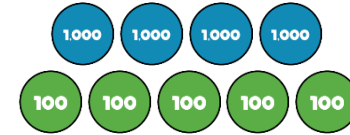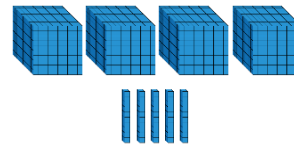## Mathematical Talk

Can you show me 8,045 (any number) in three different ways?

Which representation is the odd one out? Explain your reasoning.

What number could the arrow be pointing to?

Which column(s) change when adding 10, 100, 1,000 to 2,506?
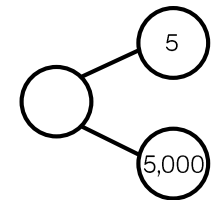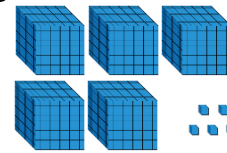
Varied Fluency

Match the diagram to the number.
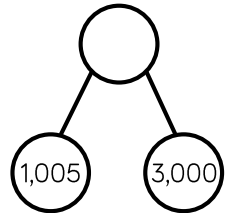
4,005   4,500   4,050

Which diagram is the odd one out?

5,000   6,000
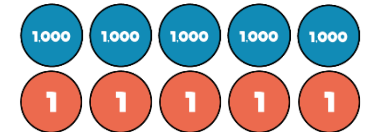
Complete the table.

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

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Numbers to 10,000

Reasoning and Problem Solving

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

She has changed each number into a letter.

Her numbers are

aabcd
acdbc
dcaba
cdadc
bdaab

Here are three clues to work out her numbers:

- The first number in her list is the greatest number.
- The digits in the fourth number total 12
- The third number in the list is the smallest number.

44,213
43,123
13,424
31,413
21,442

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

12,516   12,832

12,679

12,538   12,794

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.

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 the place value grid help you to add 10, 100 or 1,000 to any number?

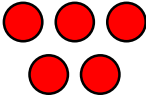How many digits change when you add 10, 100 or 1,000? Is it always the same number of digits that change?
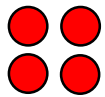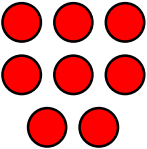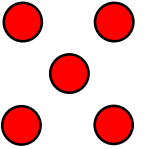
How can we represent 65,048 on a number line?

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

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

Varied Fluency

A number is shown in the place value grid.

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

Write the number in figures and in words.
- Alex adds 10 to this number
- Tommy adds 100 to this number
- Eva adds 1,000 to this number

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

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

Counters	Part-whole model
	65,048
Bar model	Number line

Complete the missing numbers.

$59,000 = 50,000 + \underline{\quad}$

$\underline{\quad} = 30,000 + 1,700 + 230$

$75,480 = \underline{\quad} + 300 + \underline{\quad}$

Numbers to 100,000

Reasoning and Problem Solving

Here is a number line.

2000   3000
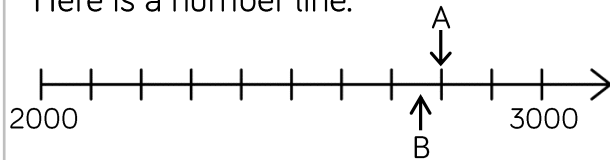
What is the value of A?

B is 40 less than A.
What is the value of B?

C is 500 less than B.
Add C to the number line.

A = 2,800

B = 2,760

2000   3000

Here are three ways of partitioning
27,650

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

Write three more ways

Possible answers:

2 ten thousands, 6
hundreds and 5
tens

20 thousands, 7
thousands and
650 ones

Rosie counts forwards and backwards in
10s from 317

Circle the numbers Rosie will count.

427	997	−7
1,666	3,210	5,627
−23	7	−3

Explain why Rosie will not say the other
numbers.

427
997
5,627
7
−3
−23

Any positive
number will have
to end in a 7

Any negative
number will have
to end in a 3

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Numbers to One Million

Notes and Guidance

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

They will recognise large numbers represented in a part-whole model, when they are partitioned in unfamiliar ways.

