Year 5

Small Steps Guidance and Examples

Block 1: Place Value

White Rose Maths

Overview

Small Steps

- Number to 10,000
- Roman numerals to 1,000
- Round to the nearest 10, 100 and 1,000
- Number to 100,000
- Compare and order numbers to 100,000
- Round numbers within 100,000
- Numbers to a million
- Counting in 10s, 100s, 1,000s, 10,000s and 100,000s
- Compare and order numbers to a million
- Round numbers to a million
- Negative numbers

NC Objectives

Read, write, order and compare numbers to at least 1000000 and determine the value of each digit.

Count forwards or backwards in steps of powers of 10 for any given number up to 1000000.

Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero.

Round any number up to 1000000 to the nearest 10, 100, 1000, 10000 and 100000

Solve number problems and practical problems that involve all of the above.

Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

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

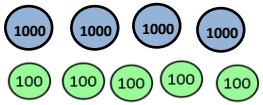
Show me 8,045 in three different ways.

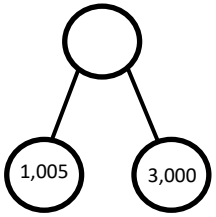
Do you prefer to use concrete objects or draw an image pictorially? Why?

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

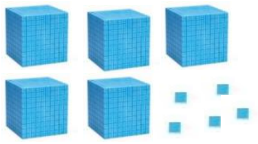
1 Match the diagram to the number.

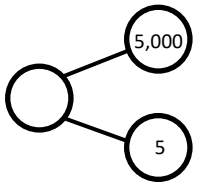


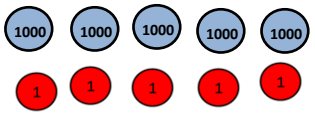


4,005 | 4,500 | 4,050

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 of the 5 numbers.

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.

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.

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?

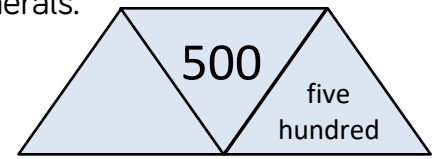
Do you notice any patterns? Look at 30 and 300.

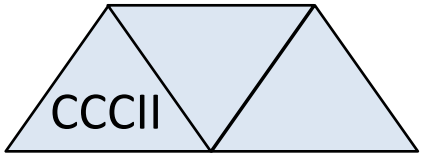
How can you check you have represented the Roman Numeral correctly?

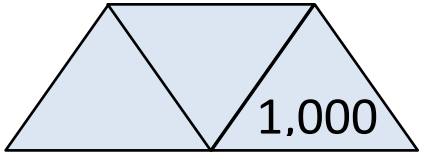
Varied Fluency

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.

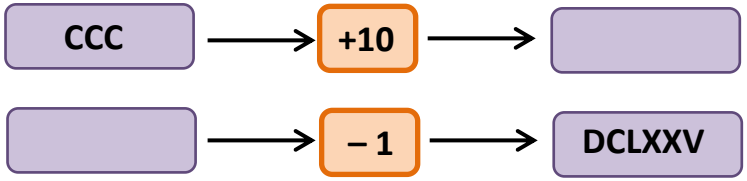






Complete the diagrams.

3 Complete the function machines.



Roman Numerals

Reasoning and Problem Solving

Solve

CCCL + CL =

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

Possible answers:
CD + C = D
M ÷ II = D
C + CC + CC = D
C × V = 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

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

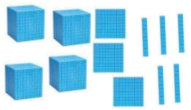
Which place value column do we need to look at when we round the nearest 1,000?

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

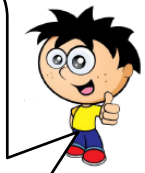
3 Complete the table.

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

Round to 10, 100 and 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

What could Nathan's number be?

Can you find all of the possibilities?

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

Alya

2,567 to the nearest 100 is 2,500

Do you agree with Alya?

Explain why.

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

Regan

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

Explain the mistake Regan has made.

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.

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

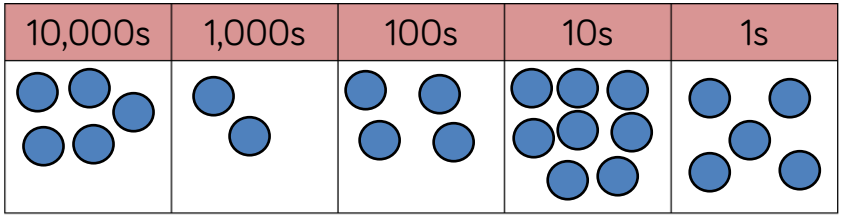
How can we estimate a number on a number line if there are no divisions?

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.

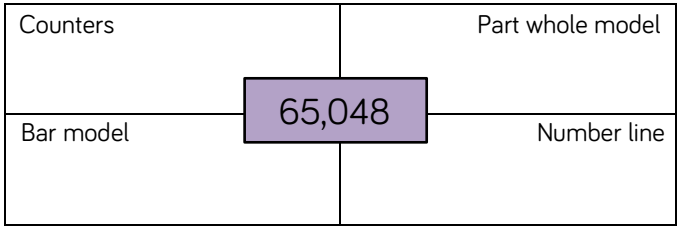


Write the number in figures and in words.

