Mathematics year group overview

'Together we unlock potential and learn for life'

Mathematics					
0-3 year olds (Pre –Nursery)					
Typically 0-12 months		Typically 1 to 2 years		Typically 2-3 years	
Topic 1 …	Topic 2 …	Topic 3 ..	Topic 1 …	Topic 2 …	Topic 3 ..
• Combine objects like stacking blocks and cups. • Put objects inside others and take them out again. • Climb and squeezing selves into different types of spaces. • Build with a range of resources		• React to changes of amount in a group of up to three items • · Counting-like behaviour, such as making sounds, pointing or saying some numbers in sequence. • · Complete inset puzzles.		• Take part in finger rhymes with numbers • Compare amounts, saying 'lots', 'more' or 'same'. • Count in everyday contexts, sometimes skipping numbers - '1-2-3-5.' • Notice patterns and arrange things in patterns.	

Mathematics		
3- 4 year olds (Nursery)		
Autumn –	**Spring –**	**Summer –**
• Show 'finger numbers' up to 5. • Talk about and identifies the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc • Understand position through words alone – for example, "The bag is under the table," – with no pointing. • Select shapes appropriately: flat surfaces for building, a triangular prism for a roof etc. • Name and recognise some 2D shapes (added to support Spring term not an official statement).	• say one number for each item in order: 1,2,3,4,5. • Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). • Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5 • Experiment with their own symbols and marks as well as numerals. • Discuss routes and locations, using words like 'in front of' and 'behind'. • Talk about and explore 2D using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'. • • Extend and create ABAB patterns – stick, leaf, stick, leaf.	• Recite numbers past 5 • Combine shapes to make new ones – an arch, a bigger triangle etc. • Talk about and explore 3D using informal and using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'. • Notice and correct an error in a repeating pattern • Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then'. • Solve real world mathematical problems with numbers up to 5. • Compare quantities using language: 'more than', 'fewer than' • Describe a familiar route • Fast recognition of up to 3 objects, without having to count them individually ('subitising'). • Make comparisons between objects relating to size, length, weight and capacity

Mathematics

Reception Year

Autumn -	Spring -	Summer -
• Counts objects, actions and sounds. • Link numeral with its cardinal number value. • Subitise • Select, rotate and manipulate shapes in order to develop spatial reasoning skills • Compare lengths, weight and capacity • Continue, copy and compare patterns	• Compare numbers • Compare quantities up to 10 in different contexts, recognising one quantity is greater than, less than or the same as another. (ELG) • Count beyond ten • Understand the 'one more than/ one less than' relationship between consecutive numbers • Explore composition on 10 • Atomically recall number bonds for numbers to 10 • Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. • Subitise up to 5.	• Verbally count beyond 20, recognising the pattern of the counting system. • Have a deep understanding of numbers to 10, including the composition of each number • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds up to 10, including double facts. • Explore and represent patterns within numbers up to 10, including evens, odds, double facts and how quantities can be distributed equally.

Number ELG	Numerical Patterns ELG
Have a deep understanding of number to 10, including the composition of each number. Subitise (recognise quantities without counting) up to 5. Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.	Verbally count beyond 20, recognising the pattern of the counting system. Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Reception Guidance

#MathsEveryoneCan

	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	Place Value - Numbers to 5 Addition and Subtraction - Sorting Place Value - Comparing groups Addition and Subtraction - Change within 5 Measurement - Time											
Spring	Addition and Subtraction - Numbers to 5 Place Value - Numbers to 10 Addition and Subtraction - Addition to 10 Geometry - Shape and space											
Summer	Geometry - Exploring patterns Addition and Subtraction - Count on and back Place Value - Numbers to 20 Multiplication and Division - Numerical patterns Measurement - Measure											

Reception - Notes and guidance

Autumn Progression

Number and Place Value	Numbers to 5	One, two, three
		Four
		Five
Addition and Subtraction	Sorting	Sorting into groups
Number and Place Value	Comparing groups	Comparing quantities of identical objects
		Comparing quantities of non-identical objects
Addition and Subtraction	Change within 5	One more
		One less
Measurement	Time	My day

Reception - Notes and guidance

Spring Progression

Addition and Subtraction	Numbers to 5	→ Number bonds to 5
Number and Place Value	Numbers to 10	→ Counting to 6, 7 and 8
		→ Counting to 9 and 10
		→ Comparing groups up to 10
Addition and Subtraction	Addition to 10	→ Combining two groups to find the whole
		→ Number bonds to 10 – ten frame
		→ Number bonds to 10 – part-whole model
Geometry	Shape and space	→ Spatial awareness
		3-D shapes
		2-D shapes

Reception - Notes and guidance

Summer Progression

Geometry	Exploring patterns	→ Making simple patterns
		→ Exploring more complex patterns
Addition and Subtraction	Count on and back	→ Adding by counting on
		→ Taking away by counting back
Number and Place Value	Numbers to 20	→ Counting to 20
Multiplication and Division	Numerical patterns	→ Doubling
		→ Halving and sharing
		→ Odds and evens
Measurement	Measure	→ Length, height and distance
		→ Weight
		→ Capacity

Autumn

Scheme of learning

Year 1/2

White Rose MATHS

#MathsEveryoneCan

Y1/2 yearly overview

The yearly overview provides suggested timings for each block of learning, which can be adapted to suit different term dates or other requirements.

	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 20)**			Number **Addition and subtraction (within 20)**			Number **Place value (within 100)**				Geometry **Shape**	
Spring	Number **Addition and subtraction (within 100)**					Number **Multiplication and division**			Measurement **Length and height**		**Statistics**	Consolidation
Summer	Measurement **Money**			Number **Fractions**			Measurement **Time**		Measurement **Mass, capacity and temperature**		Geometry **Position and direction**	Consolidation

White Rose MATHS

Autumn Block 1

Place value (within 20)

Small steps

Step 1	Count objects within 10
Step 2	Represent numbers to 10
Step 3	Count on and back within 20
Step 4	Understand 10
Step 5	Understand 11 to 15
Step 6	Understand 16 to 20
Step 7	1 more
Step 8	1 less

Small steps

Step 9	Number lines
Step 10	Estimate on a number line
Step 11	Less than, greater than, equal to
Step 12	Compare numbers
Step 13	Order numbers

Count objects within 10

Notes and guidance

The aim of this small step is for children to be able to fluently count to 10 when counting objects, which is a skill both year groups should be familiar with. Focus on the five counting principles when assessing children's ability to count accurately.

The one-to-one principle: One number name is assigned to each object that is being counted.

The stable-order principle: When counting, the numbers have to be said in a certain order.

The cardinal principle: The final object in a group is the total number of objects in that group.

The abstraction principle: Anything can be counted, including things that cannot be touched, such as sounds and movements.

The order-irrelevance principle: The order in which a group of objects is counted is irrelevant.

Children will also explore counting a specific number of objects from a larger group, which requires them to be more organised and careful when counting.

Things to look out for

- Children may count objects more than once or miss out an object that needs to be counted.

Key questions

- How many objects are there? If I move them around, is there still the same number of objects?
- How do you know that you have counted all the objects?
- Did you need to count all the objects? How many are left?

Possible sentence stems

- The last number I said was _____, so there are _____ objects in total.

Single age small step links

- Count objects (Y1)
- Count objects from a larger group (Y1)

- N/A

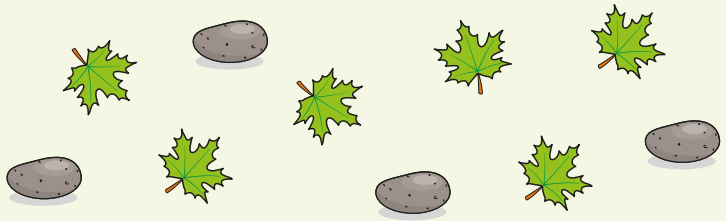
National Curriculum links

- Count to and across 100, forwards and backwards, beginning with zero or 1, or from any given number (Y1)
- 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 (Y1)

Count objects within 10

Key learning

Give children a selection of stones and leaves and ask them these questions.



How many stones are there?

How many leaves are there?

How many objects are there in total?

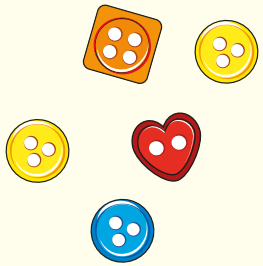
What happens if I arrange the objects differently? Does the total change?

- How many dots are there on each dice?

Read *The Button Box* by M Reid.

Give children a selection of buttons and ask them to count out:

- 4 yellow buttons
- 6 buttons with 2 holes
- 8 buttons with 4 holes.



Put children in pairs and give them 10 cubes.

Ask children to take it in turns to say a number between 1 and 10

When one child says a number, the other then counts it out in cubes.

How many cubes are left?

- Count 5 conkers.

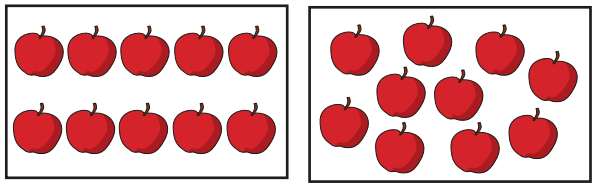
How many conkers are left?

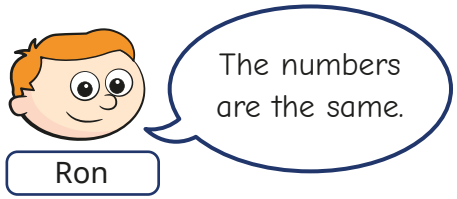
How many conkers are there in total?

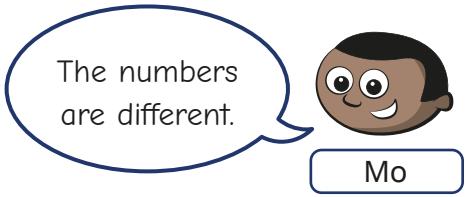
Count objects within 10

Reasoning and problem solving

The apples show two numbers.







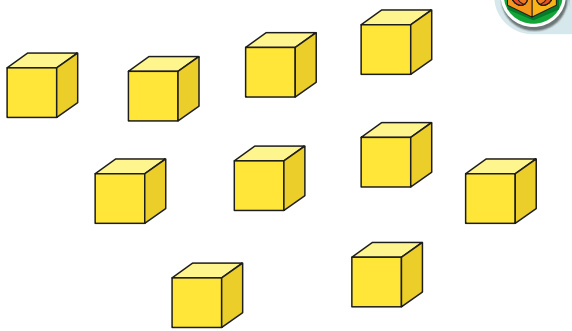
Who do you agree with?

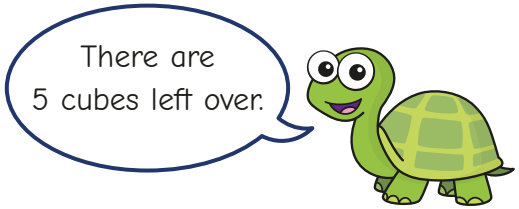
Why?

Which apples were easier to count?

Ron

Tiny counts 4 cubes from this group.





Do you agree with Tiny?

Why?

No

Represent numbers to 10

Notes and guidance

In this small step, children represent everyday objects using manipulatives such as counters and cubes up to a total of 10 objects. They should realise that they can represent anything with mathematical equipment or pictures and still count in the same way. They also use a range of manipulatives to represent numbers written as both words and numerals.

Children practise recognising and writing numerals and words to match a set of up to 10 objects. At this stage, Year 1 children may struggle to write numbers to 10 as words; therefore, there should be a greater focus on matching activities to build recognition and confidence.

Ten frames are particularly useful for this step, as they allow children to organise manipulatives in a structured way. As Year 2 children will be familiar with numbers to 10 from previous learning, they should be encouraged to explore the composition of numbers to 10 in greater depth, although this is something both year groups will cover at a later stage. Activities that involve subitising are key to developing this skill.

Things to look out for

- Children may be able to count the number of objects correctly, but write the numeral or word incorrectly.

Key questions

- How many _____ are there? How did you count them?
- How can you use counters and a ten frame to represent the _____?
- How do you write _____ in numerals/words?

Possible sentence stems

- I can use a _____ to represent each _____

Single age small step links

- Represent objects (Y1)
- Recognise numbers as words (Y1)
- Numbers to 20 (Y2)

National Curriculum links

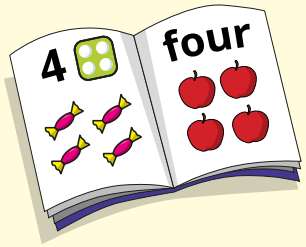
- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least (Y1)
- Identify, represent and estimate numbers using different representations, including the number line (Y2)

Represent numbers to 10

Key learning

Make a class counting book, with a double-page spread for each number from zero to 10

Stick in drawings or photographs of objects the children have collected and include the numeral and the word on each spread.



Give each child or pair of children a set of digit cards from 0 to 10, a set of cards with numbers from zero to ten written in words, some counters or cubes and a ten frame.

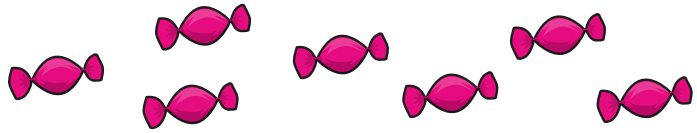
Show an image of some objects, such as 8 cars.

Ask children to represent the image using their counters or cubes and ten frames.

Then ask children to hold up the digit card and word card that match their ten frames.

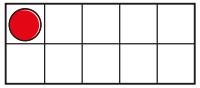
Repeat this with different numbers of objects up to 10

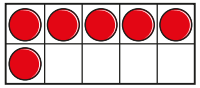
- How many sweets are there?

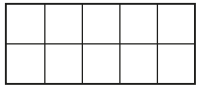


Use counters and a ten frame to show the number of sweets.

- Match the ten frames to the words and numerals.



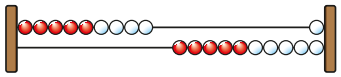


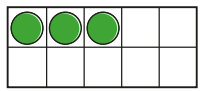


zero	1
one	0
six	6

- What numbers are shown?

Write the numbers as numerals or words.



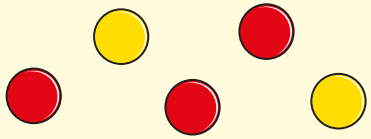


Represent numbers to 10

Reasoning and problem solving

Ask children to count out 10 double-sided counters.

Then ask children to pick up some of their counters, shake them and drop them on the floor.



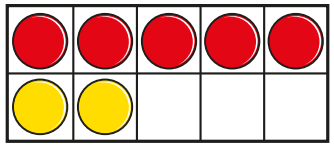
Ask children how many counters there are in one colour, and then how many counters there are in the other colour.

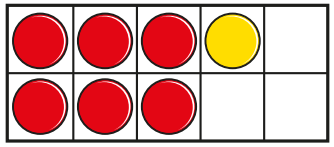
Can they tell you how many counters there are altogether?

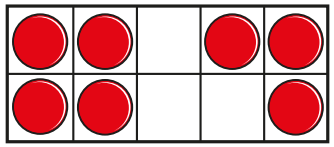
Encourage children to talk about the total number they can see and how it is made up of smaller parts.

Discuss answers as a class.

Which ten frames show seven?







How do you know?

How many other ways can you show seven on a ten frame?

All of the ten frames show seven.

Count on and back within 20

Notes and guidance

The aim of this small step is for children to be able to fluently count within 20

Although both year groups are likely to have experienced counting up to 20, children can find counting through the teen numbers difficult, as the number names do not have the same regular 1 to 9 patterns that they hear beyond 20. These numbers will be explored in more detail in future steps.

Children should explore counting backwards as well as forwards. Countdowns are a fun way to reinforce counting backwards, such as the countdown to a rocket launch.

As well as counting forwards from zero and backwards from 20, children should be given the opportunity to count on and back from any number within 20. This is an important skill to develop in preparation for learning on addition and subtraction, in which children will need to start with a given number and count on or back.

Things to look out for

- Children may stop at 1, rather than continuing to zero.
- Children may want to go back to start at zero or 1, rather than counting on from a given number.

Key questions

- What number comes before/after _____?
- Which numbers after 10 do not include "teen"?
- Should you stop counting at 1 or zero?

Possible sentence stems

- The number that comes before/after _____ is _____
- I need to start counting from _____

Single age small step links

- Count on from any number (Y1)
- Count backwards within 10 (Y1)
- Count within 20 (Y1)

- Numbers to 20 (Y2)

National Curriculum links

- Count to and across 100, forwards and backwards, beginning with zero or 1, or from any given number (Y1)
- 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 (Y1)

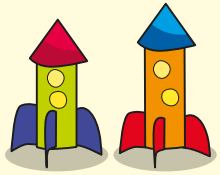
Count on and back within 20

Key learning

Read *1 to 20 Animals Aplenty* by Katie Viggers.

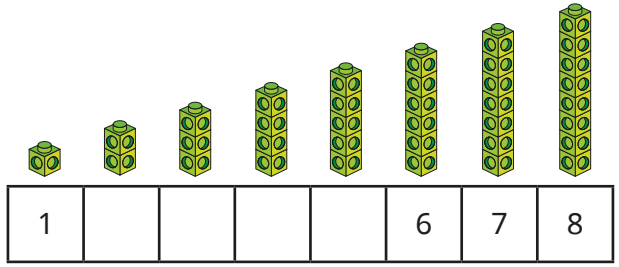
Show the pages from the book with the text hidden and ask children to count the animals on each page. Challenge them to work out the hidden rhyme.

Get creative together and make some rockets.



Ask children to "blast-off" their rockets, counting down from any given number to zero.

- Complete the number track.



Put children into three groups.

Point to a group and ask them to begin counting from zero. When you point to another group, they should continue the count. Keep switching between groups.

To add challenge, point up when you want the children to count on from the last number counted and point down for them to count back.

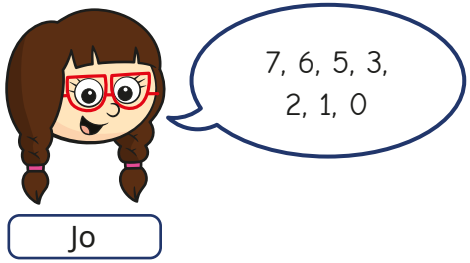
- Complete the number tracks.

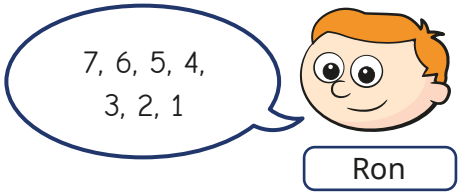
5	6								
16	15								
		7				11	12		
		17			14	13			

Count on and back within 20

Reasoning and problem solving

Jo and Ron count backwards from 7





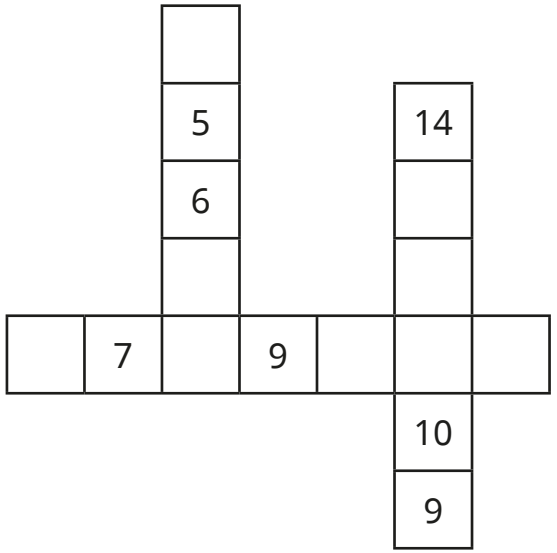
What mistake has each child made?

Work with a partner to help Jo and Ron count backwards from 7

Jo has missed the number 4

Ron has not included zero.

Complete the number tracks.



Where did you start?

Compare methods with a partner.

across:
6, 7, **8**, 9, **10**, **11**, **12**

left down:
4, 5, 6, **7**, **8**

right down:
14, **13**, **12**, **11**, 10, 9

Understand 10

Notes and guidance

In this small step, children develop their understanding of 10. A deep understanding of 10 is key for future learning.

Use ten frames, beadstrings, Rekenreks and cubes to draw attention to the fact that 10 ones are equivalent to 1 ten. These representations can support children to instantly recognise (subitise) 10 without needing to count.

Spend time looking at 10 in different ways, particularly ways where the 10 can be fixed or broken apart, for example a bundle of 10 straws. Children could then move on to seeing 10 as one base 10 piece that cannot be broken apart, although the individual ones are still obvious. They could also be encouraged to use the language of "exchange" at this stage: "We can exchange 10 base 10 ones for 1 base 10 ten", and vice versa.