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 represented in three different ways.
Can 575,400 be partitioned into 4 parts in a different way?

Where do the commas go in the numbers?
How does the place value grid help you to represent large numbers?
Which columns will change in value when Eva adds 4 counters to the hundreds column?

Varied Fluency

Thousands			Ones		
H	T	O	H	T	O

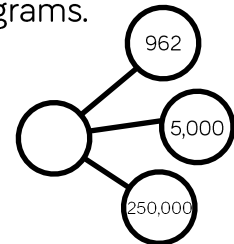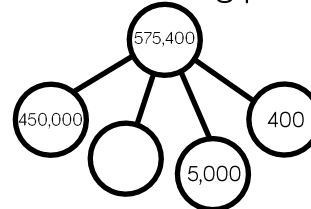Use counters to make these numbers on the place value chart.

32,651   456,301   50,030

Can you say the numbers out loud?

Complete the following part-whole diagrams.

Eva has the following number.

Thousands			Ones		
H	T	O	H	T	O
	●●● ●●●	●●●● ●●●●	●●● ●●●	●● ●●	● ●

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

Numbers to One Million

Reasoning and Problem Solving

Describe the value of the digit 7 in each of the following numbers. How do you know?

407,338

700,491

25,571

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

700,491: the value is 7 hundred thousand. It is a 6-digit number and there are 5 other numbers in place value columns to the right of this number.
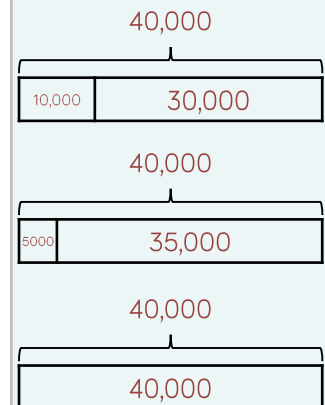
25,571: the value is 7 tens. It is one column to the left of the ones column.

The bar models are showing a pattern.

40,000

| 25,000 | 15,000 |

40,000

| 20,000 | 20,000 |

40,000

| 15,000 | 25,000 |
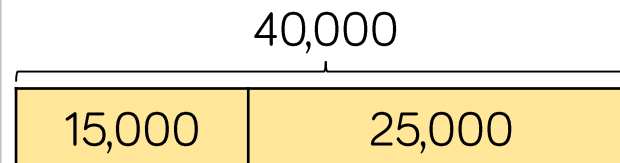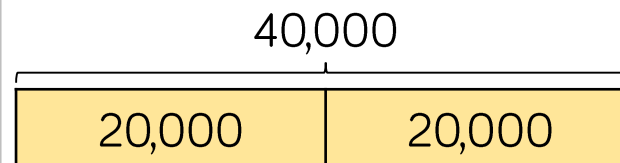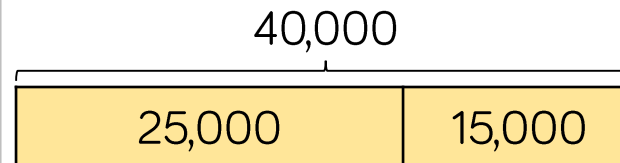
Draw the next three.

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

40,000

| 10,000 | 30,000 |

40,000

| 5000 | 35,000 |

40,000

| 40,000 |

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Numbers to Ten Million

Notes and Guidance

Children need to read, write and represent numbers to ten million in different ways.
Numbers do not always have to be in the millions – they should see a mixture of smaller and larger numbers, with up to seven digits. The repeating patterns of ones, tens, hundreds, ones of thousands, tens of thousands, hundreds of thousands could be discussed and linked to the placement of commas or other separators.

Mathematical Talk

Why is the zero in a number important when representing large numbers?

What strategies can you use to match the representation to the correct number?