- 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.



3 Complete the missing numbers.

59,000 = 50,000 + ……

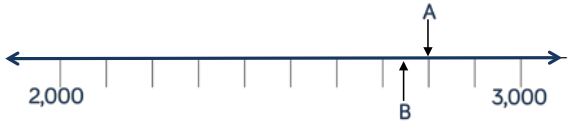
…… = 30,000 + 1,700 + 230

75,480 = …… + 300 + ……

Numbers to 100,000

Reasoning and Problem Solving

Here is a number line.



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

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
507
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

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?

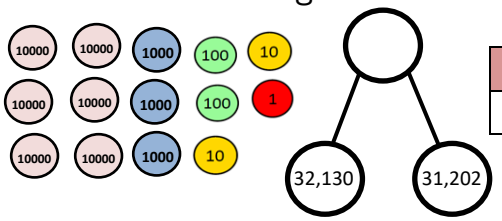
What is the value of ☐ in this number?

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

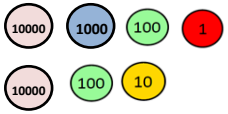
1 Order the following.



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

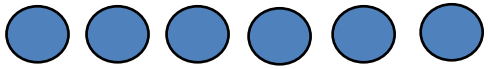
2 Add the symbols <, > and = to make the statements correct.

MMXVII ◯



◯ 92,462

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



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

Order your numbers from greatest to smallest.

Compare and Order to 100,000

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

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

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:
67,240
10,684
46,351
40,573

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 neatest 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

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

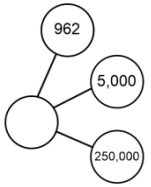
100,000s	10,000s	1,000s	100s	10s	1s

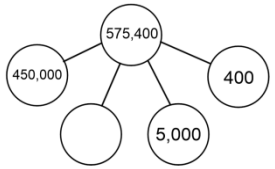
Use counters to make these numbers on the place value chart.

- 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

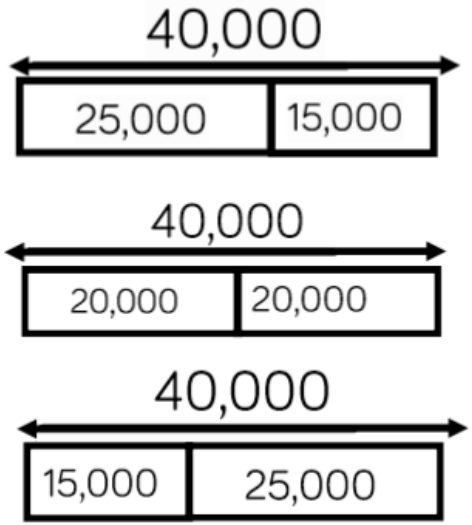
Explain how you know.

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 there are 6 other digits in place value columns to the right of this number.

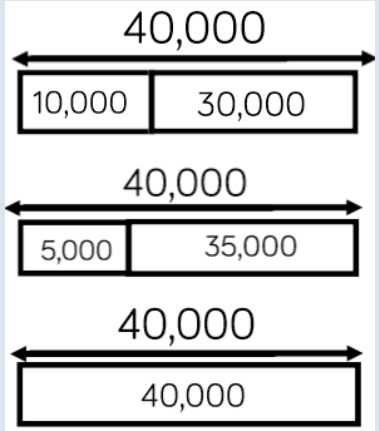
25,571; the value is 7 tens. It is one column to the left of the ones column.

The bar models are showing a pattern.



Draw the next three.

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



Counting in Powers of 10

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
10	20	30	40	50	60	70	80	90
100	200	300	400	500	600	700	800	900
1000	2000	3000	4000	5000	6000	7000	8000	9000
10000	20000	30000	40000	50000	60000	70000	80000	90000

Cards

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

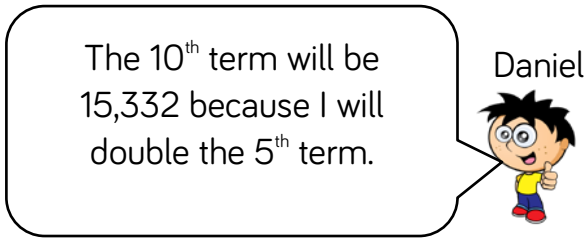
Give children a target number to make then let them choose a card. Children then need to adjust their number on the Gattengo chart.

Counting in Powers of 10

Reasoning and Problem Solving

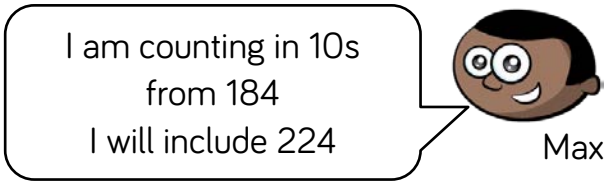
Daniel writes the first five numbers of a sequence.