Things to look out for

- Children may struggle to understand that 1 ten is made up of 10 ones. Ensure that they explore this in a variety of ways to secure a deep understanding.
- When using equipment such as base 10, children may struggle to recognise the 10 ones as they cannot physically break the representation apart.

Key questions

- How do you know that you have made 10?
- How many ones make 10?
- If you have one full ten frame, what number have you got?

Possible sentence stems

- The ten frame is full, so I know that I have made _____
- There are _____ ones in 1 ten.

Single age small step links

- Understand 10 (Y1)
- Numbers to 20 (Y2)

National Curriculum links

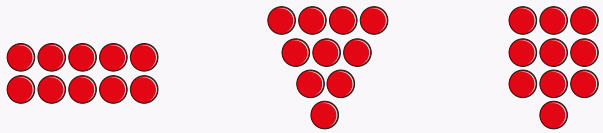
- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least (Y1)
- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s (Y1)
- Read and write numbers to at least 100 in numerals and in words (Y2)

Understand 10

Key learning

Show children 10 counters arranged in different ways.

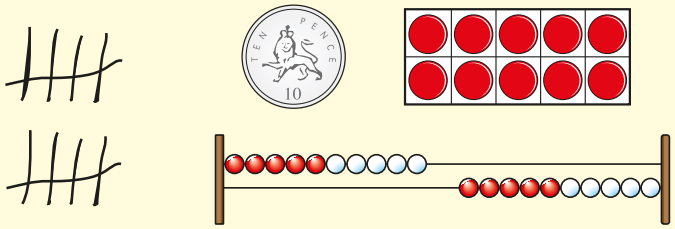
How do they see the 10 each time?



Ask children to count out 10 counters and arrange them in different ways.

What else do they notice about the composition of 10?

Ask children to show 10 in as many different ways as they can, using different representations.



Can they find a way to represent 10 that no one else has thought of?

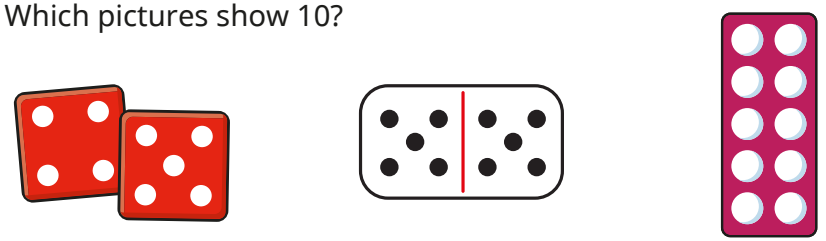
Give each child a tower of cubes from 1 to 9. Ask them to get into pairs so that each pair of children can combine their cubes to make 10

This activity could be extended by asking children to combine their cubes to make 10, by getting into groups of 3

Give one child 10 base 10 ones and another child a base 10 ten. Ask which is more.

Use the base 10 to demonstrate that 10 ones and 1 ten are equivalent. Introduce the language of "exchange", showing that when we have 10 ones we can exchange them for 1 ten.

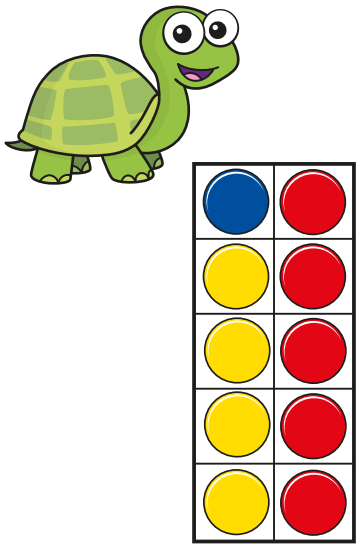
- Which pictures show 10?



Understand 10

Reasoning and problem solving

Tiny has made 10 using three different-coloured counters on a ten frame.



Make 10 using three different-coloured counters on a ten frame.

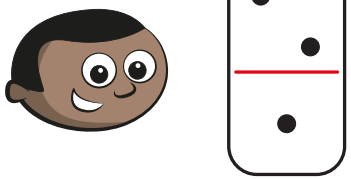
How many ways can you find?

multiple possible answers, e.g.

6, 2, 2

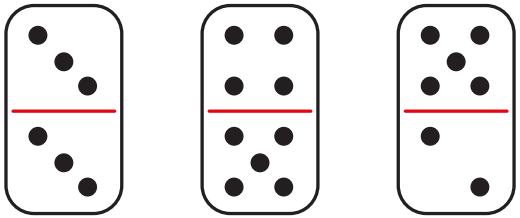
5, 2, 3

Mo has a domino.

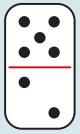


Mo wants to make 10

Which domino should he choose?



What other dominos could Mo use to make a total of 10?



Understand 11 to 15

Notes and guidance

In this small step, children develop their understanding of 11, 12, 13, 14 and 15 as being 1 ten and some ones or "ten-and-a-bit".

Start by showing children 10 on a ten frame and explore with them how to use a second ten frame to extend the number represented to 11, 12, 13, 14 and 15

Encourage children to make the numbers 11 to 15 using a range of resources that make the "10-and-a-bit" structure clear. Ten frames, number pieces, Rekenreks, towers of cubes, straws and base 10 can all help them to see the full ten and part of the next ten to support their place value understanding.

Ensure that children understand the difference between the digits in the numbers, making links between the tens and ones in the representation and the numeral. As Year 2 children are familiar with part-whole models, they could use this representation to partition numbers into tens and ones. They will also be more familiar with the "teen" numbers and should continue to practise writing these numbers as words.

Things to look out for

- Children may find the numbers 11, 12, 13 and 15 confusing, as they cannot hear the 1, 2, 3 or 5 within the number word.

Key questions

- How can you show me 11/12/13/14/15 in three different ways?
- How much more than 10 is _____?
- How many tens and ones are there in _____?

Possible sentence stems

- 11/12/13/14/15 has _____ ten and _____ ones.

Single age small step links

- Understand 11, 12 and 13 (Y1)
- Understand 14, 15 and 16 (Y1)
- Recognise numbers as words (Y1)

- Numbers to 20 (Y2)

National Curriculum links

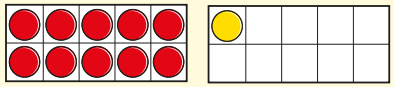
- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least (Y1)
- Read and write numbers to at least 100 in numerals and in words (Y2)

Understand 11 to 15

Key learning

Show children 10 counters on a ten frame.

Ask how many there will be if you add one more counter. Make 11, emphasising 1 full ten and 1 more, linking this to how we write the numeral 11

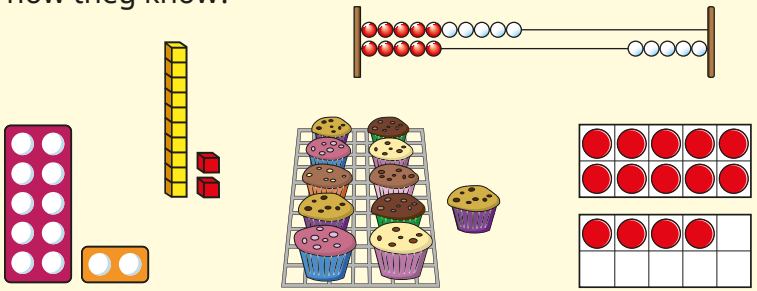


11

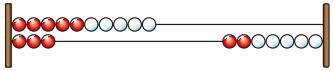
Repeat for 12, 13, 14 and 15

Quickly show a picture of 11, 12, 13, 14 or 15, making sure that the "10-and-a-bit" structure is clear. Then hide the picture.

Ask children which number they saw. Can they explain how they know?

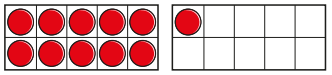


- Match the pictures to the numerals and words.



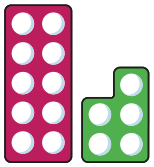
11

fifteen



13

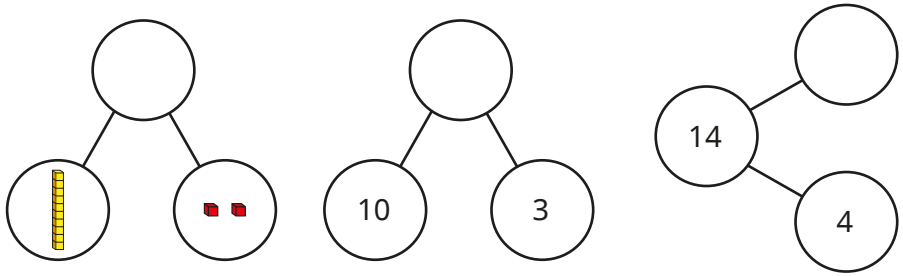
thirteen



15

eleven

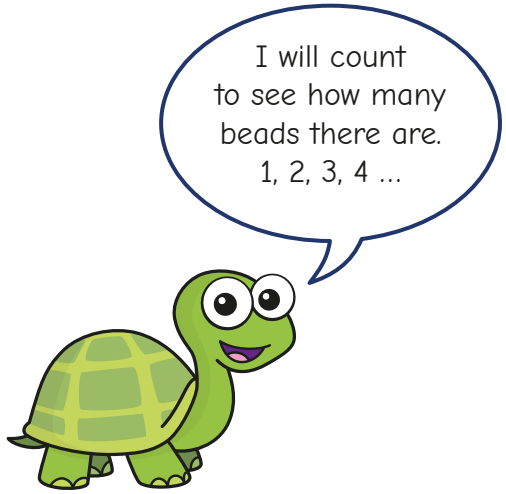
- Complete the part-whole models.



Understand 11 to 15

Reasoning and problem solving

Here are some beads on a bead string.

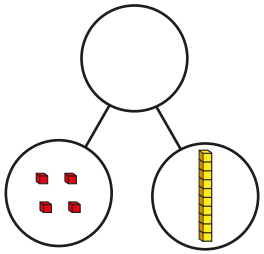


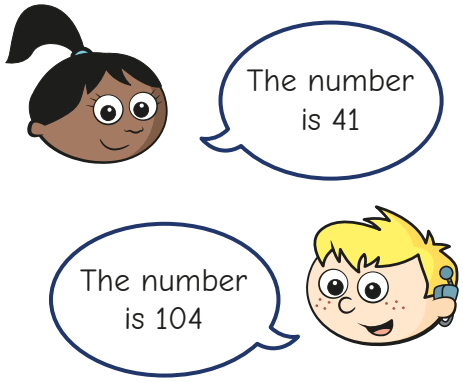
Does Tiny need to count all the beads?

How do you know?

No

Here is a part-whole model.





What mistake has each child made?

What number is shown?

14

Understand 16 to 20

Notes and guidance

In this small step, children extend the learning of the previous two steps by looking at 16, 17, 18, 19 and 20

Start by exploring 16, 17, 18 and 19 shown on ten frames, expressing them as 1 ten and a number of ones. Encourage children to notice the "10-and-a-bit" structure to help them subitise. Now that children are looking at the later teen numbers, encourage them to see the number of empty spaces in the second ten frame in order to identify these numbers more quickly. Continue to use Rekenreks, beadstrings, towers of cubes and number pieces to help children see the full ten and part of the next ten to support their place value understanding. Year 2 children could also use part-whole models to partition numbers into tens and ones.

Children then apply what they have learnt about 10 to develop an understanding of 20. The use of a range of manipulatives will help draw attention to the fact that 2 tens are equivalent to 20

Things to look out for

- Children may struggle to understand that 20 is made up of 2 tens or 20 ones, especially when using two single pieces of equipment that cannot physically break apart, such as base 10

Key questions

- How can you show me 16/17/18/19/20 in three different ways?
- How much more than 10 is _____?
- How many tens and ones are there in _____?

Possible sentence stems

- 16/17/18/19 has _____ ten and _____ ones.

Single age small step links

- Understand 14, 15 and 16 (Y1)
- Understand 17, 18 and 19 (Y1)
- Understand 20 (Y1)

- Numbers to 20 (Y2)

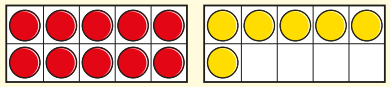
National Curriculum links

- 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 (Y1)
- Read and write numbers from 1 to 20 in numerals and words (Y1)
- Read and write numbers to at least 100 in numerals and in words (Y2)

Understand 16 to 20

Key learning

Show children 16 on ten frames.



Ask children, "What number is shown? How do you know?"

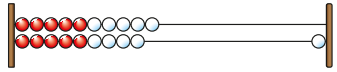
Encourage them to discuss how many full tens there are and how many extra ones. Also explore how many empty spaces there are and how children can use this to quickly work out the number shown.

Repeat with 17, 18, 19 and 20

Play Snap using a set of cards with each card showing a numeral, word or representation for 16, 17, 18, 19 or 20

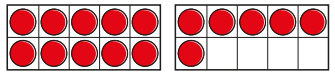
When children shout "Snap!", ask them to explain why the numbers are the same.

- Match the pictures to the numerals and words.



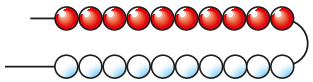
16

sixteen



19

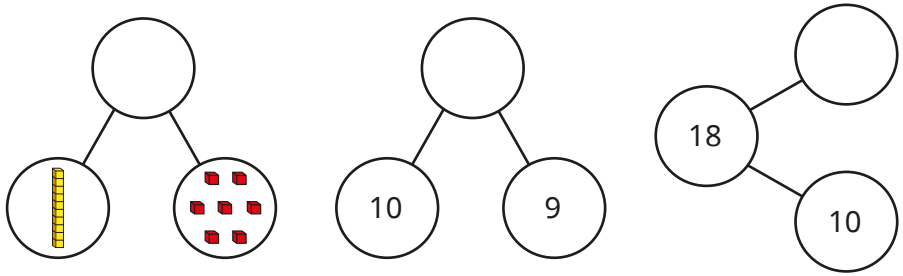
twenty



20

nineteen

- Complete the part-whole models.



Understand 16 to 20

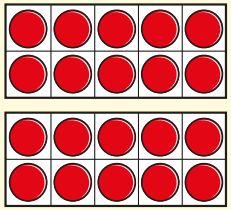
Reasoning and problem solving

Play bingo as a class.

Ask children to write six numbers between 10 and 20 in a grid.

16	18	14
11	20	13

Show them a representation of a number.

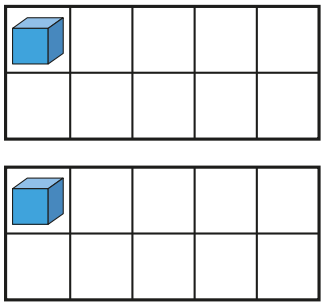


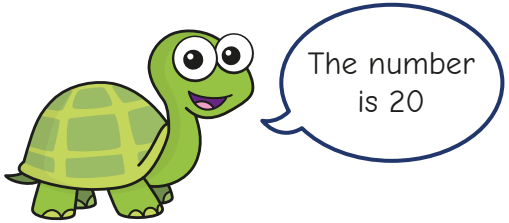
If children have written that number, they cross it out.

The first child to cross out all of their numbers wins the game.

Answers will vary depending on the representations shown.

Tiny makes a number on ten frames.

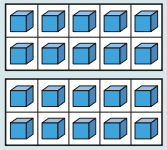




What mistake has Tiny made?

Show Tiny how to make 20 on ten frames.

How many other ways can you make 20?



1 more

Notes and guidance

In this small step, children apply their counting skills and knowledge of numbers within 20 from previous learning to find 1 more. They need to know that 1 more is the number after, and should use their counting skills to help them. Using everyday examples, such as "1 more grape", will help children with their understanding of the vocabulary. Ensure that examples involving zero are used, for example "1 more than _____ is 1".

Cubes are a useful resource to show the "1 more" pattern of consecutive numbers, and children can link this to the everyday activity of climbing the stairs. Ten frames and number tracks can also be particularly useful representations for this concept.

This should be a familiar concept to Year 2 children, so they could be encouraged to spot the patterns between the ones and teen numbers, as well as to work backwards to find missing numbers, for example "17 is 1 more than _____".

Things to look out for

- Children who are not fully secure with counting and one-to-one correspondence may struggle with 1 more.
- Children may not understand the meaning of the word "more". Use practical games and activities to help them.

Key questions

- What does "1 more" mean? How can you show 1 more?
- What is 1 more than _____?
- What number is _____ 1 more than?

Possible sentence stems

- 1 more than _____ is _____
- _____ is 1 more than _____

Single age small step links

- 1 more (Y1)
- 1 more and 1 less (Y1)

- N/A

National Curriculum links

- Given a number, identify 1 more and 1 less (Y1)
- 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 (Y1)

1 more

Key learning

Read *1 to 20 Animals Aplenty* by Katie Viggers.

Draw children's attention to the 1 more pattern in the book. Build towers of cubes to represent the animals on each page and to show the 1 more step pattern.

Other useful books for exploring this concept include *One Fox* by Kate Read and *Counting Crocodiles* by Judy Sierra.

Use "first, then, now" to tell simple maths stories based on everyday scenarios.

First there were 14 children in the playground.

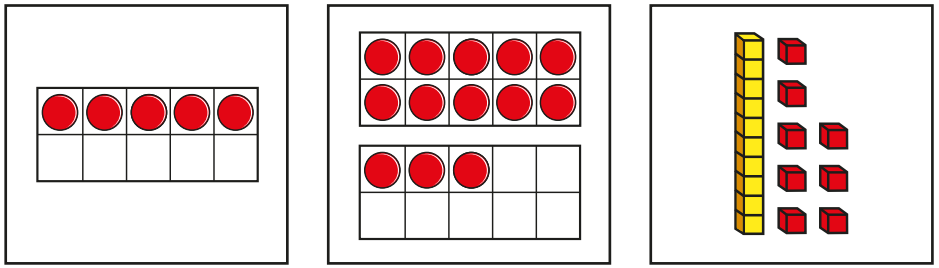
Then 1 more child came into the playground.

How many children are there in the playground now?

Ask children to represent the story using ten frames and counters.

Encourage children to come up with their own "1 more" stories.

- Make 1 more than each number.



- Use the number tracks to help you complete the sentences.

1	2	3	4	5	6	7	8	9	10

▶ 1 more than 7 is _____

▶ _____ is 1 more than 6

11	12	13	14	15	16	17	18	19	20

▶ 1 more than 17 is _____

▶ _____ is 1 more than 16

What do you notice?

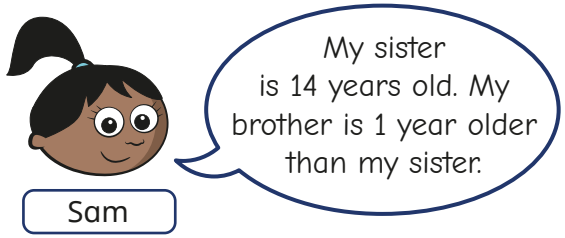
- Write the missing numbers.

▶ 1 more than _____ is 6

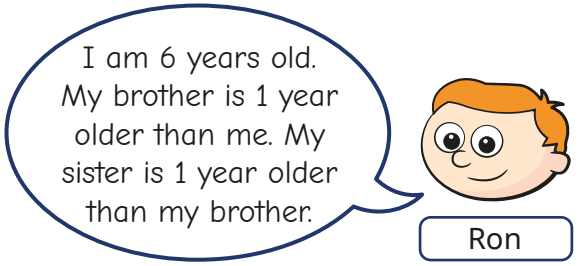
▶ 15 is 1 more than _____

1 more

Reasoning and problem solving



How old is Sam's brother?



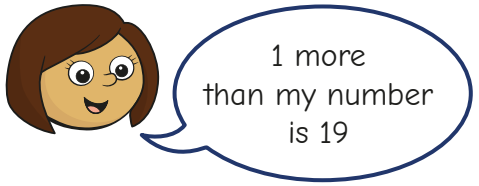
How old is Ron's sister?

Talk about your answers with a partner.

15 years old

8 years old

Kim thinks of a number.



What is Kim's number?

How do you know?

18

How many different ways can you complete the sentences?

1 more than ☐ is ☐

☐ is 1 more than ☐

What do you notice?

multiple possible answers, e.g.

13, 14

14, 13

1 less

Notes and guidance

In this small step, children continue to apply their counting skills and knowledge of numbers within 20 to find 1 less.

Children need to know that 1 less is the number before, and should use their counting backwards skills to help them. It is important to make links to previous learning on finding 1 more, so that children understand that finding 1 less is the opposite of finding 1 more. Ensure that examples involving zero are used, for example "1 less than 1 is _____".

As with the previous steps, cubes, ten frames and number tracks are useful resources to show the 1 less pattern.

This should be a familiar concept to Year 2 children, so they could be encouraged to spot the patterns between the ones and teen numbers, as well as to work backwards to find missing numbers, for example "17 is 1 less than _____".

Key questions

- What does "1 less" mean? How can you show 1 less?
- What is 1 less than _____?
- What number is _____ 1 less than?