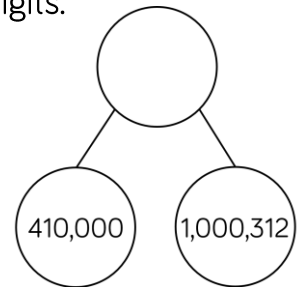How many ways can you complete the partitioned number?

What strategy can you use to work out Teddy's new number?

Varied Fluency

Match the representations to the numbers in digits.

One million, four hundred and one thousand, three hundred and twelve.

M	HTh	TTh	Th	H	T	O
●		●●●	●	●●●	●	●●

410,000   1,000,312

1,401,312   1,041,312   1,410,312

Complete the missing numbers.

$6,305,400 = \underline{\hspace{1cm}} + 300,000 + \underline{\hspace{1cm}} + 400$

$7,001,001 = 7,000,000 + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$

$42,550 = \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + 50$

Teddy's number is 306,042
He adds 5,000 to his number.
What is his new number?

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Numbers to Ten Million

Reasoning and Problem Solving

Put a digit in the missing spaces to make the statement correct.

$$4,62\,\underline{}\,,645 < 4,623,64\,\underline{}$$

Is there more than one option? Can you find them all?

The first digit can be 0, 1, 2 or 3
When the first digit is 0, 1 or 2, the second digit can be any.
When the first digit is 3, the second digit can be 6 or above.

Dora has the number 824,650

She subtracts forty thousand from her number.

She thinks her new number is 820,650

Is she correct?

Explain how you know.

Dora is incorrect because she has subtracted 4,000 not 40,000
Her answer should be 784,650

Use the digit cards and statements to work out my number.

| 0 | 3 | 3 | 5 | 5 | 6 | 7 |

- The ten thousands and hundreds have the same digit.

- The hundred thousand digit is double the tens digit.

- It is a six-digit number.

- It is less than six hundred and fifty-five thousand.

Is this the only possible solution?

Possible solutions:

653,530
653,537
650,537
650,533

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Block 1 - Place Value

Theme 3 – Compare and order

Compare and Order

Notes and Guidance

Children will compare and order numbers up to 100,000 by applying their understanding from Year 4 and how numbers can be represented in different ways.

Children should be able to compare and order numbers presented in a variety of ways, e.g. using place value counters, part-whole models, Roman numerals etc.

Mathematical Talk

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

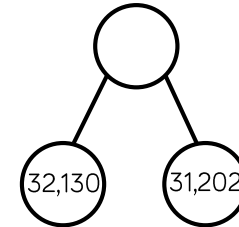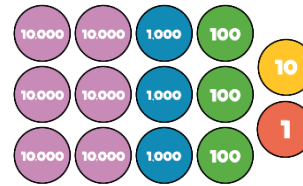What is the value of each digit in the number 63,320?

What is the value of _____ in this number?

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

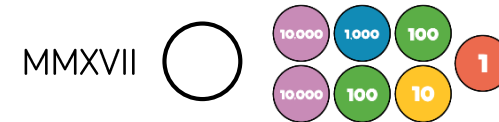What number does MMXVII represent?

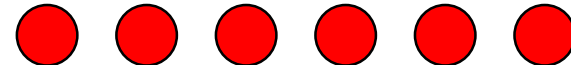## Varied Fluency

Put these numbers in ascending order.

10,000s	1,000s	100s	10s	1s
6	3	3	2	0

32,130   31,202

Add the symbol <, > or = to make the statement correct.

MMXVII ◯

Use six counters to make five different 5-digit numbers.

● ● ● ● ● ●

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

Order your numbers from greatest to smallest.

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Compare and Order

Reasoning and Problem Solving

Place the digits cards 0 to 9 face down and select five of them.

Make the greatest number possible and the smallest number possible.

How do you know which is the greatest or smallest?

Dependent on numbers chosen.
e.g. 4, 9, 1, 3, 2

Smallest: 12,349
Greatest: 94,321

I know this is the greatest number because the digit cards with the larger numbers are in the place value columns with the greater values.