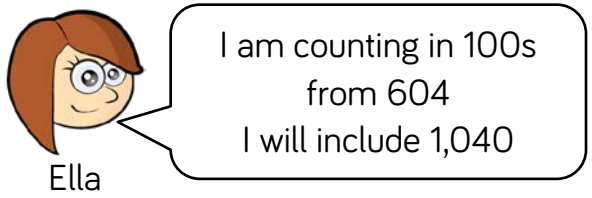
They are
3,666, 4,666, 5,666, 6,666, 7,666

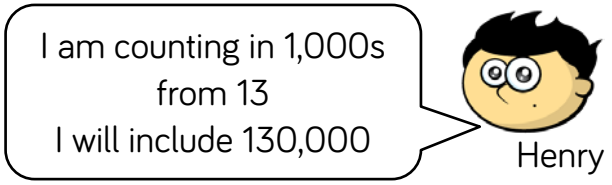


Is he correct?
Explain why.

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.







Who has made a mistake?

Identify anybody who has made a mistake and explain how you know.

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

Henry has also made a mistake as he is counting thousands so the tens and ones column won't change.

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?

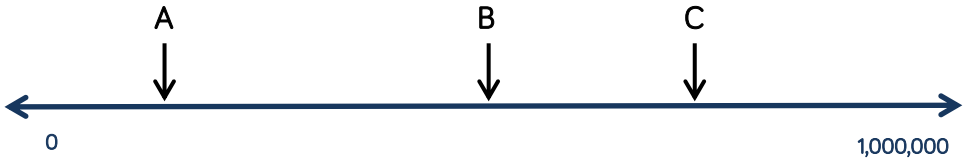
Can you write a story to support your part whole model?

Varied Fluency

1 Put the number cards in order of size.

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

2 Estimate the value of A, B and C.



3 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.

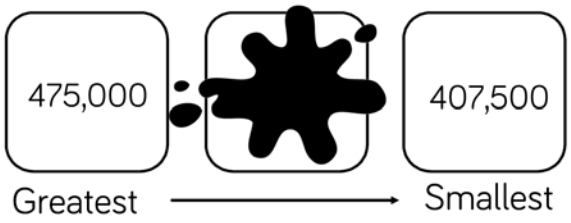
Compare and Order to a Million

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?

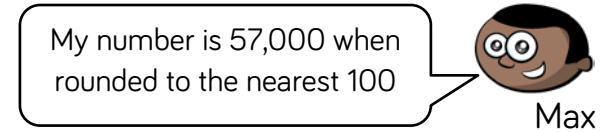
Can you find three possibilities?

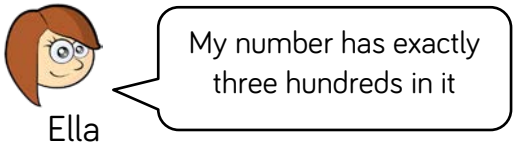
Possible answers:
444,812
435,812
439,502

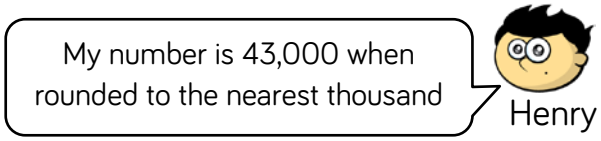
Here are four number cards.

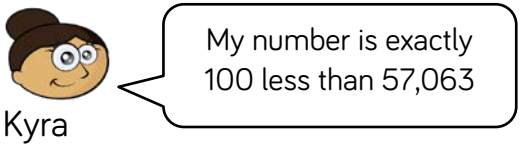
42,350	43,385
56,995	56,963

Four children take one each and say a clue.









Which card did each child have?

Max: 56,995
Ella: 42,350
Henry: 43,385
Kyra: 56,963

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.

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 = 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 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

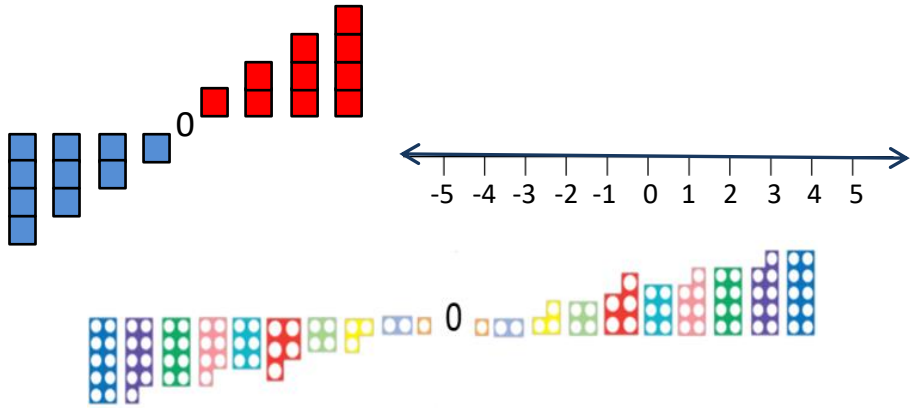
Do we include zero when counting backwards?

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 negative 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 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 -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