Possible sentence stems

- 1 less than _____ is _____
- _____ is 1 less than _____

Single age small step links

- 1 less (Y1)
- 1 more and 1 less (Y1)

- N/A

Things to look out for

- Children who are not fully secure with counting backwards may struggle with finding 1 less.

National Curriculum links

- Given a number, identify 1 more and 1 less (Y1)
- 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 (Y1)

1 less

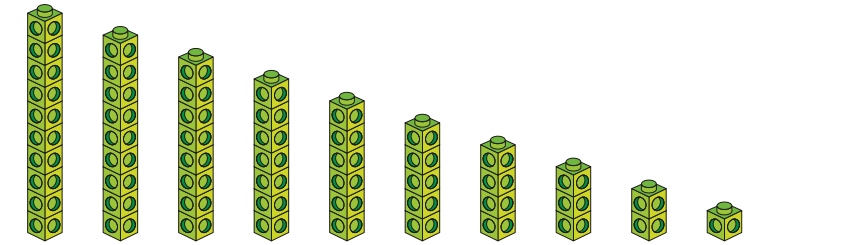
Key learning

Read *Ten Little Dinosaurs* by Mike Brownlow (or another book from the "Ten Little" series, as they all focus on the "1 less" pattern).

Ask children what they notice. Give them counters or cubes to represent the number of dinosaurs on each page.

Can they show the "1 less" pattern another way?

- Complete the number track.

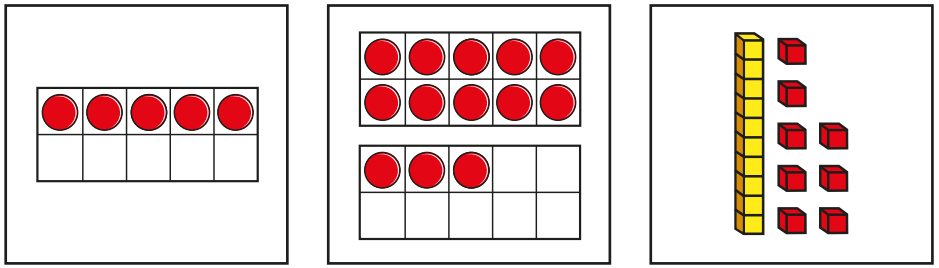


	9		7	6		4	3		1	0

Use the number track to help you complete the sentences.

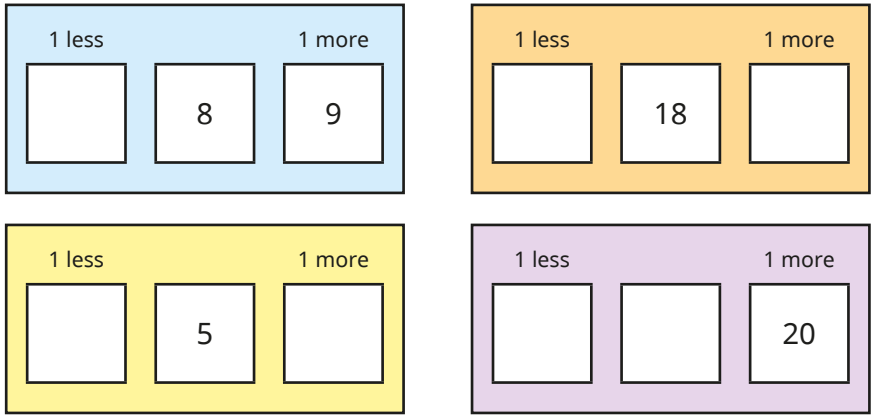
- 1 less than 6 is _____
- _____ is 1 less than 3

- Make 1 less than each number.



- Write numbers to fill in the boxes.

Use base 10 or ten frames to help you.



- Write the missing numbers.
  - 1 less than _____ is 8
  - 16 is 1 less than _____

1 less

Reasoning and problem solving

Complete the sentences.

13 is 1 less than ☐

1 more than 13 is ☐

☐ is 1 more than 13

1 less than ☐ is 13

What do you notice?

Write your own missing number sentences for a partner to complete.

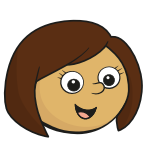
14

14

14

14

Kim thinks of a number.



1 less than my number is 19

What is Kim's number?

How do you know?

20

How many different ways can you complete the sentences?

1 less than ☐ is ☐

☐ is 1 less than ☐

What do you notice?

Multiple possible answers, e.g.

16, 15

15, 16

Number lines

Notes and guidance

In this small step, Year 1 children are introduced to a number line for the first time. So far, they have only used number tracks, so they may be tempted to label the numbers in between the divisions on the number line. Careful explanation will be needed to avoid this. All number lines will count in 1s, but their start and end point values will differ.

Number lines can be used to practise and consolidate the skills learnt so far in this block. Children recap counting forwards from zero to 20 when labelling a number line, and can also practise counting backwards, reading from right to left. They can clearly see that "1 more" is the next number to the right on the number line and that "1 less" is the number to the left.

Number lines can also be used to compare numbers, using both words and inequality symbols, as well as to order numbers. These concepts will be covered in more detail later in the block.

Things to look out for

- Children may assume that all number lines start at zero.
- Children may think that numbers on a number line can either increase or decrease from left to right, as on number tracks.

Key questions

- What does each mark on the number line represent?
- Where does the number line start/end?
- How do you find 1 more/less on a number line?

Possible sentence stems

- The first/last number on the number line is _____
- To find 1 more/less, I need to ...

Single age small step links

- The number line (Y1)
- The number line to 20 (Y1)
- Use a number line to 20 (Y1)

- 10s and 1s on the number line to 100 (Y2)

National Curriculum links

- 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 (Y1)
- Identify, represent and estimate numbers using different representations, including the number line (Y2)

Number lines

Key learning

Get children to pace out a 0–20 number line in the playground, counting each step from zero. Use chalk to label the numbers.

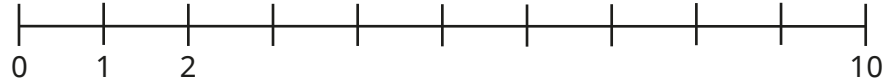
Ask children to find any given number on the number line. Is the number nearer to zero or nearer to 20? How do they know?

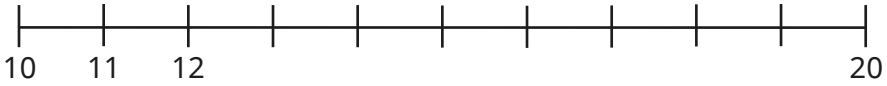
Ask them to explain how they know which number is halfway between zero and 20

- Here is a number line.

  - Circle the number 6
  - Underline a number greater than 6
  - Draw an arrow to the number that is 1 less than 4
  - Draw a box around the smallest number.

- Complete the number lines.

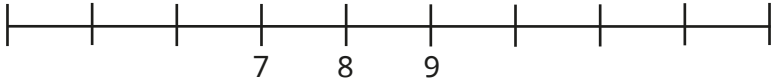




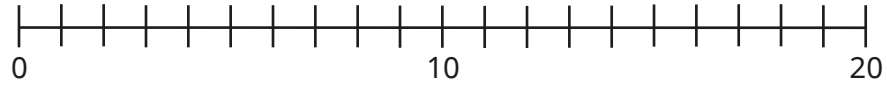
What is the same about the number lines?

What is different?

- Complete the number line.



- Label 8, 19 and 14 on the number line.

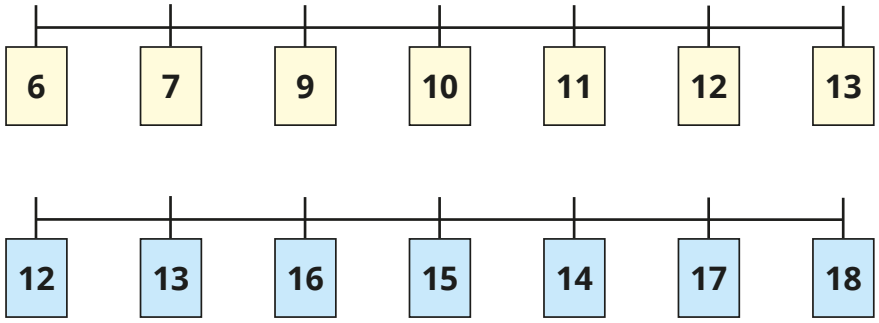


Number lines

Reasoning and problem solving

Tiny has put number cards on two number lines.

Spot the mistake in each number line.

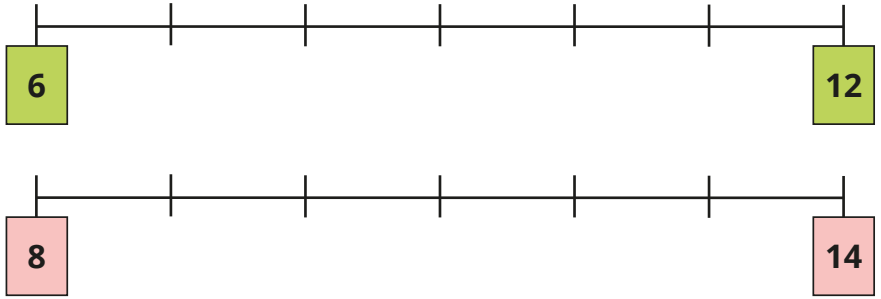


Draw a number line with a mistake for a partner to spot.

8 is missing.

14 and 16 are the wrong way round.

Here are two number lines.



What numbers go on both number lines?

What numbers go on only one number line?

What numbers do not go on either number line?

8, 9, 10, 11, 12

6, 7 13, 14

multiple possible answers, e.g. 0, 1, 15, 20

Estimate on a number line

Notes and guidance

In this small step, Year 1 children are introduced to estimating for the first time. "Estimate" is a new word for them to learn. Previously, they may have been asked to "guess" or make predictions.

As children begin to estimate on a number line, take time to explore the halfway point. Where do they think halfway is? How do they know? What informal measurements (for example, steps in the playground) could they use to check?

Some children may struggle with the concept of estimating, finding it hard not to have an exact answer. Conversations with other children are vital to develop understanding and accuracy.

Children need to be confident using a number line before being able to estimate. For example, if children are estimating where 4 is on a blank number line from zero to 10, they need to be able to reason that it will be less than halfway along the line.

Things to look out for

- Some children may be reluctant to estimate in case they get it wrong. Introduce estimation in a fun, game-like way, so that children feel comfortable having a go and discussing their reasoning.

Key questions

- What does "estimate" mean?
- What number is halfway along the number line?
- Is halfway along the number line always 5? Why/why not?

Possible sentence stems

- _____ is halfway along the number line.
- _____ is closer to _____ than _____

Single age small step links

- Estimate on a number line to 20 (Y1)
- Estimate numbers on a number line (Y2)

National Curriculum links

- 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 (Y1)
- Identify, represent and estimate numbers using different representations, including the number line (Y2)

Estimate on a number line

Key learning

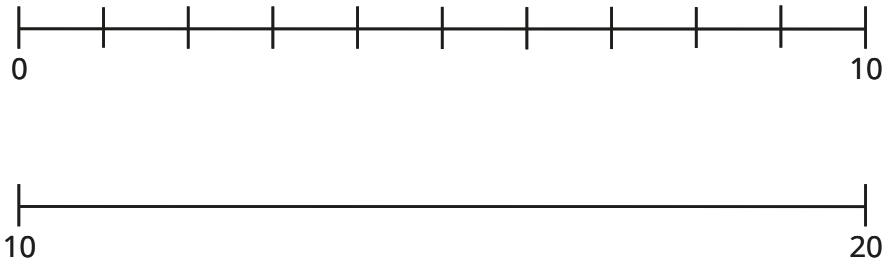
Use chalk to draw a number line on the playground. Label one end zero and the other end 10

Give a child a number card and ask them to position themselves on the number line. Repeat for other numbers. Encourage children to explain their reasoning. For example, 5 is halfway along the line and 6 is a little bit past halfway.

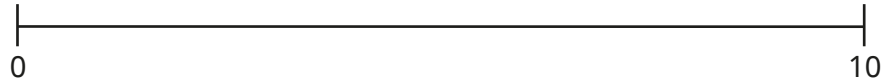
Discuss what changes if the number line is zero to 20. Which number will be halfway? Where will 5 and 15 be? Where will 12 come?

- Use the number line from 0 to 10 to help you estimate.

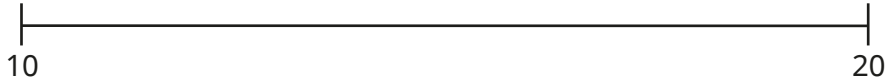
  Where do 11 and 17 belong on the number line from 10 to 20?



- Estimate where 6 belongs on the number line.

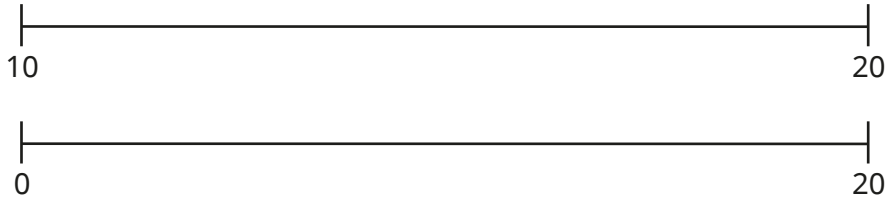


Estimate where 16 belongs on the number line.



What is the same? What is different?

- Estimate where 14 belongs on each number line.



What is the same? What is different?

- Draw and label number lines from 0 to 10 and 0 to 20

  Which numbers will you mark on your lines first?

Estimate on a number line

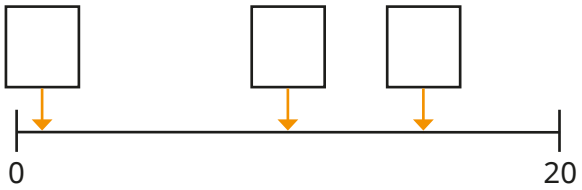
Reasoning and problem solving

What could the missing number be?

How do you know?

12

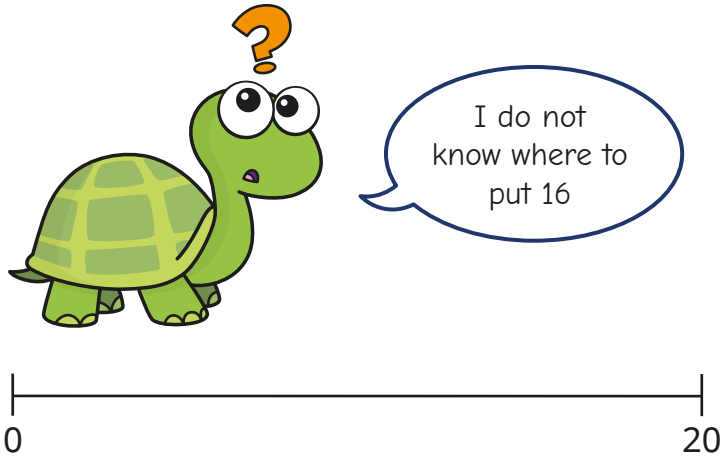
What could the missing numbers be?



How do you know?

1, 10, 15

Tiny is estimating where 16 belongs on the number line.



What numbers could Tiny mark on the number line to help?

Why would this help?

10, 15

Less than, greater than, equal to

Notes and guidance

In this small step, Year 1 children are introduced to the new vocabulary of "fewer", "more" and "the same" to compare a number of objects. They also compare numerical values using the vocabulary "less than", "greater than" or "equal to", alongside the symbols <, > and =.

Concrete resources will be useful when comparing a number of objects. Number tracks and number lines are better suited to comparing numerical values and children will begin to see that smaller numbers are to the left of greater numbers on number lines.

Ensure that children do not get confused with the language that they need to use. The word "fewer" can be tricky, as many adults tend to incorrectly use the word "less". "Fewer" is used when talking about a number of items or objects, whereas "less" is used when talking about values. For example, "There are fewer blue cars than red cars" is correct; "There are less blue cars than red cars" is incorrect.

Things to look out for

- When objects are shown in a scattered formation, it can cause confusion, so use sets of objects that are clearly fewer, more or the same.

Key questions

- How do you know that this tower has fewer/more than this tower?
- How can you use the number track/number line to find a number less than/greater than _____ ?

Possible sentence stems

- There are more/fewer _____ than _____
- _____ is less than/greater than/equal to _____

Single age small step links

- Fewer, more, same (Y1)
- Less than, greater than, equal to (Y1)
- Compare objects (Y2)

National Curriculum links

- 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 (Y1)
- Compare and order numbers from 0 up to 100; use <, > and = signs (Y2)

Less than, greater than, equal to

Key learning

For this game, children need a dice and some dominoes.

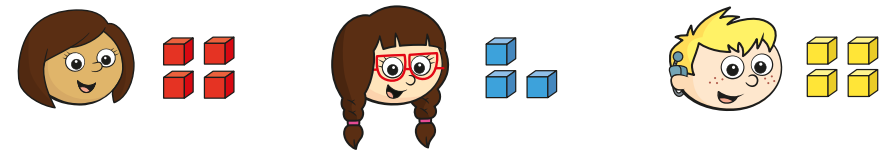
Children roll the dice to get a starting number.

Ask children to sort their dominoes into groups that show:

- the number
- fewer spots than the number
- more spots than the number

- Choose a word to complete the sentences.

fewer | more | same



Kim | Jo | Max

Kim and Max have the _____ number of cubes.

Kim has _____ cubes than Jo.

Jo has _____ cubes than Max.

- Circle 2 and 10 on the number track.

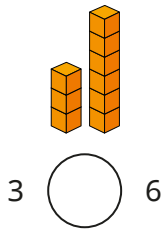
0	1	2	3	4	5	6	7	8	9	10

Choose a phrase to complete the sentences.

equal to | less than | greater than

- 2 is _____ 10
- 10 is _____ 2

- Write <, > or = to compare the numbers.



3 ◯ 6

3 ◯ 1

one ◯ three

3 ◯ three

Less than, greater than, equal to

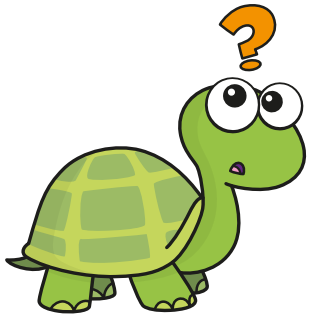
Reasoning and problem solving

What could the missing number be?

$\square > 11$

Help Tiny to choose a number from the track.

10	11	12	13	14	15	16	17	18	19	20



Is there more than one answer?

12, 13, 14, 15, 16, 17, 18, 19, 20

Is the statement true or false?

15 ones is greater than 2 tens.

How do you know?

False

Here are some digit cards.

2	5	6	9

Use the digit cards to make the statement correct.

$1\square > 1\square > 1\square$

How many answers can you find?

multiple possible answers, e.g.

19 > 16 > 15

Compare numbers

Notes and guidance

In this small step, children build on their learning from earlier in the block to compare pairs of numbers within 20

Children can use their knowledge of counting to support them. For example, because they would say 17 after 16, they know that 17 is greater than 16. They can also use their knowledge of representing numbers using objects to help them identify which number in a pair is greater or less than the other. Ten frames and number lines are useful representations to support children when comparing numbers.

Both the inequality symbols and the language of "greater than", "less than" and "equal to" are used throughout. It is important that children see examples of all the symbols, to reinforce their meaning. Year 2 children should also compare numbers written as words.

Things to look out for

- Children may think that, for example, 7 is greater than 15 because 7 is greater than 5
- Children may find it more difficult to compare numbers to zero as it is harder to visualise.

Key questions

- Which number is further along the number line?
- Which number is the smaller/greater number? How do you know?
- What does this symbol (< / > / =) mean?

Possible sentence stems

- _____ is less than/greater than _____
- _____ is equal to _____

Single age small step links

- Compare numbers (Y1)
- Compare numbers to 20 (Y1)
- Compare numbers (Y2)

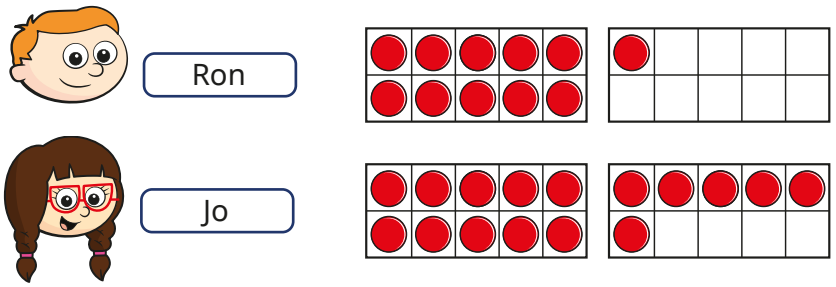
National Curriculum links

- 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 (Y1)
- Compare and order numbers from 0 up to 100; use <, > and = signs (Y2)

Compare numbers

Key learning

- Ron and Jo have each made a number.