Using the digit cards 0 to 9, create three different 5-digit numbers that fit the following clues:

- The digit in the hundreds column and the ones column have 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 include:

47,260
56,341
18,325
20,476

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

What do we need to know to be able to compare and order large numbers?

Why can't we just look at the thousands columns when we are ordering these five numbers?

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

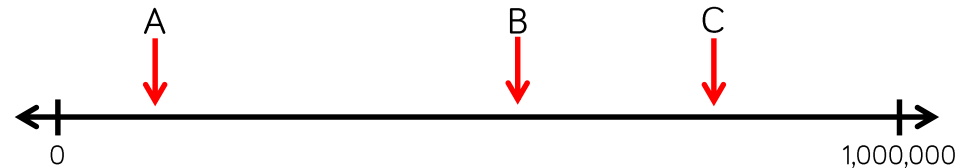▪ Put the number cards in order of size.

| 13,010 | 13,100 | 13,011 | 13,110 | 13,111 |

▪ Estimate the values of A, B and C.

A   B   C

0   1,000,000

▪ 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

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

The population of Halifax ◯ the population of Wakefield.

Double the population of Brighouse ◯ the population of Halifax.

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Compare and Order

Reasoning and Problem Solving

The missing number is an odd number.

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

The sum of the digits is 23

475,000	?	407,500
Greatest		Smallest

What could the number be?

Can you find three possibilities?

Possible answers include:

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 — Mo

My number has exactly three hundreds in it — Rosie

My number is 43,000 when rounded to the nearest thousand — Jack

My number is exactly 100 less then 57,063 — Dora

Which card did each child have?

Mo: 56,995
Rosie: 42,350
Jack: 43,385
Dora: 56,963

Compare and Order

Notes and Guidance

Children will compare and order whole numbers up to ten million using numbers presented in different ways.

They should use the correct mathematical vocabulary (greater than/less than) alongside inequality symbols.

Mathematical Talk

What is the value of each digit in the number?
What is the value of _____ in this number?

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

What do you know about the covered number?
What could the number be? What must the number be? What can't the number be?
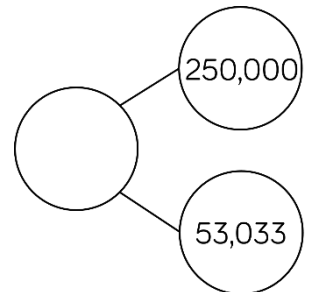
Varied Fluency

Complete the statements to make them true.

What number could the splat be covering?

Three hundred and thirteen thousand and thirty-three

250,000

53,033

Greatest ⟶ Smallest

A house costs £250,000
A motorised home costs £100,000
A bungalow is priced halfway between the two.
Work out the price of the bungalow.

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Compare and Order

Reasoning and Problem Solving

Eva has ordered eight 6-digit numbers.

The smallest number is 345,900

The greatest number is 347,000

All the other numbers have a digit total of 20 and have no repeating digits.

What are the other six numbers?

Can you place all eight numbers in ascending order?

The other six numbers have to have a digit total of 20 and so must start with 346, _ _ _ because anything between 345,900 and 346,000 has a larger digit total. The final three digits have to add up to 7 so the solution is:
345,900
346,025
346,052
346,205
346,250
346,502
346,520
347,000

Jack draws bar model A.
His teacher asks him to draw another where the total is 30,000

50,000

A

10,000

B

30,000
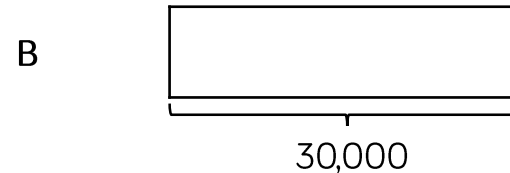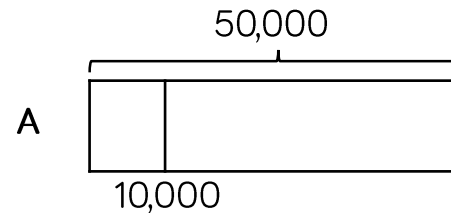
Explain how you know bar B is inaccurate.

