Autumn Scheme of Learning

Year 1

#MathsEveryoneCan

2019-20

White Rose Maths

Contents

Welcome

Welcome to the White Rose Maths' new, more detailed schemes of learning for 2019-20.

We have listened to all the feedback over the last 2 years and as a result of this, we have made some changes to our primary schemes. *They are bigger, bolder and more detailed than before.*

The new schemes still have the *same look and feel* as the old ones, but we have tried to provide more detailed guidance. We have worked with enthusiastic and passionate teachers from up and down the country, who are experts in their particular year group, to bring you additional guidance. *These schemes have been written for teachers, by teachers.*

We all believe that every child can succeed in mathematics. Thank you to everyone who has contributed to the work of White Rose Maths. It is only with your help that we can make a difference.

We hope that you find the schemes of learning helpful. As always, get in touch if you or your school want support with any aspect of teaching maths.

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

Thanks from the White Rose Maths Team
#MathsEveryoneCan

White Rose Maths contact details

support@whiterosemaths.com
@WhiteRoseMaths
White Rose Maths

What's included?

Our schemes include:

- Small steps progression. These show our blocks broken down into smaller steps.
- Small steps guidance. For each small step we provide some brief guidance to help teachers understand the key discussion and teaching points. This guidance has been written for teachers, by teachers.
- A more integrated approach to fluency, reasoning and problem solving.
- Answers to all the problems in our new scheme.
- This year there will also be updated assessments.
- We are also working with Diagnostic Questions to provide questions for every single objective of the National Curriculum.

How to use the small steps

We were regularly asked how it is possible to spend so long on particular blocks of content and National Curriculum objectives.

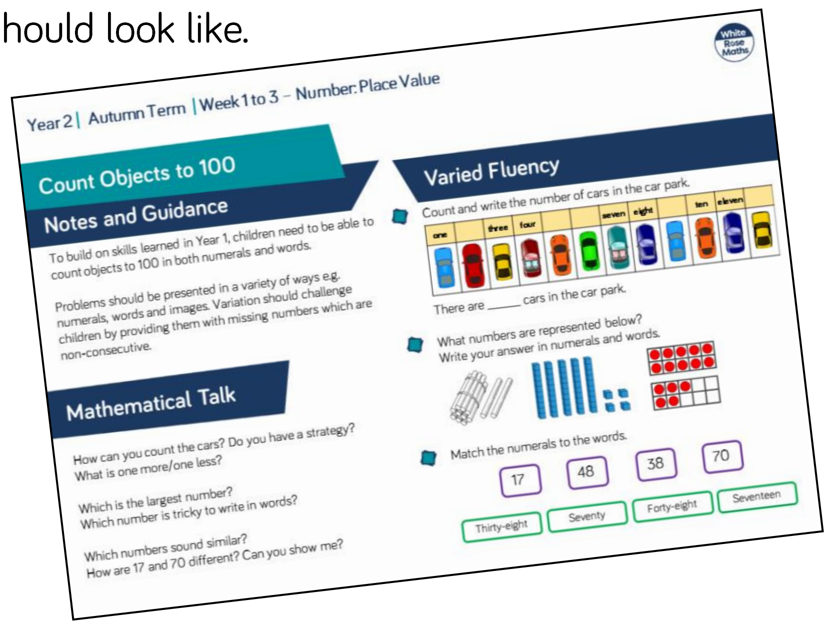
We know that breaking the curriculum down into small manageable steps should help children understand concepts better. Too often, we have noticed that teachers will try and cover too many concepts at once and this can lead to cognitive overload. In our opinion, it is better to follow a small steps approach.

As a result, for each block of content we have provided a "Small Step" breakdown. We recommend that the steps are taught separately and would encourage teachers to spend more time on particular steps if they feel it is necessary. Flexibility has been built into the scheme to allow this to happen.

Teaching notes

Alongside the small steps breakdown, we have provided teachers with some brief notes and guidance to help enhance their teaching of the topic. The "Mathematical Talk" section provides questions to encourage mathematical thinking and reasoning, to dig deeper into concepts.

We have also continued to provide guidance on what varied fluency, reasoning and problem solving should look like.



Teaching for Mastery

These overviews are designed to support a mastery approach to teaching and learning and have been designed to support the aims and objectives of the new National Curriculum.