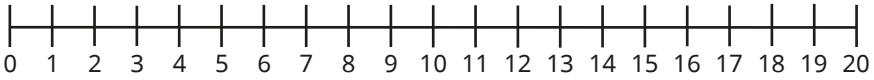


What number has Ron made?

What number has Jo made?

Who has made the greater number?

-



- Circle 12 and 18 on the number line.
- Write **less** or **greater** to compare the numbers.

12 is _____ than 18 18 is _____ than 12

- Write < or > to compare the numbers.

12 ◯ 18 18 ◯ 12

- Write the missing phrase.

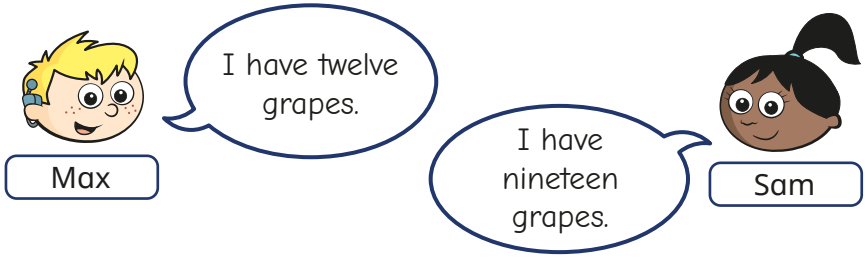
less than	greater than	equal to

- 9 is _____ 19
- 2 is _____ twenty.
- Twelve is _____ 12
- 18 is _____ eight.
- 15 is _____ 14
- 17 is _____ 6

- Write <, > or = to compare the numbers.

8 ◯ 3 20 ◯ 10 15 ◯ 14 16 ◯ 6

- Max and Sam have some grapes.



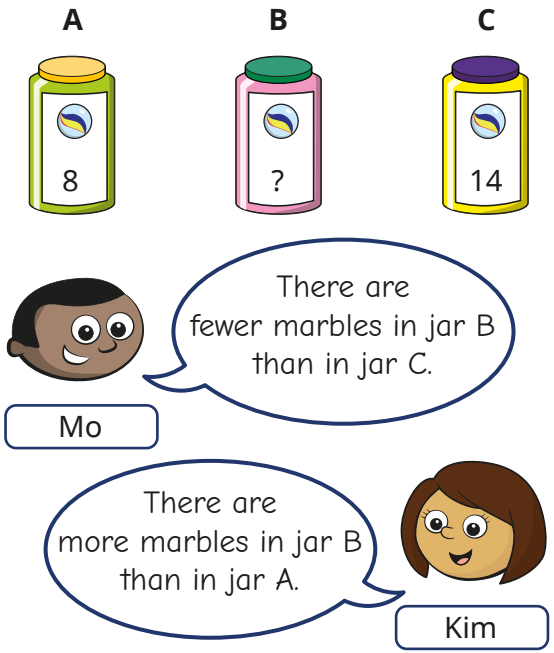
Who has more grapes?

How do you know?

Compare numbers

Reasoning and problem solving

Mo and Kim have three jars of marbles.



How many marbles could there be in jar B?

Compare answers with a partner.

9, 10, 11, 12, 13

Which statement is false?

9 > 2	eleven = 11
12 > 20	16 < 17

Explain how you know.

12 > 20

Here are some number cards.

1	5	11	15	19	20

Use the cards to complete the sentences.

☐ is greater than ☐

☐ is less than ☐

How many ways can you do it?

multiple possible answers, e.g.

5 is greater than 1

11 is less than 19

15 is greater than 11

19 is less than 20

Order numbers

Notes and guidance

In this small step, children use their knowledge of comparing numbers within 20 to order sets of three numbers.

Children should use the language they used in the previous steps as well as "greatest", "smallest", "most" and "fewest". They should be exposed to different methods for ordering such as comparing two groups initially and lining groups up.

Ten frames are a useful representation to emphasise the "10-and-a-bit" structure when ordering numbers to 20. Year 2 children should be encouraged to apply their knowledge of tens and ones to help them work abstractly. For example, when ordering 8, 17 and 14 children should recognise that 8 is the only number that does not have 1 ten, so it is the smallest number.

Things to look out for

- Children may misunderstand the terminology. It is important to be consistent, particularly with the word "greatest". This is often replaced with "largest" or "biggest", which can be confusing for young children.
- Children may struggle with descending order, and think that numbers can only be ordered from smallest to greatest.

Key questions

- How can you show the numbers using cubes or counters?
- Which number is the greatest/smallest? How do you know?
- Do all the numbers have tens? How does this help?

Possible sentence stems

- _____ ones is greater/less than _____ ones, so _____ is greater/less than _____
- The greatest/smallest number is _____

Single age small step links

- Order objects and numbers (Y1)
- Order numbers to 20 (Y1)

- Order objects and numbers (Y2)

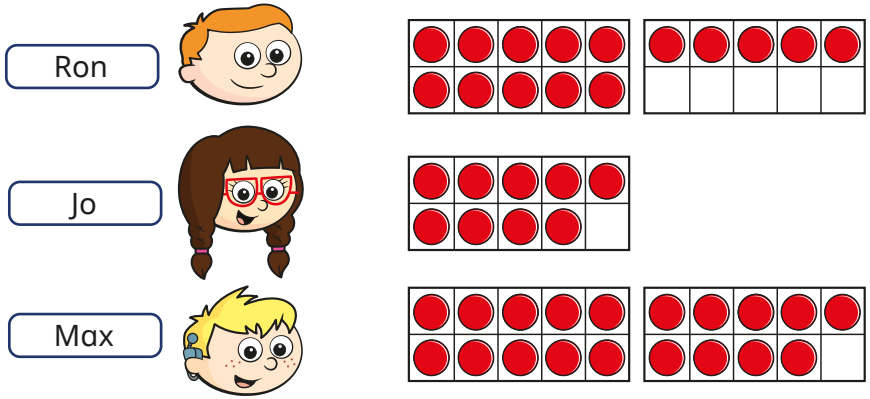
National Curriculum links

- 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 (Y1)
- Compare and order numbers from 0 up to 100; use <, > and = signs (Y2)

Order numbers

Key learning

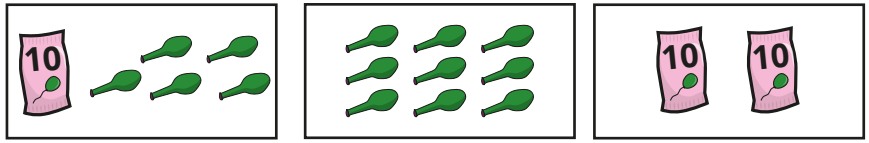
- Ron, Jo and Max use counters to make numbers.



  - What numbers have they made?
  - Who has made the greatest number? How do you know?
  - Who has made the smallest number? How do you know?
  - Write the numbers in order.

    Start with the smallest number.

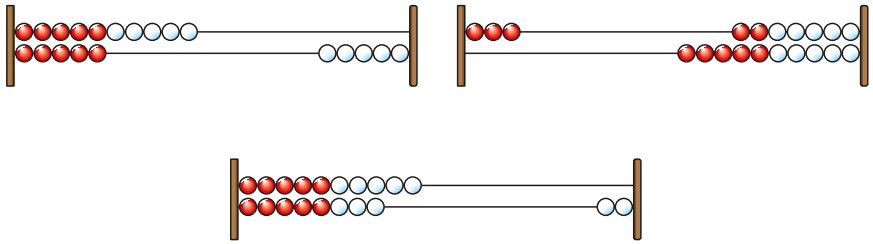
- Here are three groups of balloons.



  Put the groups in order.

  Start with the one that has the most balloons.

- Kay has made three numbers on Rekenreks.



  - What numbers has Kay made?
  - Write the numbers in order.

    Start with the greatest number.

- Complete the sentences for each set of numbers.

  _____ is the greatest number.

  _____ is the smallest number.

2, 12, 8	20, 0, 9
16, 14, 15	thirteen, three, five

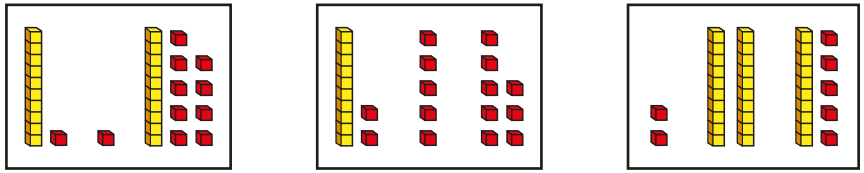
  Write each set of numbers in order, from greatest to smallest.

Order numbers

Reasoning and problem solving

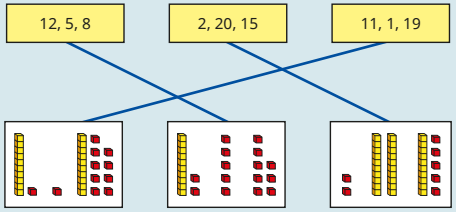
Match the labels to the pictures.

12, 5, 8	2, 20, 15	11, 1, 19



Order the numbers in each set from smallest to greatest.

Order all of the numbers from greatest to smallest.



5, 8, 12

2, 15, 20

1, 11, 19

20, 19, 15, 12, 11, 8, 5, 2, 1

Use 20 cubes.

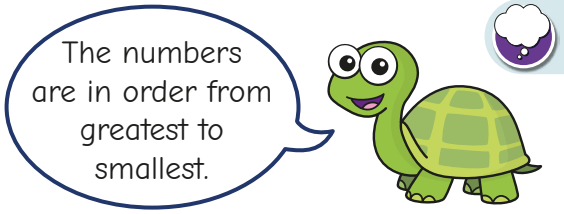
Put them into three groups.

Order the groups from greatest to smallest.

How many different ways can you find?

multiple possible answers, e.g.

17, 2, 1 16, 3, 1



Do you agree with Tiny?

Why?

No

Autumn

Scheme of learning

Year 3/4

#MathsEveryoneCan

Y3/4 yearly overview

The yearly overview provides suggested timings for each block of learning, which can be adapted to suit different term dates or other requirements.

	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 A**			Measurement **Area**
Spring	Number **Multiplication and division B**				Measurement **Length and perimeter**		Number **Fractions A**		Measurement **Mass and capacity**		Number **Fractions B**	
Summer	Measurement **Time**			Number **Decimals**		Measurement **Money**		Geometry **Shape**	Geometry **Position and direction**		**Statistics**	

White Rose MATHS

Autumn Block 1

Place value

Small steps

Step 1	Hundreds, tens and ones
Step 2	Represent numbers to 1,000
Step 3	Partition numbers to 1,000
Step 4	Thousands
Step 5	Represent numbers to 10,000
Step 6	Partition numbers to 10,000
Step 7	Flexible partitioning
Step 8	Find 1, 10, 100 or 1,000 more or less

Small steps

Step 9	Number line to 1,000
Step 10	Number line to 10,000
Step 11	Estimate on a number line
Step 12	Compare numbers
Step 13	Order numbers
Step 14	Round to the nearest 10
Step 15	Round to the nearest 100
Step 16	Round to the nearest 1,000

Small steps

Step 17	Round to the nearest 10, 100 or 1,000
Step 18	Roman numerals

Hundreds, tens and ones

Notes and guidance

In this small step, children explore the structure of 100 as well as count in 100s.

Children should understand that 10 tens are equivalent to 1 hundred. By unitising the hundred, they should be able to state the number of tens that make up any 3-digit multiple of 100

Once children are confident, they look at the structure of a 3-digit number by considering how many hundreds, tens and ones it is made up of, using place value counters. This resource will be new to Year 3 children and they should be encouraged to consider the similarities and differences between place value counters and other resources, such as base 10

By describing numbers such as 253 as being made up of 2 hundred counters, 5 ten counters and 3 one counters, children can more easily begin to think of this as 2 hundreds, 5 tens and 3 ones.

Things to look out for

- When working with place value counters, the fact that the physical size of the object does not reflect its value may cause some difficulties.

Key questions

- How many tens are there in 100/240?
- How do you know which column to put the counter in?
- How many hundreds, tens and ones is _____ made up of?

Possible sentence stems

- _____ can be made using _____ hundred counters _____ ten counters and _____ one counters.
- _____ is made up of _____ hundreds _____ tens and _____ ones.

Single age small step links

- Hundreds, tens and ones (Y3)
- Hundreds (Y3)

- N/A

National Curriculum links

- Recognise the place value of each digit in a 3-digit number (hundreds, tens, ones) (Y3)
- Count from zero in multiples of 4, 8, 50 and 100 (Y3)

Hundreds, tens and ones

Key learning

- How many marbles are there?

- Complete the sentences.

  There are _____ tens in 100

  There are _____ hundreds in 500

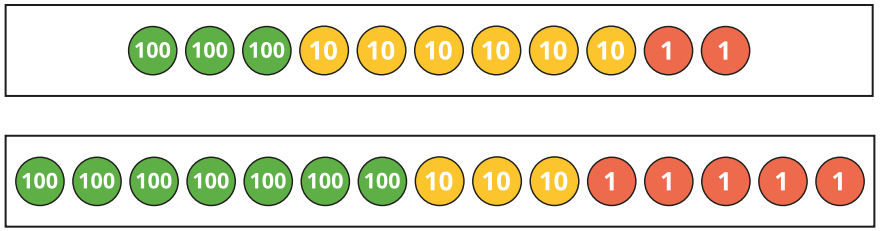
  There are _____ tens in 500

- Use base 10 to make 143

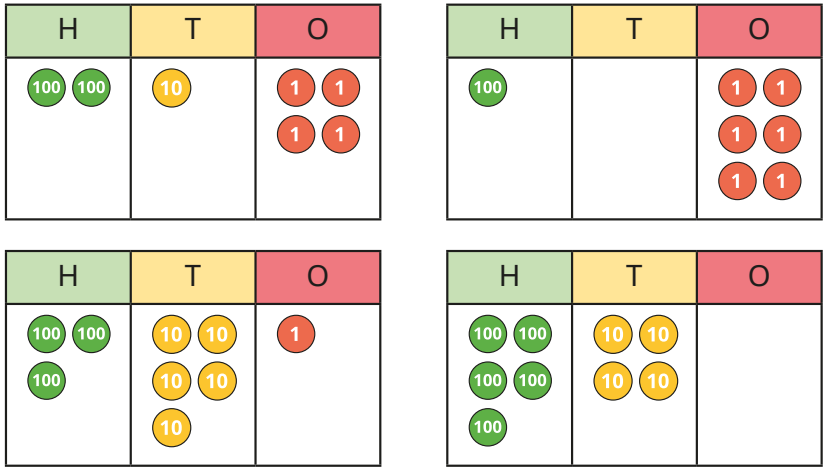
  Use place value counters to make 143

  What is the same? What is different?

- What numbers are shown?



- What numbers are shown?



  How many hundreds are there in each number?

  How many tens are there in each number?

  How many ones are there in each number?

- Use a place value chart to help you describe each number.

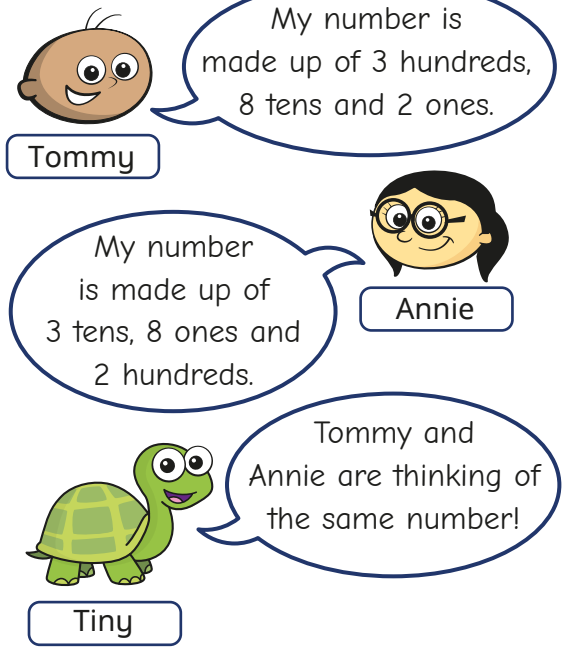
281	304	720	500

  _____ is made up of _____ hundreds, _____ tens and _____ ones.

Hundreds, tens and ones

Reasoning and problem solving

Tommy and Annie are each thinking of a number.



Explain the mistake Tiny has made.

What numbers are Tommy and Annie thinking of?

Tiny has not noticed that the parts are in a different order.

Tommy: 382

Annie: 238

Here is a number shown on a place value chart.

Hundreds	Tens	Ones
●	● ●	● ●

What number is shown?

How many hundreds, tens and ones are there?

What other numbers can be made using exactly five counters?

How many hundreds, tens and ones are there in each number?

122

1 hundred, 2 tens and 2 ones

multiple possible answers, e.g.

5, 32, 113, 212, 311, 401, 500

Represent numbers to 1,000

Notes and guidance

In this small step, children build on their understanding of hundreds, tens and ones to represent numbers to 1,000 in a variety of ways. This is predominantly Year 3 curriculum content, but provides essential foundations for later learning on numbers up to 10,000

Using base 10 to start with helps children to see the relative sizes of numbers, as well as the comparable sizes of hundreds, tens and ones. Once confident, children can then begin to use place value counters, where the counters are the same size regardless of the number represented. Year 3 children may require greater exposure to base 10 compared to Year 4 children to ensure that this vital understanding is secure.

Children should be able to describe the number of hundreds, tens and ones a number is made up of.

Things to look out for

- Children may not recognise that when there are 10 or more ones or tens, they need to make an exchange.
- Children may not understand the purpose of placeholders or use them appropriately.

Key questions

- What is the value of each base 10 piece/place value counter?
- How many hundreds/tens/ones are there?
- How many ones/tens make 1 ten/hundred?
- What do you do if there are no tens/ones?

Possible sentence stems

- There are _____ hundreds, _____ tens and _____ ones. The number is _____
- When a number has no _____, I use _____ as a placeholder.

Single age small step links

- Represent numbers to 100 (Y3)
- Represent numbers to 1,000 (Y3)

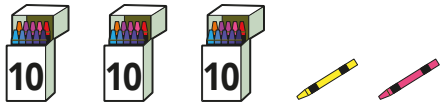
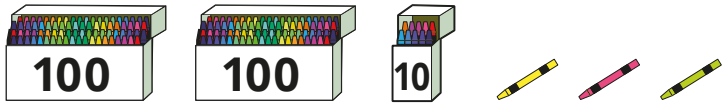
- Represent numbers to 1,000 (Y4)

National Curriculum links

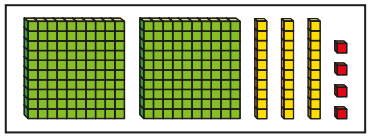
- Read and write numbers up to 1,000 in numerals and in words (Y3)
- Identify, represent and estimate numbers using different representations (Y3 and Y4)

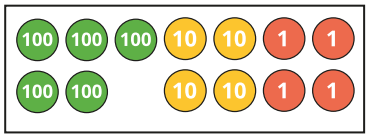
Represent numbers to 1,000

Key learning

- How many crayons are there?
  - 
  - 

- Complete the sentences to describe each number.

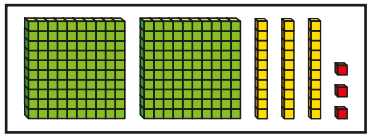


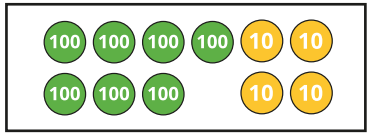


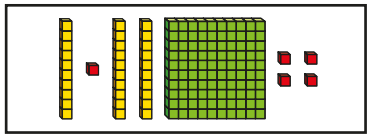
There are _____ hundreds, _____ tens and _____ ones.

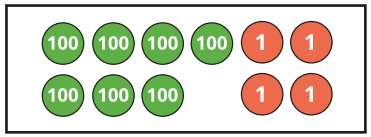
The number is _____

- What numbers are shown?









- Use base 10 to show each number.

71	231	452

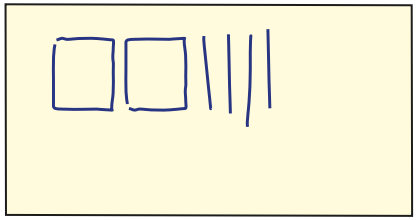
- Use place value counters to show each number.

138	240	406

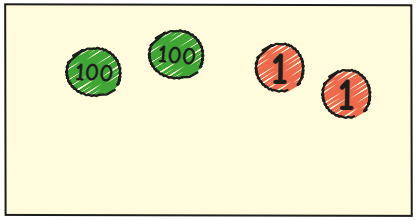
- Scott is drawing numbers.

  Complete his drawings.