Bar B is inaccurate because it starts at 10,000 and finishes after 50,000 therefore it is longer than 40,000

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Block 1 - Place Value

Theme 4 – Rounding

Round to 10, 100 and 1,000

Notes and Guidance

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

Children must understand that the column from the question and the column to the right of it are used e.g. when rounding 1,450 to the nearest hundred – look at the hundreds and tens columns. Number lines are a useful support.

Mathematical Talk

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

When is it best to round to the nearest 10? 100? 1,000?
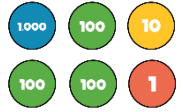Can you give an example of this?
Can you justify your reasoning?

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

◼ Complete the table.

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

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

300	10,000	8,900

◼ Complete the table.

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

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Rounding to 10, 100 and 1,000

Reasoning and Problem Solving

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

Jack

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

What could Jack's number be?

Can you find all of the possibilities?

2,567 to the nearest 100 is 2,500

Whitney

Do you agree with Whitney?
Explain why.

I do not agree with Whitney because 2,567 rounded to the nearest 100 is 2,600. I know this because if the tens digit is 5, 6, 7, 8 or 9 we round up to the next hundred.

Teddy

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

Explain the mistake Teddy has made.

Teddy has correctly changed four thousand to five thousand but has added the tens and the ones back on. When rounding to the nearest thousand, the answer is always a multiple of 1,000

Round within 100,000

Notes and Guidance

Children continue to work on rounding, now using numbers up to 100,000

Children use their knowledge of multiples of 10, 100, 1,000 and 10,000 to work out which two numbers the number they are rounding sits between. A number line is a good way to visualise which multiple is the nearest. Children may need reminding of the convention of rounding up if numbers are exactly halfway.

Mathematical Talk

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

Why would we round these distances to the nearest 1,000 miles?

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

Round 85,617
- To the nearest 10
- To the nearest 100
- To the nearest 1,000
- To the nearest 10,000

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	

Complete the table.

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

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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 could 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 5-digit numbers have a difference of five.

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 five where the last three digits are between 495 and 504

e.g. 52,498 and 52,503

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Round within a Million

Notes and Guidance

Children use numbers with up to six digits, to recap previous rounding, and learn the new skill of rounding to the nearest 100,000

They look at cases when rounding a number for a purpose, including certain contexts where you round up when you wouldn't expect two e.g. to pack 53 items in boxes of 10 you would need 6 boxes.

Mathematical Talk

How many digits does one million have?
Why are we rounding these populations to the nearest 100,000?
Can you partition the number _____ in different ways?

Which digits do you need to look at when rounding to the nearest 10? 100? 1,000? 10,000? 100,000?

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

Varied Fluency

Round these populations to the nearest 100,000

City	Population	Rounded to the nearest 100,000
Leeds	720,492	
Durham	87,559	
Sheffield	512,827	
Birmingham	992,000	

Round 450,985 to the nearest
- 10
- 100
- 1,000
- 10,000
- 100,000

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

How many batches should the organisers buy?

Round within a Million

Reasoning and Problem Solving

The difference between two 3-digit numbers is two.

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

What could the two numbers be?

499 and 501
498 and 500

When the difference between A and B is rounded to the nearest 100, the answer is 700

When the difference between B and C is rounded to the nearest 100, the answer is 400

A, B and C are not multiples of 10

What could A, B and C be?

A − B is between 650 to 749

B has to be greater than 400 to complete
B − C = 400

Possible answer:

A = 1,241
B = 506
C = 59

Round within Ten Million

Notes and Guidance

Children build on their prior knowledge of rounding.

They will learn to round any number within ten million.

They use their knowledge of multiples and place value columns to work out which two numbers the number they are rounding sits between.