The overviews:

- have number at their heart. A large proportion of time is spent reinforcing number to build competency
- ensure teachers stay in the required key stage and support the ideal of depth before breadth.
- ensure students have the opportunity to stay together as they work through the schemes as a whole group
- provide plenty of opportunities to build reasoning and problem solving elements into the curriculum.

For more guidance on teaching for mastery, visit the NCETM website:

https://www.ncetm.org.uk/resources/47230

Concrete - Pictorial - Abstract

We believe that all children, when introduced to a new concept, should have the opportunity to build competency by taking this approach.

Concrete – children should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.

Pictorial – alongside this children should use pictorial representations. These representations can then be used to help reason and solve problems.

Abstract – both concrete and pictorial representations should support children's understanding of abstract methods.

Need some CPD to develop this approach? Visit www.whiterosemaths.com for find a course right for you.

Supporting resources

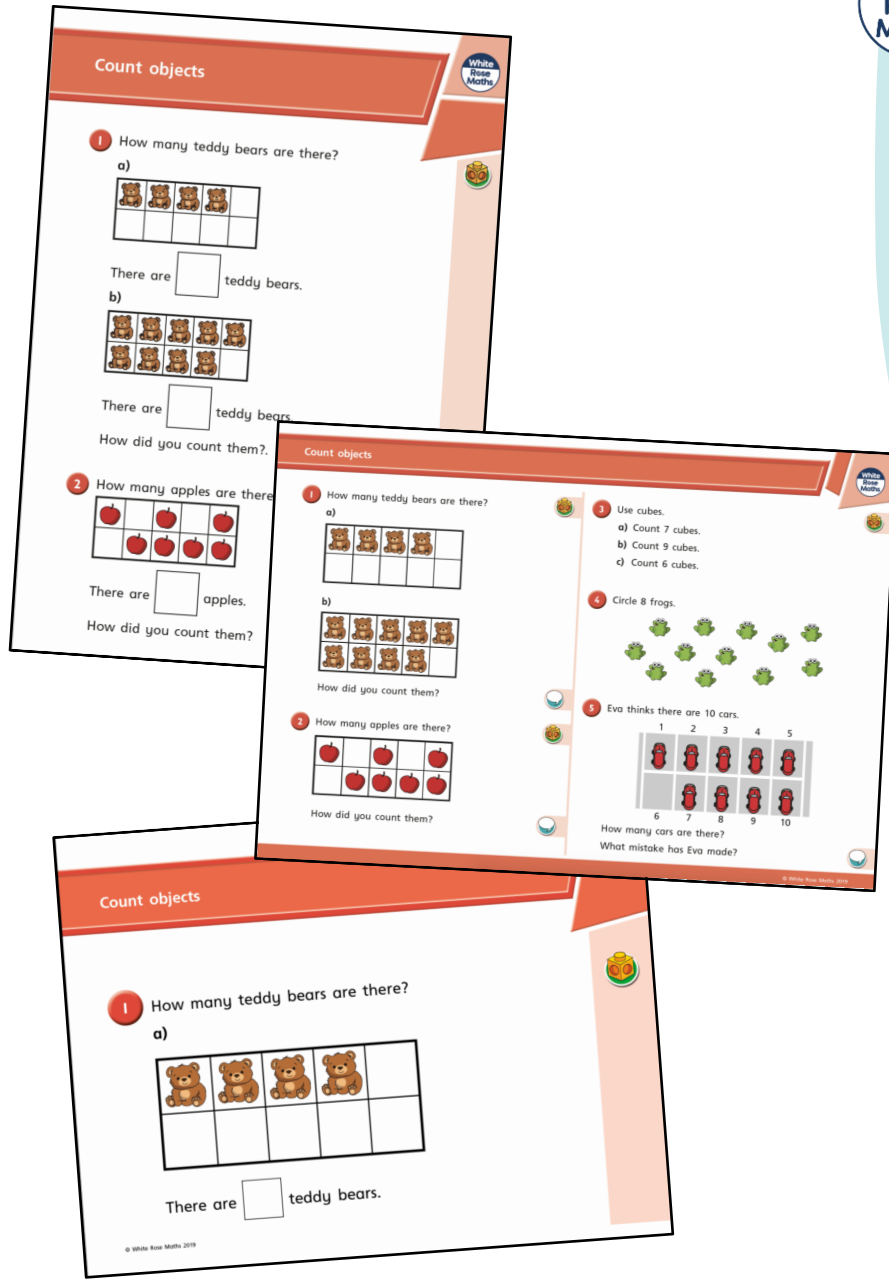
NEW for 2019-20!