362

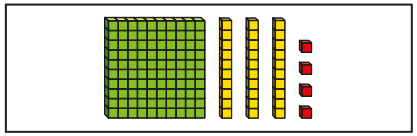


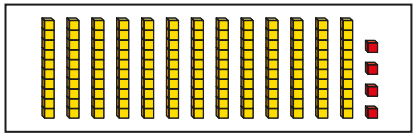
335



- These two numbers are the same.

  Explain why.



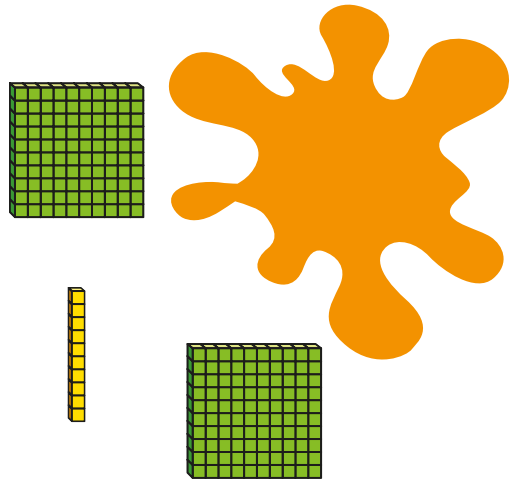


Represent numbers to 1,000

Reasoning and problem solving

Dani uses base 10 to make the number 235

Some of the base 10 pieces are covered up.

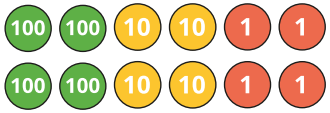


What amount is covered up?

Use base 10 to make the missing amount in different ways.

25

Here are some place value counters.



Rosie picks five counters.

What numbers could Rosie have made?

Compare answers with a partner.

18 possible numbers, e.g.

320, 302, 131, 41

Here are four digit cards.

3	1	0	5

How many different 3-digit numbers can you make using the digit cards?

Use base 10 or place value counters to make each number.

18 possible numbers, e.g.

310, 105, 531

Partition numbers to 1,000

Notes and guidance

In this small step, children partition numbers up to 1,000 into hundreds, tens and ones.

Children represent numbers in a part-whole model and identify missing parts and wholes. They write numbers in expanded form, using a part-whole model as support where needed, and identify the number of hundreds, tens and ones in a 3-digit number. To build on learning from the previous step, examples that include zero as a placeholder should be explicitly explored. Children should be able to identify the value of any given digit in a 3-digit number.

Base 10 should be used to support children's understanding of the relative size of numbers before moving on to using place value counters. Year 3 children may need greater exposure to such representations.

Things to look out for

- Children may not correctly assign place value to each digit of a number. For example, they may write 514 = 5 + 1 + 4
- Where the parts of a part-whole model are not given in value order, children may incorrectly interpret the number.
- Children may omit zeros needed as placeholders.

Key questions

- How many hundreds/tens/ones are there in _____?
- What is the value of the missing part? How do you know?
- What is the value of the digit _____ in the number _____?

Possible sentence stems

- _____ has _____ hundreds _____ tens and _____ ones.
  _____ = _____ + _____ + _____

Single age small step links

- Partition numbers to 100 (Y3)
- Partition numbers to 1,000 (Y3)

- Partition numbers to 1,000 (Y4)

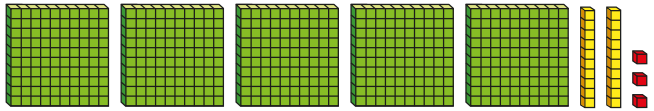
National Curriculum links

- Read and write numbers up to 1,000 in numerals and in words (Y3)
- Recognise the place value of each digit in a 3-digit number (hundreds, tens, ones) (Y3)
- Identify, represent and estimate numbers using different representations (Y3 and Y4)

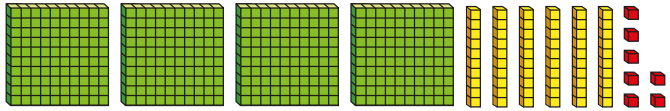
Partition numbers to 1,000

Key learning

Use the representations to help you complete the number sentences.



523 = 500 + _____ + _____



467 = _____ + _____ + _____

381 = 300 + _____ + _____

- Use base 10 or place value counters to make each number.

123	420	605	900

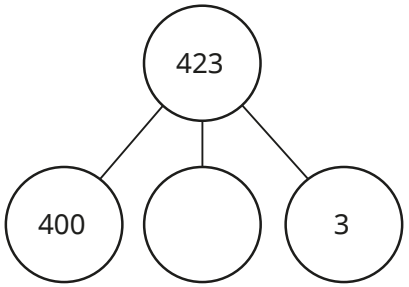
Complete the sentences to describe each number.

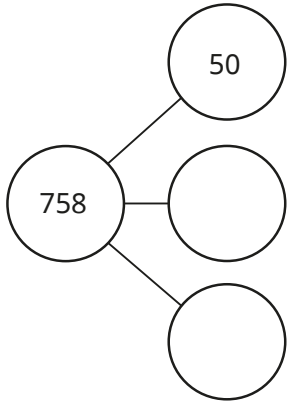
There are _____ hundreds, _____ tens and _____ ones.

The number is _____

_____ = _____ + _____ + _____

- Complete the part-whole models.





- Complete the number sentences.
  - 190 = _____ + _____
  - _____ = 200 + 5
  - 927 has 9 _____, 2 _____ and _____ ones.
  - 158 has _____ hundred, _____ tens and _____ ones.

- What is the value of the hundreds digit in 715?

  What is the value of the tens digit in 260?

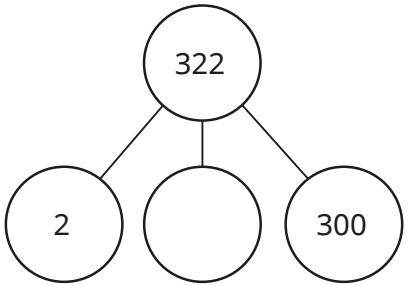
  What is the value of the ones digit in 32?

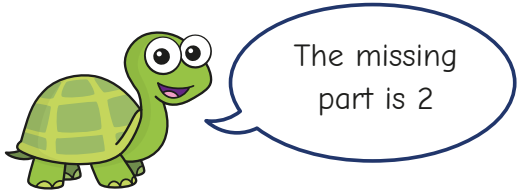
- Write in numerals the number that has 7 hundreds, 4 tens and 1 one.

Partition numbers to 1,000

Reasoning and problem solving

Tiny is completing a part-whole model.



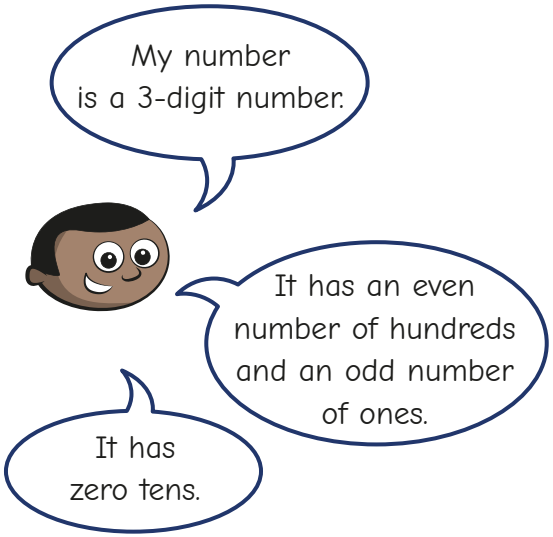


Explain the mistake that Tiny has made.

What is the missing part?

20

Mo is thinking of a number.



What could Mo's number be?

Find three posibilities and partition them.

multiple possible answers, e.g.

201 = 200 + 1

403 = 400 + 3

605 = 600 + 5

Thousands

Notes and guidance

Building on previous steps where children explored numbers up to 1,000, they now explore numbers beyond 1,000

Children start by identifying the number of thousands from pictures. They count in 1,000s forwards and backwards from any given multiple of 1,000, initially using number tracks as support.

Children look at the composition of multiples of 1,000 by exploring how many hundreds they are made up of. They unitise the hundred and state the number of hundreds that make up any 4-digit multiple of 100 or 1,000, for example "20 hundreds are equal to 2,000". Base 10 and place value counters in a ten frame are useful resources to show the connection between the number of hundreds that are equal to a multiple of a thousand. As this is the first time that Year 3 children are introduced to thousands, they may need greater exposure to such representations.

Things to look out for

- Children may not appreciate that 1,000 is 10 times the size of 100
- When they are meant to be counting in 1,000s, children may count in the more familiar 100s.

Key questions

- How many thousands are there in 6,000?
- How many hundreds are there in 6,000?
- Counting on in 1,000s from 3,000, what is the next number?
- If you count back in 1,000s from 8,000, will you say 5,000? How do you know?

Possible sentence stems

- The next/previous multiple of 1,000 is _____
- 1 thousand is equal to _____ hundreds, so _____ thousands is equal to _____ hundreds.
- _____ thousands can be written in numerals as _____

Single age small step links

- N/A

- Thousands (Y4)

National Curriculum links

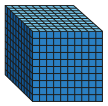
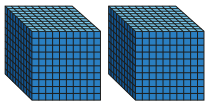
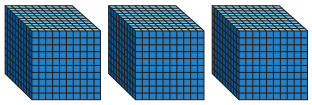
- Count in multiples of 6, 7, 9, 25 and 1,000 (Y4)

Thousands

Key learning

- How many marbles are there?

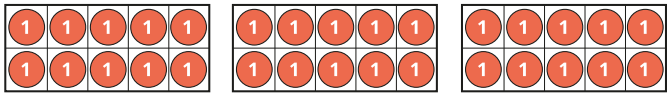
Write your answer in numerals and words.

- What numbers are shown?
  - 
  - 
  - 

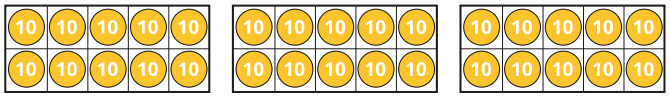
- Complete the number tracks.

3,000	4,000			
		7,000	8,000	9,000

- Complete the sentences to match the ten frames.



_____ ones = _____ tens



_____ tens = _____ hundreds

_____ hundreds = _____ thousands

What do you notice?

- Complete the sentences.
  - 4 thousand = 4,000

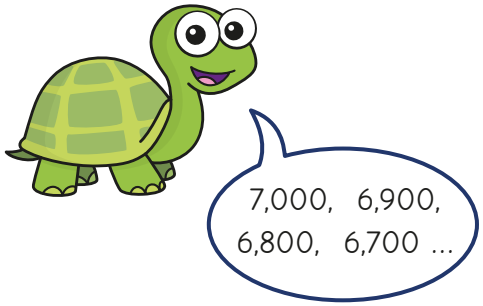
    There are _____ hundreds in 4 thousand.
  - _____ thousand = 6,000

    There are 60 hundreds in _____ thousand.

Thousands

Reasoning and problem solving

Tiny is counting back in 1,000s from 7,000



Explain the mistake that Tiny has made.

Tiny has counted back in 100s, not 1,000s.

Tiny should say, "7,000, 6,000, 5,000 ..."

Is the statement true or false?

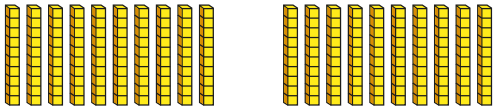
> When counting in 1,000s, the numbers will always have four digits.

Explain your answer.

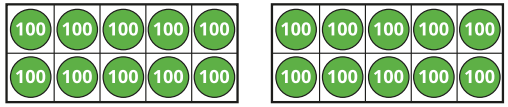
False

Jack, Kim and Sam are asked to represent 2,000

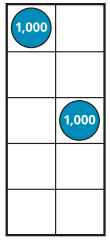
Jack



Kim



Sam



Who is correct?

Explain your answer.

Kim and Sam

Represent numbers to 10,000

Notes and guidance

In this small step, children represent numbers to 10,000

Children use different representations, such as base 10, place value charts and Gattegno charts, which help to highlight the relative sizes of the parts, and the place value of the digits, in the numbers. Year 3 children may require greater exposure to manipulatives such as base 10 to secure their understanding of the size of thousands in comparison to hundreds, tens and ones.

It may be helpful to discuss how and why we use a comma when writing numbers, as it can help with reading and writing greater numbers.

Children should experience questions that include zero as a placeholder and represent a blank column in a place value chart.

Things to look out for

- Numbers may be written incorrectly, for example 2,456 as 2000400506
- Children may forget to use zero as a placeholder.

Key questions

- What number is shown?
- How many thousands/hundreds/tens/ones are there?
- What is the value of each digit?

Possible sentence stems

- There are _____ thousands _____ hundreds _____ tens and _____ ones.
  The number is _____

Single age small step links

- Represent numbers to 1,000 (Y3)
- Represent numbers to 10,000 (Y4)

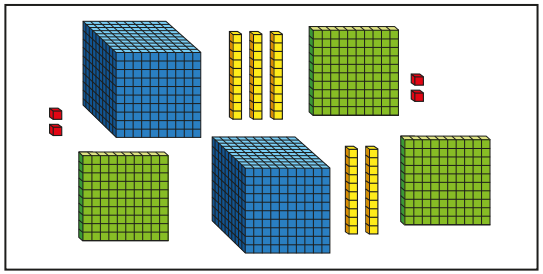
National Curriculum links

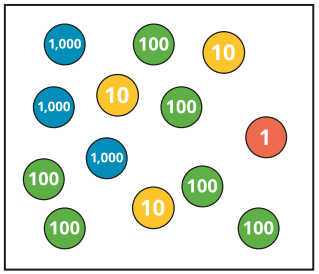
- Read and write numbers up to 1,000 in numerals and in words (Y3)
- Identify, represent and estimate numbers using different representations (Y3 and Y4)
- Recognise the place value of each digit in a 4-digit number (thousands, hundreds, tens and ones) (Y4)

Represent numbers to 10,000

Key learning

- Complete the sentences for each number.

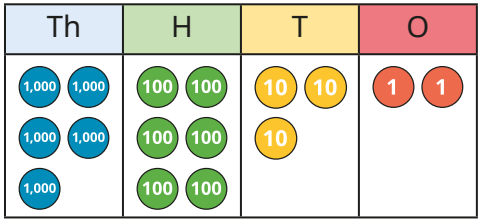




There are _____ thousands, _____ hundreds, _____ tens and _____ ones.

The number is _____

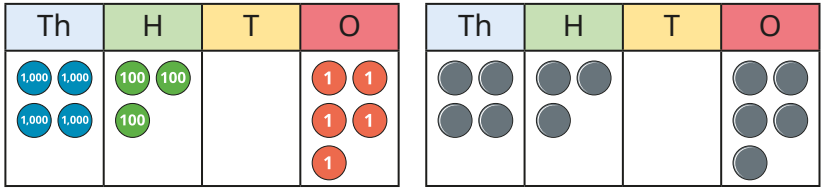
- What number is shown on the place value chart?



- Use base 10 or place value counters to show each number.

1,263	3,829	2,751	5,151

- What numbers are represented on the place value charts?



Write your answers in words and numerals.

What is the same and what is different about the place value charts?

- Use place value counters to represent each number on a place value chart.

3,102	4,052	6,260	5,003

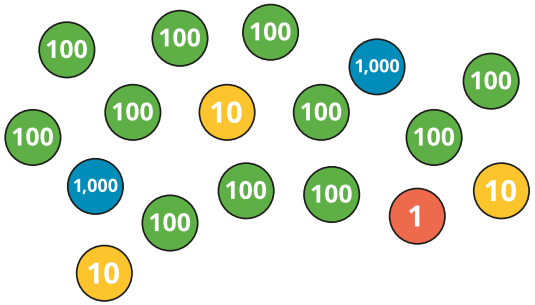
- What number is shown on the Gattegno chart?

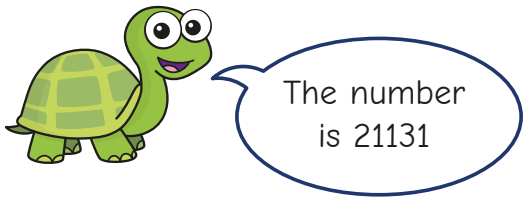
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

Represent numbers to 10,000

Reasoning and problem solving

Tiny uses place value counters to make a number.



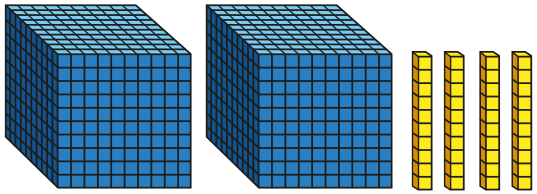


Do you agree with Tiny?

Explain your answer.

No

Esther has these pieces of base 10



What 4-digit numbers can she make?

2,040 1,040
2,030 1,030
2,010 1,010
2,000 1,000

Use exactly five counters to make as many 4-digit numbers as possible.

Write each number in numerals.

Th	H	T	O

multiple possible answers, e.g.

5,000

4,001

1,112

Partition numbers to 10,000

Notes and guidance

In this small step, children partition numbers up to 10,000 by identifying the number of thousands, hundreds, tens and ones. They should give their answers using numerals, words and in expanded form, for example 1,234, 1 thousand, 2 hundreds, 3 tens and 4 ones or 1,000 + 200 + 30 + 4. Ensure that Year 3 children are confident with partitioning numbers to 1,000 before progressing to partitioning numbers to 10,000

Base 10 and place value counters continue to be used to support children in partitioning numbers. Year 3 children may require greater exposure to such representations. Part-whole models are a useful representation to recognise the value of each digit as well as to identify any missing parts in a calculation.

Children should experience questions that include zero as a placeholder. Emphasise that it cannot be omitted, in order to address the misconception that, for example, 4,006 = 46

Things to look out for

- Children may not associate the digits with their value and just write, for example, 2,536 = 2 + 5 + 3 + 6
- Partitioned numbers that are presented "out of order" may lead to errors, for example 3,000 + 2 + 50 + 600 = 3,256

Key questions

- How many thousands/hundreds/tens/ones are there?
- What is the value of the missing part? How do you know?
- What does a zero in a place value column tell you?

Possible sentence stems

- _____ has _____ thousands _____ hundreds _____ tens and _____ ones.
  _____ = _____ + _____ +_____ +_____

Single age small step links

- Partition numbers to 1,000 (Y3)
- Partition numbers to 10,000 (Y4)

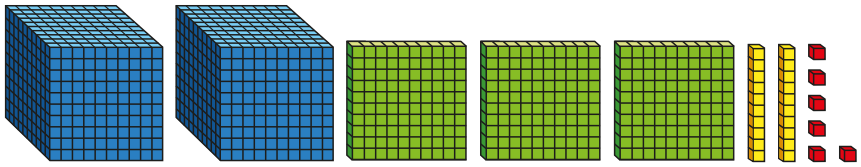
National Curriculum links

- Recognise the place value of each digit in a 4-digit number (thousands, hundreds, tens and ones) (Y4)
- Identify, represent and estimate numbers using different representations (Y3 and Y4)

Partition numbers to 10,000

Key learning

- Complete the number sentences.



2,326 = 2,000 + _____ + _____ + _____

Thousands	Hundreds	Tens	Ones
1,000 1,000 1,000	100 100	10 10 10 10 10 10	1 1 1 1

3,264 = 3,000 + _____ + _____ + _____

Thousands	Hundreds	Tens	Ones

5,931 = _____ + _____ + _____ + _____

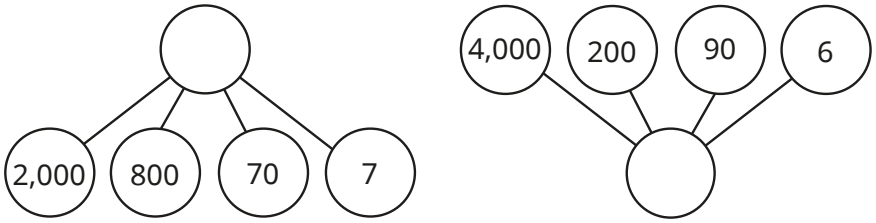
- Use a Gattegno chart to complete the number sentences.

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

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

The number is _____

- Complete the part-whole models.



- Complete the number sentences.

3,443 = 3 thousands + 4 hundreds + _____ + _____

_____ = 1,000 + 600 + 5

_____ = 200 + 90 + 5,000

Partition numbers to 10,000

Reasoning and problem solving

Tiny is partitioning 5,703

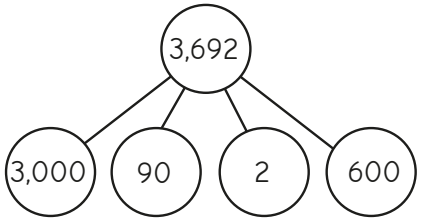
5,703 = 500 + 70 + 3

Explain the mistake that Tiny has made.