Mathematical Talk

Why do we round up when the following digit is 5 or above?
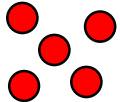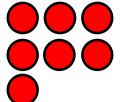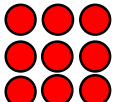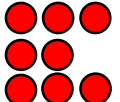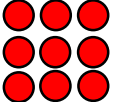Which place value column do we need to look at when we round to the nearest 100,000?
What is the purpose of rounding?
When is it best to round to 1,000? 10,000?
Can you justify your reasoning?

What could/must/can't the missing digit be?
Explain how you know.

Varied Fluency

HTh	TTh	Th	H	T	O

Round the number in the place value chart to:
- The nearest 10,000
- The nearest 100,000
- The nearest 1,000,000

Write five numbers that round to the following numbers when rounded to the nearest hundred thousand.

200,000   600,000   1,900,000

Complete the missing digits so that each number rounds to one hundred and thirty thousand when rounded to the nearest ten thousand.

12 __ ,657   1 __ 1,999   13 __ ,001

Round within Ten Million

Reasoning and Problem Solving

My number is 1,350 when rounded to the nearest 10

Mo

My number is 1,400 when rounded to the nearest 100

Rosie

Both numbers are whole numbers.

What is the greatest possible difference between the two numbers?

The greatest possible difference is 104 (1,345 and 1,449)

Whitney rounded 2,215,678 to the nearest million and wrote 2,215,000

Can you explain to Whitney what mistake she has made?

There should be no non-zero digits in the columns after the millions column.

Miss Grogan gives out four number cards.

| 15,987 | 15,813 | 15,101 | 16,101 |

Four children each have a card and give a clue to what their number is.

Tommy says, "My number rounds to 16,000 to the nearest 1,000"

Alex says, "My number has one hundred."

Jack says, " My number is 15,990 when rounded to the nearest 10"

Dora says, "My number is 15,000 when rounded to the nearest 1,000"

Can you work out which child has which card?

Tommy: 15,813

Alex: 16,101

Jack: 15,987

Dora: 15,101

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Block 1 - Place Value

Theme 5 – Counting

Counting in Powers of 10

Notes and Guidance

Children complete number sequences and can describe the term-to-term rule e.g. add ten each time. It is important to include sequences that go down as well as those that go up.

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

Mathematical Talk

Will there be any negative numbers in this sequence?

What pattern do you begin to see with the positive and negative numbers in the sequence?

What patterns do you notice when you compare sequences increasing or decreasing in 10s, 100s, 1,000s etc.?

Can you create a rule for the sequence?

Varied Fluency

☐ Complete the sequence.

_____ , _____ , 2 , _____ , 22 , _____ , 42 , _____ , _____ , 72

The rule for the sequence is _____ .

☐ 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, …

☐ Here is a Gattegno chart showing 32,450

1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90
100	200	300	400	500	600	700	800	900
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000

Cards

+10	−10
+100	−100
+1,000	−1,000
+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 chart.
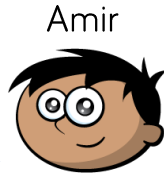
Counting in Powers of 10

Reasoning and Problem Solving

Amir writes the first five numbers of a sequence.
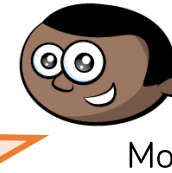
They are
3,666, 4,666, 5,666, 6,666, 7,666

> The 10th term will be 15,322 because I will double the 5th term.

Amir

Is he correct?
Explain why.

The 10th term is 12,666 because Amir is adding 1,000 each time. He should have added 5,000 not doubled the 5th term.

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

Mo

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

Rosie

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

Jack

Who has made a mistake?
Identify anyone who has made a mistake and explain how you know.

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

Jack has also made a mistake as he is counting in 1,000s, so the tens and ones columns won't change.

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Block 1 - Place Value

Theme 6 – Negative numbers

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, such as temperature, to be able to count back through zero. They may need to be reminded to call them negative numbers e.g. "negative four" rather than "minus four".

Mathematical Talk

Do we include zero when counting backwards?