Tiny has not assigned the correct value to each digit.

There are no tens.

Aisha uses a part-whole model to partition 3,692

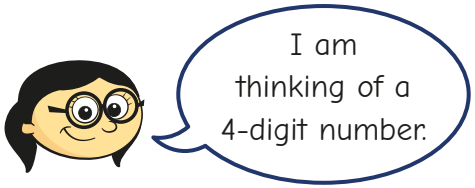


Has she partitioned the number correctly?

Explain your answer.

Yes

The order of the parts does not matter, as long as they have the correct value.



Use the clues to work out Annie's number.

- There are the same number of hundreds and tens.
- The 4-digit number is even.
- The tens digit is 1
- The thousands digit is one more than the ones digit.
- The sum of the digits is 19

Think of another 4-digit number and challenge a partner to work out your number from clues.

9,118

Flexible partitioning

Notes and guidance

Previously, children have partitioned numbers up to 10,000 in a standard way, considering how many thousands, hundreds, tens and ones there are in a number. In this step, Year 3 children flexibly partition numbers to 1,000, whereas Year 4 children progress to flexibly partition numbers up to 10,000, understanding that the whole number can be split into parts in many different ways.

Children use numerals, words and expanded form to flexibly partition numbers. A key focus should be understanding that, for example, 6,000 + 400 + 20 + 9 = 5,000 + 1,400 + 20 + 9, as this is crucial to understanding addition and subtraction of 4-digit numbers in future blocks.

The representations used in previous steps can provide support, arranging place value counters or base 10 to appreciate that the different partitions give the same number.

Ensure that links are made to the vocabulary of "exchanging" when demonstrating how to flexibly partition numbers.

Things to look out for

- Children may just combine digits when identifying a number that has been partitioned in a non-standard way, for example 2,000 + 1,300 + 60 + 8 = 21,368

Key questions

- What different multiples of 1,000 could be the first part? How does this affect the values of the other parts?
- How can you write the number using a part-whole model?
- What can you exchange the thousands/hundreds/tens/ones digit for?

Possible sentence stems

- _____ is equal to _____ thousands, _____ hundreds, _____ tens and _____ ones or _____ thousands, _____ hundreds, _____ tens and _____ ones.

Single age small step links

- Flexible partitioning of numbers to 1,000 (Y3)
- Flexible partitioning of numbers to 10,000 (Y4)

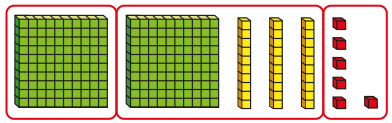
National Curriculum links

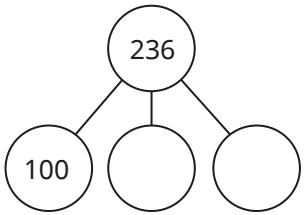
- Recognise the place value of each digit in a 3-digit number (thousands, hundreds, tens and ones) (Y3)
- Recognise the place value of each digit in a 4-digit number (thousands, hundreds, tens and ones) (Y4)

Flexible partitioning

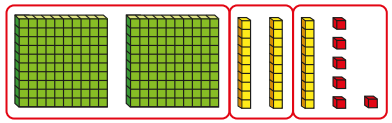
Key learning

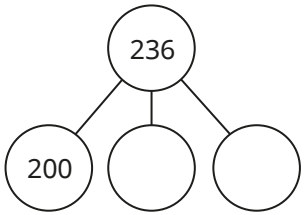
- Complete the part-whole models and number sentences.



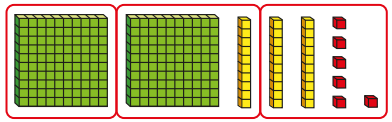


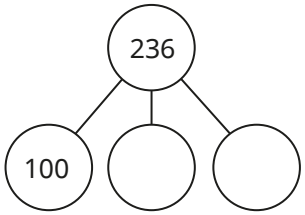
236 = 100 + _____ + _____





236 = 200 + _____ + _____





236 = 100 + _____ + _____

How else can you partition 236?

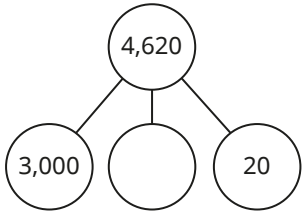
- Use the place value chart to complete the number sentences.

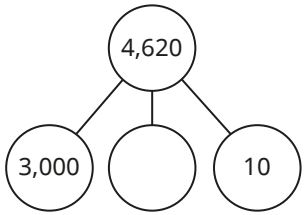
Thousands	Hundreds	Tens	Ones
1,000 1,000 1,000	100 100 100 100	10 10 10 10 10 10	1 1 1 1 1 1 1 1

3,468 = 3,000 + 400 + _____ + 18

3,468 = 2,000 + _____ + 60 + 8

- Complete the part-whole models.





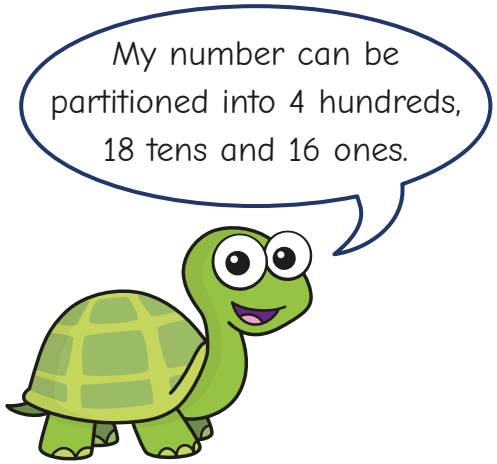
- Complete the number sentences.
  - 816 = 700 + _____ + 6
  - 2,816 = 1,000 + _____ + 10 + _____
  - 9,570 = _____ + 270 + _____

Is there more than one way of completing each sentence?

Flexible partitioning

Reasoning and problem solving

Tiny is thinking of a number.



Complete the number sentence to partition Tiny's number in a different way.

_____ = _____ + _____ + _____+ _____

multiple possible answers, e.g.

596 = 100 + 400 + 80 + 16

Which is the odd one out?

5,200

5 thousands + 20 tens

4 thousands + 12 hundreds

1,000 + 400 + 200

520 tens

Explain how you know.

1,000 + 400 + 200 = 1,600

Partition 2,835 in five different ways.

Compare answers with a partner.

What is the same?

What is different?

multiple possible answers, e.g.

2,000 + 700 + 130 + 5

1,000 + 1,800 + 20 + 15

Find 1, 10, 100 or 1,000 more or less

Notes and guidance

In this small step, children find 1, 10, 100 and 1,000 more or less than a given number with up to four digits.

Using base 10, place value counters and plain counters in a place value chart will support understanding, particularly when multiples of 10/100/1,000 are crossed. Year 3 children may require greater exposure to concrete resources allowing them to see "more" or "less" as physically adding or removing pieces of equipment.

It is important to explore examples that result in a number with zero as a placeholder, as this concept needs regular reinforcing. Draw attention to which place value columns change and which stay the same in each example. This allows children to generalise that, for example, when finding 100 more/less, the ones and tens never change, the hundreds always change and the thousands sometimes change.

Things to look out for

- Calculations that cross a boundary may cause confusion.
- In questions such as "10 more than _____ is 297", children may find 10 more than 297

Key questions

- When finding 1/10/100/1,000 more/less, which place value columns does this affect?
- Do you need to make an exchange?

Possible sentence stems

- _____ is _____ more/less than _____
- When finding _____ more/less the _____ column will always/sometimes/never change.

Single age small step links

- Find 1, 10 or 100 more or less (Y3)
- Find 1, 10, 100, 1,000 more or less (Y4)

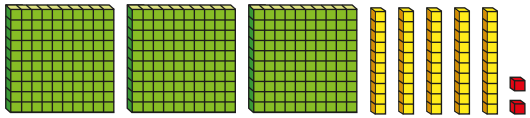
National Curriculum links

- Count from zero in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number (Y3)
- Find 1,000 more or less than a given number (Y4)

Find 1, 10, 100 or 1,000 more or less

Key learning

- Complete the sentences.



The number is _____

1 less than the number is _____

10 less than the number is _____

100 less than the number is _____

- Complete the sentences.

Thousands	Hundreds	Tens	Ones
1,000 1,000 1,000 1,000	100 100 100 100 100 100	10 10 10 10 10 10 10	1 1 1 1 1

The number is _____

1 more than the number is _____

10 more than the number is _____

100 more than the number is _____

1,000 more than the number is _____

- The place value chart shows that 100 more than 3,941 is 4,041

Thousands	Hundreds	Tens	Ones
1,000 1,000 1,000 1,000	100 100 100 100 100 100 100 100 100 100	10 10 10 10	1

Use this method to find the values.

10 more than 392	100 more than 8,913	1 more than 2,499

- The place value chart shows that 10 less than 1,502 is 1,492

Thousands	Hundreds	Tens	Ones
1,000	100 100 100 100 ~~100~~	10 10 10 10 10 10 10 10 10 ~~10~~	1 1

Use this method to find the values.

10 less than 2,904	100 less than 3,042

Find 1, 10, 100 or 1,000 more or less

Reasoning and problem solving

Tommy is thinking of a number.

What is Tommy's number?

Explain your thinking.

340

One counter has fallen off the place value chart.

Th	H	T	O
●● ●		●●	●●● ●

What could the number have been?

List all the possibilities.

4,025
3,125
3,035
3,026

Complete the function machines.

input			output
8,949	→	+ 1,000 →	
350	→	→	349
	→	– 100 →	925

9,949

– 1

1,025

Are the statements always true, sometimes true or never true?

When you find 10 more or less than a number, the hundreds column changes.

When you find 100 more or less than a number, the ones column changes.

Explain your reasoning.

sometimes true

never true

Number line to 1,000

Notes and guidance

In this small step, children build on their understanding of number lines from previous years, focusing on using the number line to 100 and then to 1,000. It is important that children explore a variety of examples, including number lines that do not start from zero and number lines with increments other than 1,10 or 100

Children label, identify and find missing values on blank or partially completed number lines. Using everyday scales, such as rulers and measuring jugs, can be helpful.

When looking at partially completed number lines, it is important that children become confident in finding the difference between the start and end points and dividing to find the value of each interval. Explicit examples should be used that have a varying number of intervals and unmarked values in different positions.

Things to look out for

- Children may count the number of divisions, rather than the intervals.
- Children may incorrectly count the number of intervals and therefore label the positions of numbers incorrectly.

Key questions

- What is the start point value? What is the end point value?
- How many intervals are there? What is each interval worth?
- What is the number line counting up in? How do you know?

Possible sentence stems

- The difference in value between the start and end of the number line is _____
- There are _____ intervals on the number line.
  Each interval is worth _____

Single age small step links

- Number line to 100 (Y3)
- Number line to 1,000 (Y3)
- Number line to 1,000 (Y4)

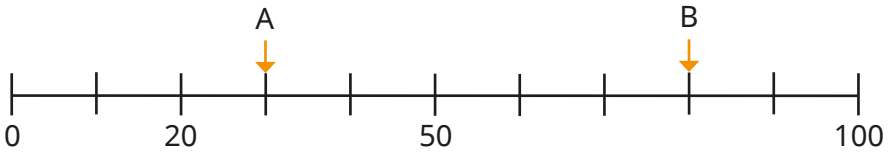
National Curriculum links

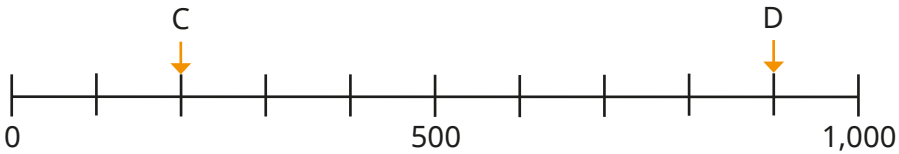
- Count from zero in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number (Y3)
- Identify, represent and estimate numbers using different representations (Y3 and Y4)

Number line to 1,000

Key learning

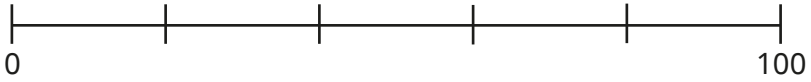
- What numbers are the arrows pointing to?

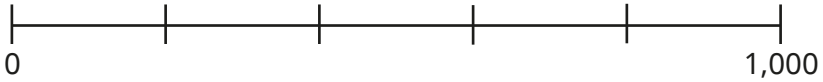




- Complete the sentences for each number line.

Label the number lines.



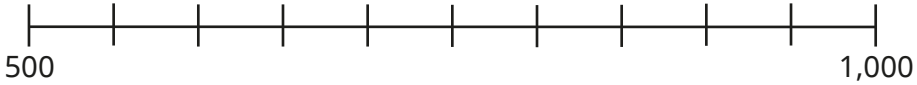


The difference in value between the start and the end of the number line is _____

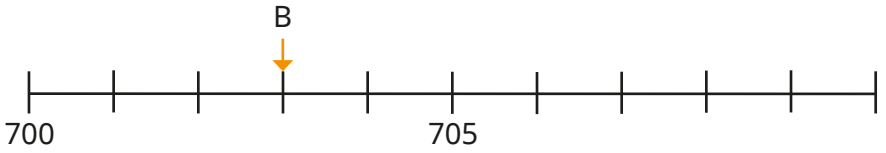
There are _____ intervals.

_____ ÷ _____ = _____

- Draw an arrow to show where each number belongs on the number line.

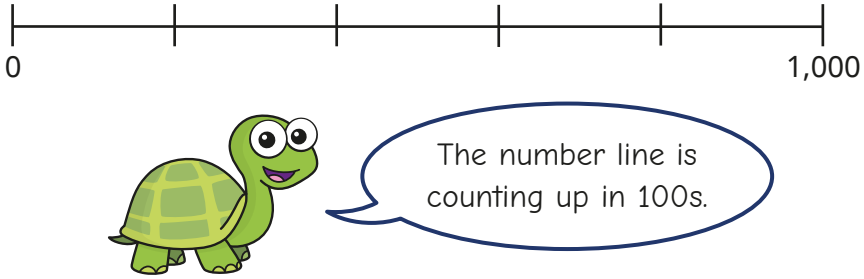


- What numbers are the arrows pointing to?



Number line to 1,000

Reasoning and problem solving

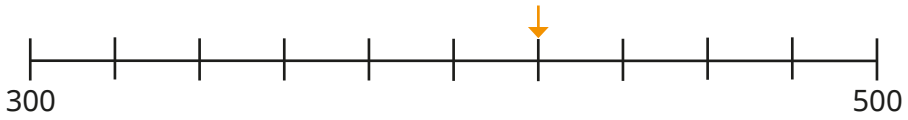


Do you agree with Tiny?

Talk about your answer with a partner.

No

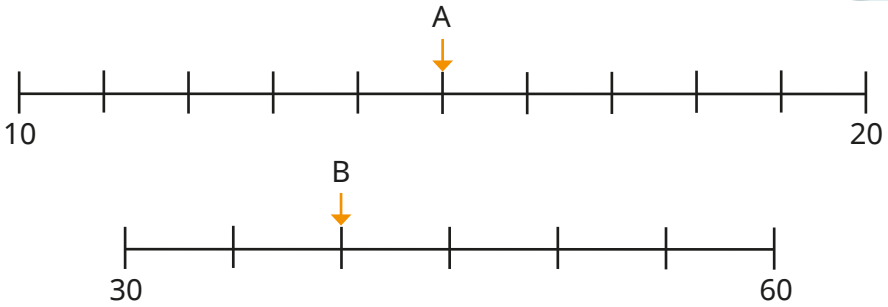
What number is the arrow pointing to?



How did you work this out?

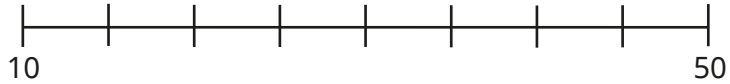
420

What numbers are the arrows pointing to?

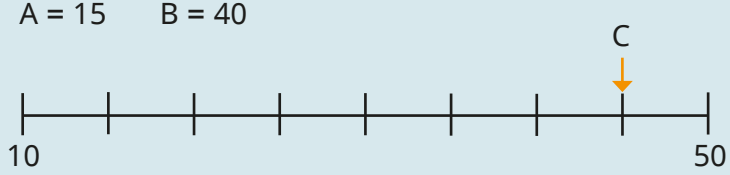


A + B + C = 100

Draw an arrow to show where C belongs on the number line.



A = 15 B = 40



Number line to 10,000

Notes and guidance

Building on previous learning of number lines to 1,000, children now move on to look at number lines to 10,000. Year 3 children may spend some time consolidating number lines to 1,000, while Year 4 children focus on number lines to 10,000

Children label, identify and find missing values on blank or partially completed number lines. Using everyday scales, such as rulers and measuring jugs, can be helpful.

When looking at partially completed number lines, it is important that children become confident in finding the difference between the start and end points and dividing to find the value of each interval. Examples should be used that have a varying number of intervals and unmarked values in different positions. Children should also be able to work out the value at the midpoint of an interval.

Things to look out for

- Children may assume that the increments on the number line are each worth one unit, focusing solely on the starting number.
- Children may count the number of divisions, rather than the intervals.

Key questions

- What are the values at the start and end points of the number line?
- How many intervals are there? What is each interval worth?
- What other numbers can you mark on the number line?

Possible sentence stems

- The difference in value between the start and end point of the number line is _____
- There are _____ intervals. Each interval is worth _____

Single age small step links

- Number line to 1,000 (Y3)

- Number line to 1,000 (Y4)
- Number line to 10,000 (Y4)

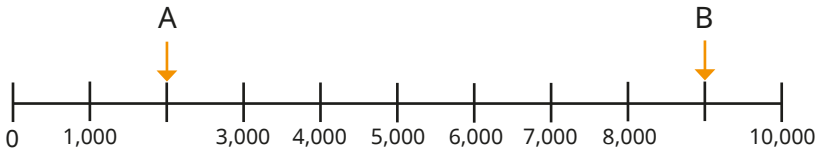
National Curriculum links

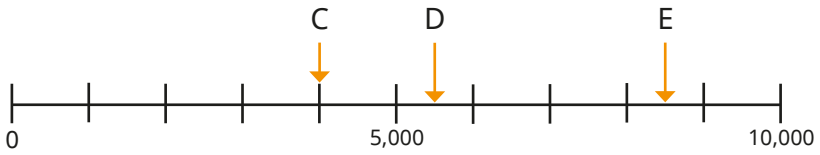
- Count from zero in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number (Y3)
- Identify, represent and estimate numbers using different representations (Y3 and Y4)

Number line to 10,000

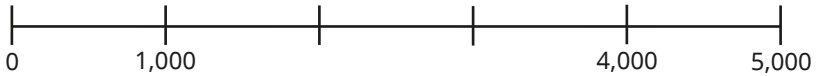
Key learning

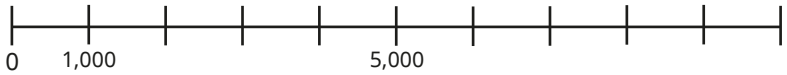
- What numbers are the arrows pointing to?

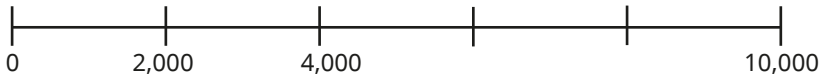




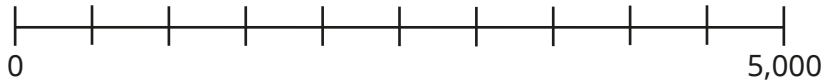
- Complete the number lines.

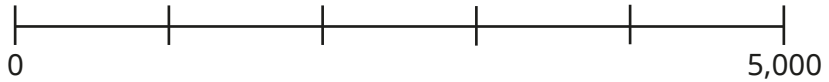




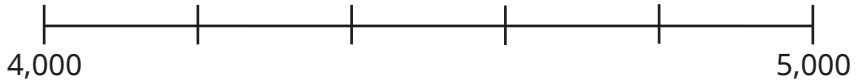


- Label the number lines.



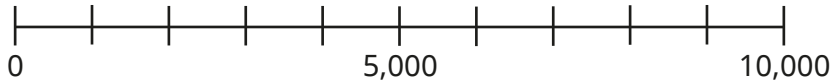


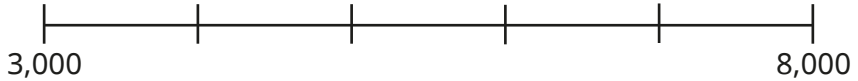
- Label 4,900 and three other numbers on the number line.



Compare answers with a partner.

- Draw an arrow to show the position of 5,500 on each number line

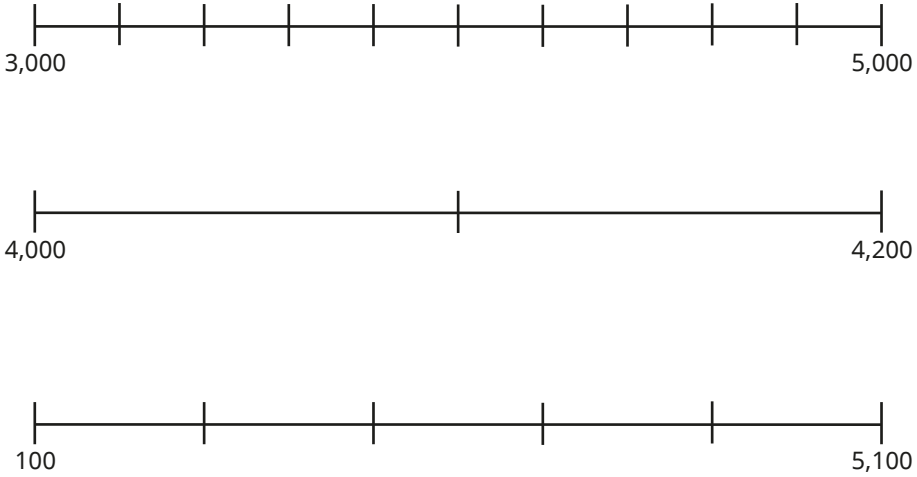




Number line to 10,000

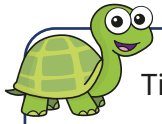
Reasoning and problem solving

Label 4,100 on each number line.

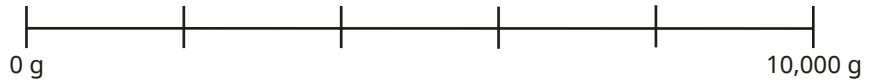


What do you notice?

Children should draw an arrow in the correct position on each number line.



Tiny is working out the missing values on a scale.



10,000 – 0 = 10,000

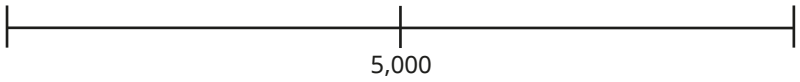
10,000 ÷ 6 = ?

Explain the mistake that Tiny has made.

There are 6 divisions, but only 5 intervals.

Tiny needs to divide by 5

What could the start and end numbers be?



multiple possible answers, e.g. 4,000 and 6,000

Estimate on a number line

Notes and guidance

Building on the previous small step, children now estimate the position of numbers on number lines.

Children use their existing number sense to complete their estimates and explain their thinking. Initially, they consider key intervals that are factors of 1,000 and 10,000, including but not limited to multiples of 100 and 1,000. Thinking beyond this, they should try to be as accurate as possible, using their knowledge of the midpoint of intervals and which of the two divisions a number is closer to. For example 6,429 is closer to 6,000 than 7,000 and it is less than halfway between the two points. This will be a useful skill later in the block when children look at rounding.

Children should understand that their answer may not be exactly the same as their partner's, as they are only able to estimate the positions or values. Year 3 children may focus on consolidating estimating on a number line to 1,000, while Year 4 children focus on estimating on a number line to 10,000

Things to look out for

- Children may misinterpret the scale, for example thinking that a mark close to 10,000 is 9,999 when 9,000 is more appropriate.

Key questions

- What other numbers could you mark on accurately?
- Which division is the arrow close to?
- How would splitting the line into more intervals help?
- How accurate do you think your estimate is?

Possible sentence stems

- _____ is closer to _____than _____, so the position of _____ on the number line is closer to _____ than _____

Single age small step links

- Estimate on a number line to 1,000 (Y3)
- Estimate on a number line to 10,000 (Y4)

National Curriculum links

- Count from zero in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number (Y3)
- Identify, represent and estimate numbers using different representations. (Y3 and Y4)

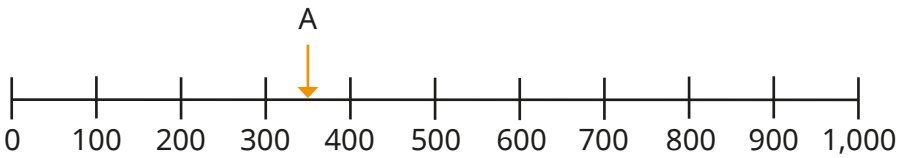
Estimate on a number line

Key learning

- Mark the midpoint of each number line.

  What number does each midpoint represent?

- What number is the arrow pointing to?



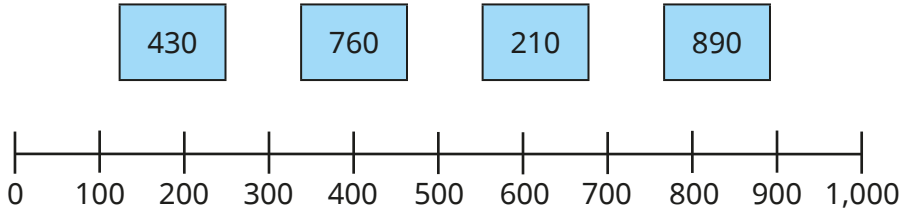
  Is the number 320 to the left or right of the arrow?

  Is the number 370 to the left or right of the arrow?

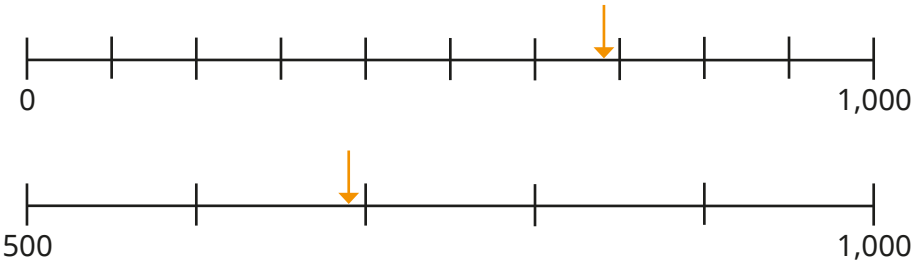
  How do you know?

  Draw arrows to estimate where 320 and 370 belong on the number line.

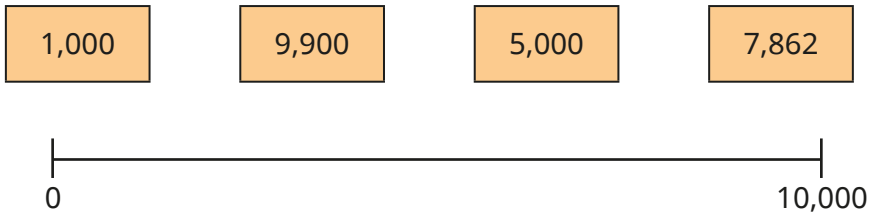
- Estimate where the numbers belong on the number line.



- Estimate the numbers that the arrows are pointing to.



- Estimate where the numbers belong on the number line.

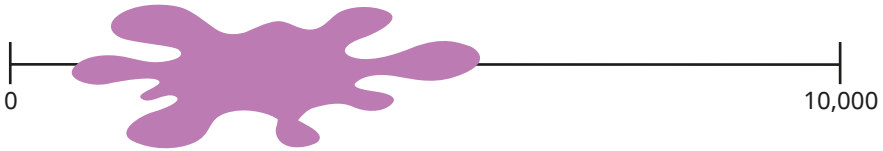


  Compare methods with a partner.

Estimate on a number line

Reasoning and problem solving

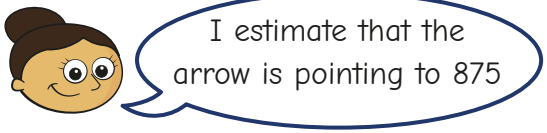
Miss Rose has spilt some paint on the number line.



Estimate three numbers that could appear under the paint.

Explain your answers.

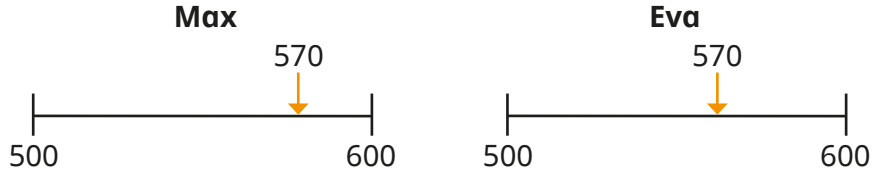
numbers between 1,000 and 5,500



Explain why Dora cannot be correct.

The arrow is pointing between 850 and 900. It is pointing before the midpoint, which is at 875

Max and Eva have estimated where 570 belongs on the same number line.



Can Max and Eva both be correct?

Talk about it with a partner.

Yes

- C is greater than A.
- C is less than half of B.

Give three possible values for C.

e.g. A = 2,500 B = 7,000 C = between 2,500 and 3,500

Compare numbers

Notes and guidance

In this small step, children compare numbers using language such as greater/smaller than and less/more than.

Children use concrete resources, pictorial representations, words and symbols, so that they are confident with the language used and are able to visualise the numbers that they are comparing. They can then progress to using the inequality symbols < , > and =, which they have encountered in previous years.

Demonstrate to children that when comparing numbers, they need to start with the greatest place value. If the digit in the greatest place value column is the same, they need to look at columns to the right until they find different digits.

Year 3 children should begin by comparing numbers to 1,000 before progressing to comparing numbers to 10,000. Year 4 children could be challenged to solve more complex problems involving comparing numbers.

Things to look out for

- Children may interpret the inequality symbols incorrectly, confusing < and >.
- When comparing numbers, children may compare the smallest place value column first.

Key questions

- What is the value of the _____ digit in _____ ?
- How many thousands/hundreds/tens/ones are there?
- What strategy did you use to compare the two numbers?
- When comparing two numbers, if the first digits are equal in value, what do you look at next?

Possible sentence stems

- _____ is greater/less than ____ because ...
- If the digits in the _____ column are the same, I need to look in the _____ column.

Single age small step links

- Compare numbers to 1,000 (Y3)
- Compare numbers to 10,000 (Y4)

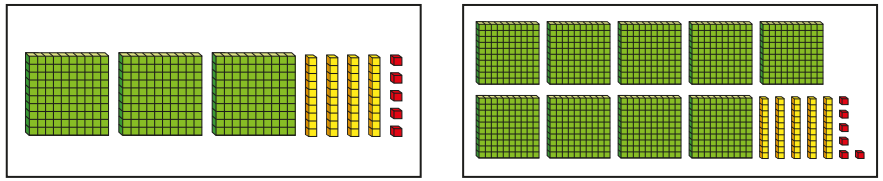
National Curriculum links

- Compare and order numbers up to 1,000 (Y3)
- Order and compare numbers beyond 1,000 (Y4)

Compare numbers

Key learning

- Which is the greater number? How do you know?



Complete the sentences.

_____ is less than _____ _____ is greater than _____

- Use place value counters to make and compare the numbers.

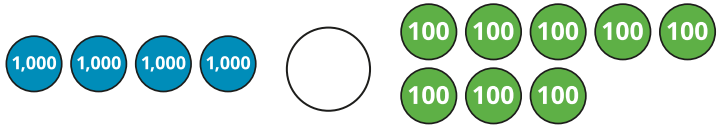
2,367 3,267

Th	H	T	O

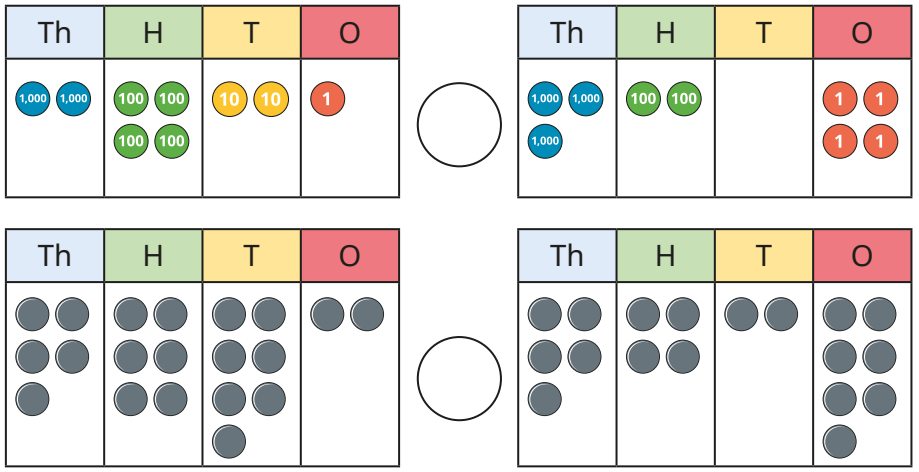
Th	H	T	O

2,367 is _____ than 3,267

- Write <, > or = to compare the numbers.



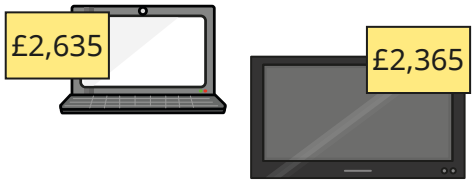
- Write <, > or = to compare the numbers.



- A laptop costs £2,635

A TV costs £2,365

Which item is more expensive?



- Complete the statements.

Th	H	T	O
5	0	5	6
5	0	1	8

5,056 is _____ than 5,018

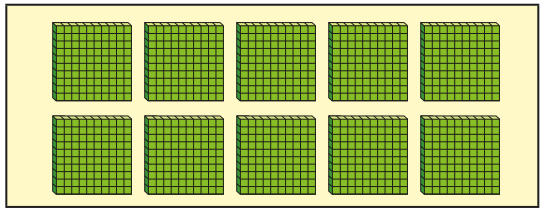
5,056 ◯ 5,018

Compare numbers

Reasoning and problem solving

Sort the cards into the table.

2 thousands	998
100 more than 989	800 + 70 + 5
one thousand, two hundred and four	



Numbers 1,000 or greater	Numbers less than 1,000

1,000 or greater:

2 thousands

100 more than 989

one thousand, two hundred and four

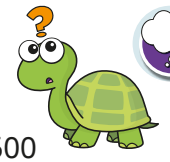
1,000 (base 10)

less than 1,000:

800 + 70 + 5

998

Tiny is thinking of a number.



- It is greater than 3,500 but less than 4,300
- The digits sum to 12

What number could Tiny be thinking of?

Give four possible answers.

multiple possible answers, e.g.

3,621

3,810

3,900

4,152

Here are four digit cards.

1	5	9	8

What is the greatest number you can make, using three of the digits?

What is the smallest number you can make, using all four digits?

985

1,589

Order numbers

Notes and guidance

In this small step, children order a set of numbers up to 10,000. Year 3 children will begin by ordering numbers up to 1,000 before progressing to ordering numbers to 10,000

Children order numbers both from the smallest to the greatest and from the greatest to the smallest. They should be encouraged to use "greatest" rather than "biggest" or "largest", and Year 4 children will also use "ascending" and "descending".

A secure understanding of place value is vital for this step, as children need to understand the value of a digit that is in a particular column. For example, a digit in the hundreds column is worth more than a digit in the tens column.

Base 10 and place value counters are used to represent numbers to help children make comparisons.

Things to look out for

- Children may need to be reminded of the meanings of the words "ascending" and "descending".
- When comparing numbers with different numbers of digits, children may focus only on the first digit of each number and not consider the place value of the digit.

Key questions

- Which number is the greatest/smallest? How do you know?
- When comparing two numbers with the same number of digits, if the first digits are equal in value, what do you look at next?
- What is different about comparing numbers with the same number of digits and comparing numbers with different numbers of digits?

Possible sentence stems

- _____ is greater/less than _____, so _____ thousand is greater/less than _____ thousand.

Single age small step links

- Order numbers to 1,000 (Y3)
- Order numbers to 10,000 (Y4)

National Curriculum links

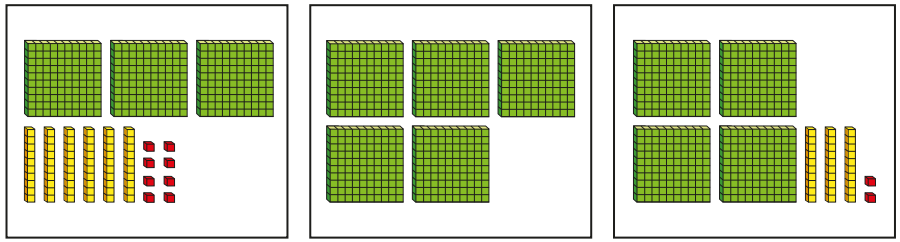
- Compare and order numbers up to 1,000 (Y3)
- Order and compare numbers beyond 1,000 (Y4)

Order numbers

White Rose MATHS

Key learning

- What numbers are shown?



Write the numbers in order. Start with the smallest number.

- Eva uses place value counters to make four numbers.

Th	H	T	O
1,000	100 100 100 100	10 10 10 10 10 10 10 10	

Th	H	T	O
1,000 1,000		10	1 1 1 1 1 1 1 1

Th	H	T	O
1,000 1,000 1,000			

Th	H	T	O
	100 100 100 100 100 100 100 100 100	10 10 10 10 10 10 10 10	1 1 1 1 1 1 1 1

Put the numbers in descending order.

- Use base 10 or place value counters to make each number.

4,440	400	948

Write the numbers in order. Start with the smallest number.

Write the numbers in order again. Start with the greatest number.

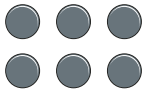
- Write the numbers in ascending order.

Th	H	T	O
2	2	8	1

Th	H	T	O
2	2	0	8

Th	H	T	O
3	0	0	0

- Put six counters in a place value chart to make six different numbers.



Write your numbers in ascending order.

- Write the measurements in order. Start with the smallest measurement.

4,283 m	6,391 m	841 m	6,491 m

Order numbers

Reasoning and problem solving

Teddy writes six numbers in descending order.

He spills ink on two of the numbers.

2,105, [ink] 792, 528, [ink] 316

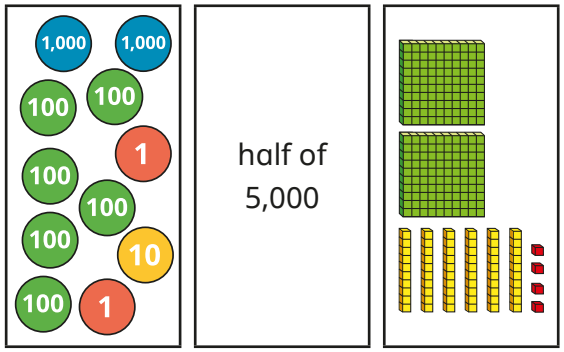
What could the hidden numbers be?

Explain how you know.

first number: between 2,104 and 793

second number: between 527 and 317

Put the numbers in ascending order.



264 (base 10)

2,500 (half of 5,000)

2,612 (counters)

Is the statement always true, sometimes true or never true?

> When ordering numbers, you have to look at every digit in every place value column.

Explain your answer.

sometimes true

Tiny writes five numbers in ascending order.

1,632 4,252 4,579 847 9,934

smallest greatest

What mistake has Tiny made?

Tiny has focused on the first digit and not necessarily its value.

847 is a 3-digit number and is the smallest.

Round to the nearest 10

Notes and guidance

In this small step, children round numbers to the nearest 10. They begin by rounding 2-digit numbers, as it is clearer what the previous and next multiples of 10 are. When building on this, and starting to round 3-digit numbers, it is important to include examples that have zero as a placeholder in the tens column, for example 203, as children can often think that 200 is not a multiple of 10 because it is a multiple of 100

Number lines can be used not only to identify the previous and next multiple of 10, but also to show which multiple of 10 a number is closer to. As this is the first time that Year 3 children are introduced to rounding, they may require greater exposure to number lines, while Year 4 children may begin to make generalisations. Children should understand the convention that when the ones digit is 5, they round to the next multiple of 10

Avoid using language such as "round up" and "round down", as this can lead to misconceptions.

Things to look out for

- Children may look at the wrong column when deciding which way to round.
- Children may think that, for example, 52 "rounds down" and give the result as 42 or 40

Key questions

- What is the multiple of 10 before/after _____ ?
- Which multiple of 10 is _____ closer to? How do you know?
- Which numbers rounded to the nearest 10 result in zero?
- Which place value column do you need to look at to decide which multiple to round to?

Possible sentence stems

- The two multiples of 10 the number lies between are _____ and _____

  _____ is closer to _____ than _____

  _____ rounded to the nearest 10 is _____

Single age small step links

- N/A

- Round to the nearest 10 (Y4)

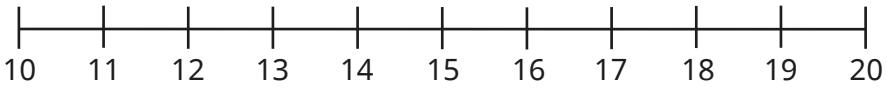
National Curriculum links

- Round any number to the nearest 10, 100 or 1,000 (Y4)

Round to the nearest 10

Key learning

- Use the number line to help you complete the sentences.