Which is the coldest/warmest temperature?
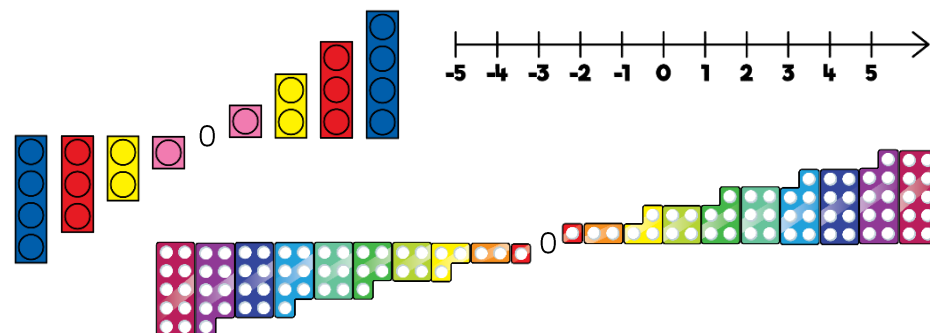How can we estimate where a number goes on this number line?
Does it help to estimate where zero goes first? Why?

What was the temperature increase/decrease?.
Can you show how you know the increase/decrease on a number line?
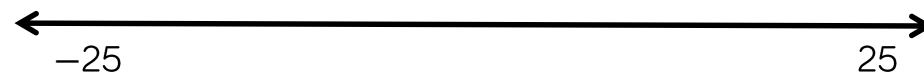
Varied Fluency

Here are three representations for negative numbers.

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

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

−25   25

Whitney visits a zoo.
The rainforest room has a temperature of 32°C
The Arctic room has a temperature of −24°C
Show the difference in 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 degrees.
  The difference is 20 degrees.

- Four less than negative six is negative two.

- 15 more than −2 is 13

Explain how you know 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 negative 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

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

- The number that is half way between 40 and −50

- The difference between −6 and 7

52

−20

−5

13

Ordered:
−20, −5, 13, 52

Negative Numbers

Notes and Guidance

Children continue their work on negative numbers from year 5 by counting forwards and backwards through zero.

They extend their learning by finding intervals across zero. Number lines, both vertical and horizontal are useful to support this, as these emphasise the position of zero.
Children need to see negative numbers in relevant contexts.

Mathematical Talk

Are all negative numbers whole numbers?
Why do the numbers on a number line mirror each other from 0?

Why does positive one add negative one equal zero?
Can you use a number line to show this?

Draw me a picture to show 5 subtract 8
Show 5 more than −2 on a number line.
Could Mo really afford the jumper? How do you know?

Varied Fluency

Use sandcastles (+1) and holes (−1) to calculate.
Here is an example.

$-2 + 5 =$

Two sandcastles will fill two holes. There are three sandcastles left, therefore negative two add five is equal to three.
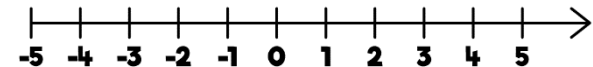
Use this method to solve:

$$3 - 6 \qquad -7 + 8 \qquad 5 - 9$$

Use the number line to answer the questions.

-5 -4 -3 -2 -1 0 1 2 3 4 5

- What is 6 less than 4?
- What is 5 more than −2?
- What is the difference between 3 and −3?

Mo has £17.50 in his bank account. He pays for a jumper which costs £30
How much does he have in his bank account now?

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Negative Numbers

Reasoning and Problem Solving

A company decided to build offices over ground and underground.

> If we build from −20 to 20, we will have 40 floors.

Do you agree? Explain why.

No, there would be 41 floors because you need to count floor 0

When counting forwards in tens from any positive one-digit number, the last digit never changes.

When counting backwards in tens from any positive one-digit number, the last digit does change.

Can you find examples to show this?

Explain why this happens.

Possible examples:

9, 19, 29, 39 etc.

9, −1, −11, −21

This happens because when you cross 0, the numbers mirror the positive side of the number line. Therefore, the final digit in the number changes and will make the number bond to 10