  - 14 is closer to _____ than _____

    14 rounded to the nearest 10 is _____
  - 18 is closer to _____ than _____

    18 rounded to the nearest 10 is _____

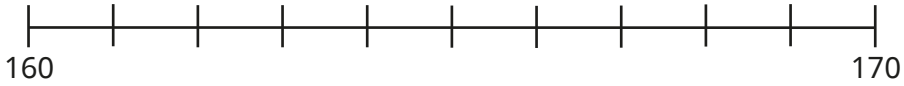
- Complete the number line and the sentences.

  - 52 is closer to _____ than _____

    52 rounded to the nearest 10 is _____
  - 55 is the same distance from _____ as it is from _____

    55 rounded to the nearest 10 is _____

- Use the number line to help you complete the sentences.



  - 167 rounded to the nearest 10 is _____
  - 163 rounded to the nearest 10 is _____
  - 160 rounded to the nearest 10 is _____
  - 165 rounded to the nearest 10 is _____

- Round each number to the nearest 10

32	76	125	843	590	8

- Which numbers round to 430 to the nearest 10?

428 **400** **431** **425** **435** **340** **430**

- Which numbers do **not** round to 60 to the nearest 10?

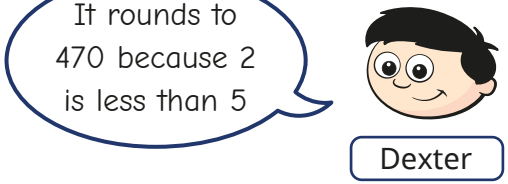
63 **54** **65** **59** **60** **55** **50**

Round to the nearest 10

Reasoning and problem solving

Whitney and Dexter are rounding 472 to the nearest 10

Whitney: It rounds to 480 because 7 is greater than 5



Dexter: It rounds to 470 because 2 is less than 5

Who is correct?

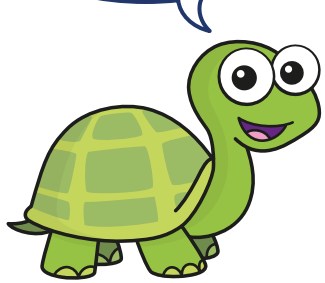
Explain your answer.

Dexter

When rounded to the nearest 10, there are 250 children in a school.

How many children could there be?

245, 246, 247, 248, 249, 250, 251, 252, 253 or 254



325 can round to 320 or 330 to the nearest 10

What mistake has Tiny made?

Round 325 to the nearest 10

If the ones digit is a 5, the number rounds to the next multiple of 10

330

Round to the nearest 100

Notes and guidance

Building on the previous step, children now begin to round numbers to the nearest 100

Children begin by focusing on rounding 3-digit numbers, as it is clearer what the previous and next multiples of 100 are. Number lines continue to be used, particularly to support Year 3 children. It is important to discuss what is the same and what is different when rounding numbers to 10 and 100. Children can then begin to understand that when asked to round to a given number, they need to look at the next place value column to the right.

It is helpful to use examples that are less than 50, so children can see that these round to the previous multiple of 100, which is zero.

As in the previous step, avoid using language such as "round up" and "round down", as this can lead to misconceptions.

Things to look out for

- Children may look at the wrong column to decide which way to round, and use the hundreds column instead of the tens column.
- Children may focus on rules about "up" and "down" instead of looking at multiples of 100, for example rounding 432 to 402 or 332

Key questions

- What is the multiple of 100 before/after _____ ?
- Which multiple of 100 is _____ closer to? How do you know?
- Which numbers rounded to the nearest 100 result in zero?
- Which place value column do you need to look at to decide which multiple to round to?

Possible sentence stems

- The two multiples of 100 that the number lies between are _____ and _____

  _____ is closer to _____ than _____

  _____ rounded to the nearest 100 is _____

Single age small step links

- N/A
- Round to the nearest 100 (Y4)

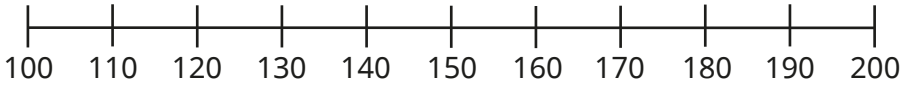
National Curriculum links

- Round any number to the nearest 10, 100 or 1,000 (Y4)

Round to the nearest 100

Key learning

- Use the number line to help you complete the sentences.

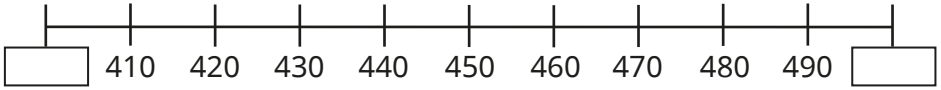


  - 120 is closer to _____ than _____

    120 rounded to the nearest 100 is _____
  - 170 is closer to _____ than _____

    170 rounded to the nearest 100 is _____

- Complete the number line and the sentences.

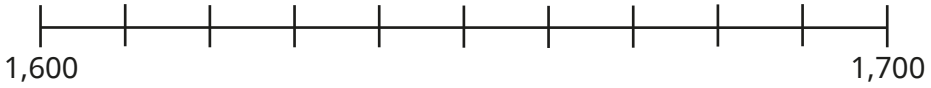


  - 480 is closer to _____ than _____

    480 rounded to the nearest 100 is _____
  - 433 is closer to _____ than _____

    433 rounded to the nearest 100 is _____

- Use the number line to help you complete the sentences.



  - 1,620 rounded to the nearest 100 is _____
  - 1,629 rounded to the nearest 100 is _____
  - 1,680 rounded to the nearest 100 is _____
  - 1,683 rounded to the nearest 100 is _____
  - 1,650 rounded to the nearest 100 is _____

  What do you notice?

- Round each number to the nearest 100

320	4,680	960
1,527	681	2,967

  What do you notice?

- Which numbers round to 1,200 to the nearest 100?

1,000 **1,240** **1,222** **1,130** **1,180**

Round to the nearest 100

Reasoning and problem solving

To the nearest 100, there are 800 people at a football match.

What is the smallest number of people that could be at the football match?

What is the greatest number of people that could be at the football match?

How would your answers change if the number of people at the football match was 800 when rounded to the nearest 10?

750

849

795

804

To the nearest 100, there are 2,600 people at a concert.

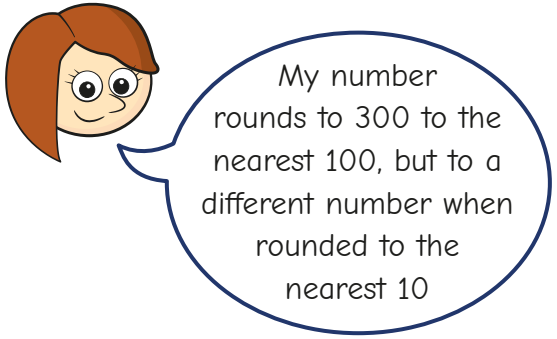
The sum of the digits in the number is 12

How many people could there be?

multiple possible answers, e.g.

2,550, 2,622, 2,640, 2613

Rosie is thinking of a number.



What number could Rosie be thinking of?

How many answers can you find?

250 to 294

305 to 349

Round to the nearest 1,000

Notes and guidance

Building on the previous small steps, children now round numbers to the nearest 1,000

Children begin by discussing which multiple of 1,000 a number is closest to. They can then identify that if the digit in the hundreds column is between zero and 4, they round to the previous multiple of 1,000, but if the digit in the hundreds column is 5 or above, they round to the next multiple of 1,000

As in the previous steps, number lines show children which multiple of 1,000 a number is closer to. Year 3 children will predominantly round using the number line representation, while Year 4 children should be encouraged to look at the value of the digits in the hundreds column to round a number to the nearest 1,000

Children can make links with rounding numbers to the nearest 10 or 100, but this will be explored further in the next step.

Things to look out for

- Children may look at the wrong column to decide which way to round and use the thousands column instead of the hundreds column.

Key questions

- What is the multiple of 1,000 before/after _____ ?
- Which multiple of 1,000 is _____ closer to? How do you know?
- Which numbers rounded to the nearest 1,000 result in zero?
- Which place value column do you need to look at to decide which multiple to round to?

Possible sentence stems

- The two multiples of 1,000 that the number lies between are _____ and _____

  _____ is closer to _____ than _____

  _____ rounded to the nearest 1,000 is _____

Single age small step links

- N/A

- Round to the nearest 1,000 (Y4)

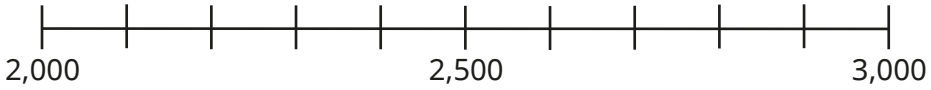
National Curriculum links

- Round any number to the nearest 10, 100 or 1,000 (Y4)

Round to the nearest 1,000

Key learning

- Use the number line to help you complete the sentences.



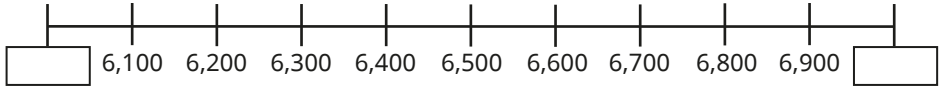
  - 2,400 is closer to _____ than _____

    2,400 rounded to the nearest 1,000 is _____

  - 2,859 is closer to _____ than _____

    2,859 rounded to the nearest 1,000 is _____

- Complete the number line.



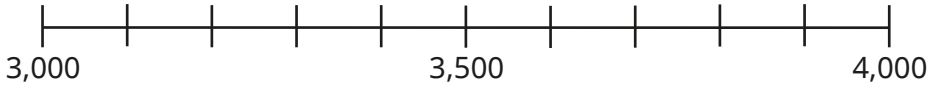
  - Draw an arrow to show 6,250 on the number line.

    6,250 rounded to the nearest 1,000 is _____

  - Draw an arrow to show 6,980 on the number line.

    6,980 rounded to the nearest 1,000 is _____

- Use the number line to help you complete the sentences.



  - 3,430 is closer to _____ than _____

    3,430 rounded to the nearest 1,000 is _____

  - 3,602 is closer to _____ than _____

    3,602 rounded to the nearest 1,000 is _____

  - 3,500 is the same distance from _____ as it is from _____

    3,500 rounded to the nearest 1,000 is _____

- Round each number to the nearest 1,000

1,460	7,300	265	9,678	4,444

- Which numbers round to 7,000 to the nearest 1,000?

7,099 **5,094** **6,999** **7,250** **8,750** **7,631**

Round to the nearest 1,000

Reasoning and problem solving

Each of the numbers round to 5,000 to the nearest 1,000

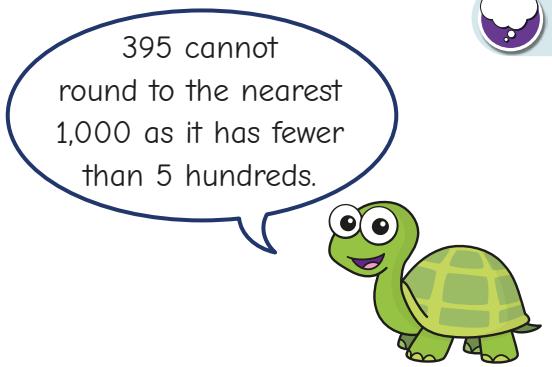
4,__03 4,9__1 5,19__

4,67__ 5,3__8 4,__82

The same digit is missing from each number.

What could the missing digit be?

5, 6, 7, 8 or 9



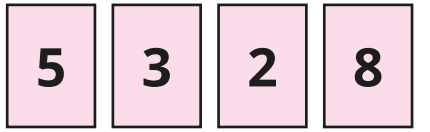
Do you agree with Tiny?

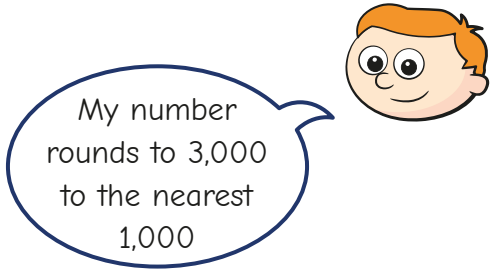
Explain your answer.

No

395 rounded to the nearest 1,000 is zero.

Ron uses the cards to make a 4-digit number.





What number could Ron have made?

Is there more than one possibility?

2,538

2,583

2,835

2,853

3,258

3,285

Round to the nearest 10, 100 or 1,000

Notes and guidance

In this small step, children round to the nearest 10, 100 or 1,000, choosing the appropriate columns to look at.

Discuss with children what is the same and what is different when rounding numbers to the nearest 10, 100 or 1,000. Ensure children understand that when asked to round to a given number, they need to look at the place value column to the right of that of the required accuracy to decide whether to round to the previous or next multiple. It is worth discussing with children when each degree of accuracy is more appropriate.

As with previous steps, encourage children to use number lines to support them when rounding to the nearest 10, 100 or 1,000, particularly Year 3 children, who may struggle to visualise the previous and next multiple.

Things to look out for

- When rounding numbers to different degrees of accuracy, children may look at the incorrect place value column(s).
- When rounding the same number to different degrees of accuracy, children may not always use the starting number but, for example, round it to the nearest 10, then round this value to the nearest 100 and so on.

Key questions

- What is the multiple of 10/100/1,000 before/after _____ ?
- Which multiple of 10/100/1,000 is _____ closer to? How do you know?
- What is the same and what is different about rounding to the nearest 10, 100 or 1,000?

Possible sentence stems

- The two multiples of 10/100/1,000 that the number lies between are _____ and _____

  _____ is closer to _____ than _____

  _____ rounded to the nearest 10/100/1,000 is _____

Single age small step links

- N/A

- Round to the nearest 10, 100 or 1,000 (Y4)

National Curriculum links

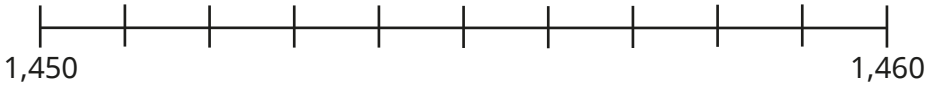
- Round any number to the nearest 10, 100 or 1,000 (Y4)

Round to the nearest 10, 100 or 1,000

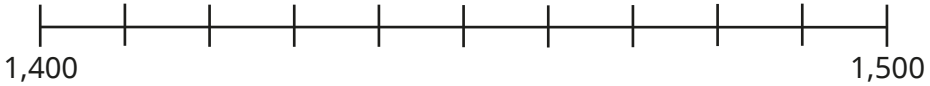
Key learning

- Draw an arrow to mark 1,452 on each number line.

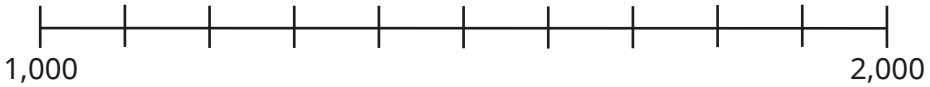
  Complete the sentences.



  1,452 rounded to the nearest 10 is _____

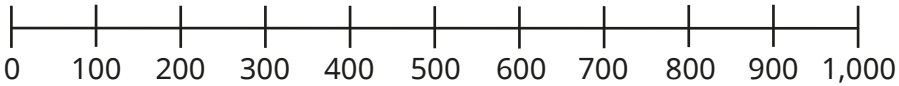


  1,452 rounded to the nearest 100 is _____



  1,452 rounded to the nearest 1,000 is _____

- Use the number line to help you complete the sentences.



  368 rounded to the nearest 10 is _____

  368 rounded to the nearest 100 is _____

  368 rounded to the nearest 1,000 is _____

- Complete the table.

Number	3,691	854	8,062	5,555
Rounded to the nearest 10				
Rounded to the nearest 100				
Rounded to the nearest 1,000				

- Complete the sentences.

  3,999 rounded to the nearest 10 is _____

  3,999 rounded to the nearest 100 is _____

  3,999 rounded to the nearest 1,000 is _____

  What do you notice?

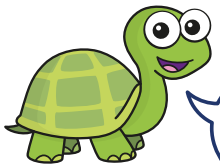
- A baker uses 2,753 g of sugar.

  Round the mass of sugar to the nearest 10 g, 100 g and kilogram.

  Which do you think is the most appropriate way of rounding the number? Why?

Round to the nearest 10, 100 or 1,000

Reasoning and problem solving



3,824 rounded to the nearest 100 is 4,000

What mistake has Tiny made?

What is the correct answer?

Tiny has rounded to the nearest 1,000 instead of the nearest 100

3,800

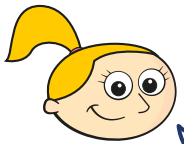
Would you round to the nearest 10, 100 or 1,000?

number of people at a music concert

number of people on a bus

number of books in a school library

Discuss this as a class.



Eva

My number rounds to 2,000 when rounded to the nearest 10, 100 or 1,000

My number also rounds to 2,000 when rounded to the nearest 1,000

Mo

But it rounds to 1,500 when rounded to the nearest 10 or 100

What could Eva and Mo's numbers be?

Compare answers with a partner.

Eva's number could be between 1,995 and 2,004

Mo's number could be between 1,500 to 1,504

Roman numerals

Notes and guidance

This small step introduces children to Roman numerals and the Roman number system. They learn that I represents 1, V represents 5, X represents 10, L represents 50 and C represents 100

Children explore the similarities and differences between the Roman number system and our number system, understanding that the Roman system does not have a zero and does not use placeholders.

By the end of this step, children should understand that numbers in the Roman number system follow these principles: letters are not usually written four times (for example, 4 is written as IV, instead of IIII and 40 is written as XL, instead of XXXX); if a lower value digit is written to the left of a higher value digit, it is subtracted (for example, IX = 10 – 1) and if it is written to the right, it is added (for example, XI = 10 + 1).

Children in Year 3 may spend more time focusing on Roman numbers to 12, using the context of a clock face, while children in Year 4 will look at Roman numerals to 100

Things to look out for

- Children may think that numbers like 99 can be written as IC instead of XCIX

Key questions

- What letters are used in the Roman number system?
- What rules do you use when converting numbers to Roman numerals?
- How do you know what order to write the letters in when using Roman numerals?

Possible sentence stems

- The letter _____ represents the number _____

Single age small step links

- Roman numerals to 12 (Y3)
- Roman numerals (Y4)

National Curriculum links

- Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks (Y3)
- 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 (Y4)

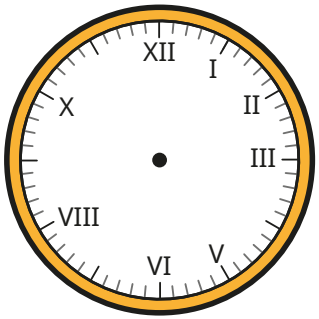
Roman numerals

Key learning

- Match the numbers to the Roman numerals.

1	2	3	4	5	6	10	12
II	V	VI	X	I	XII	III	IV

- Write Roman numerals to complete the clock face.

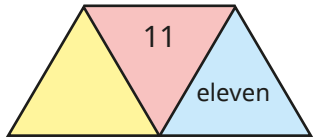


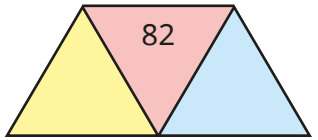
- Four numbers are written in Roman numerals.

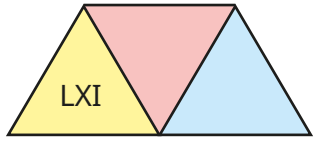
XL	XXI	LXXVI	XCV

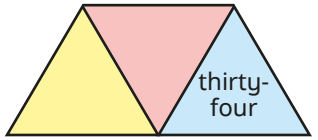
What are the numbers?

- Each diagram should show a number in numerals, words and Roman numerals. Complete the diagrams.









- Complete the calculations.
  - L + L = _____
  - IX + VII = _____
  - C – XX = _____
  - X × V = _____

- Write <, > or = to complete the statements.

99 ◯ C 11 ◯ IX C – L ◯ L

LX ◯ XL 7 + 5 ◯ XII XCIX ◯ C

Roman numerals

Reasoning and problem solving

Tiny writes the number 9 in Roman numerals.

VIIII

Explain Tiny's mistake.

Write the number 9 in Roman numerals.

IX

Work out the calculation, giving your answer in Roman numerals.

LXXII + XXVIII

Use Roman numerals to make up some other calculations that have the same answer.

C

multiple possible answers, e.g.

X × X

XC + X

XXV × IV

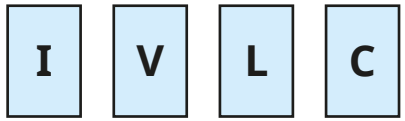
Is the statement true or false?

XXX + III = XXXIII, so
XXXIII + XXXIII = XXXIIIXXXIII

Explain your answer.

False

Which of these Roman numerals is never written to the left of X?



V