We have produced supporting resources for every small step from Year 1 to Year 8.

The worksheets are provided in three different formats:

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

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



Training

White Rose Maths offer a plethora of training courses to help you embed teaching for mastery at your school.

Our popular JIGSAW package consists of five key elements:

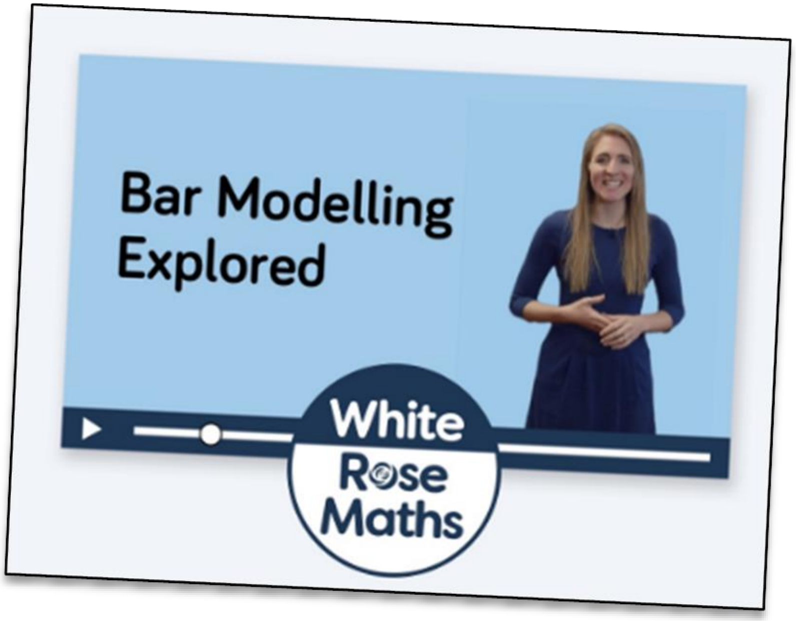
- CPA
- Bar Modelling
- Mathematical Talk & Questioning
- Reasoning & Problem Solving
- Thinking through Variation

For more information and to book visit our website www.whiterosemaths.com

NEW for 2019-20!

We have made the above courses available in a digital format. You can now have CPD whenever you want, wherever you want in easy to digest bite size chunks.

Find out more at www.resources.whiterosemaths.com



FAQs

If we spend so much time on number work, how can we cover the rest of the curriculum?

Children who have an excellent grasp of number make better mathematicians. Spending longer on mastering key topics will build a child's confidence and help secure understanding. This should mean that less time will need to be spent on other topics.

In addition, schools that have been using these schemes already have used other subjects and topic time to teach and consolidate other areas of the mathematics curriculum.

Should I teach one small step per lesson?

Each small step should be seen as a separate concept that needs teaching. You may find that you need to spend more time on particular concepts. Flexibility has been built into the curriculum model to allow this to happen. This may involve spending more than one lesson on a small step, depending on your class' understanding.

How do I use the fluency, reasoning and problem solving questions?

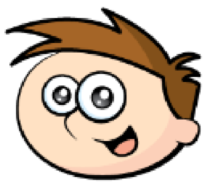
The questions are designed to be used by the teacher to help them understand the key teaching points that need to be covered. They should be used as inspiration and ideas to help teachers plan carefully structured lessons.

How do I reinforce what children already know if I don't teach a concept again?

The scheme has been designed to give sufficient time for teachers to explore concepts in depth, however we also interleave prior content in new concepts. E.g. when children look at measurement we recommend that there are lots of questions that practice the four operations and fractions. This helps children make links between topics and understand them more deeply. We also recommend that schools look to reinforce number fluency through mental and oral starters or in additional maths time during the day.

Meet the Characters

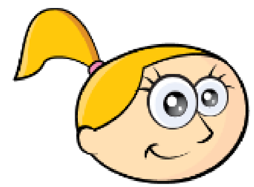
Children love to learn with characters and our team within the scheme will be sure to get them talking and reasoning about mathematical concepts and ideas. Who's your favourite?



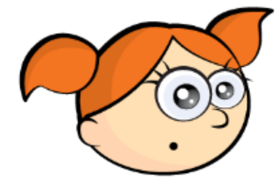
Teddy

Rosie

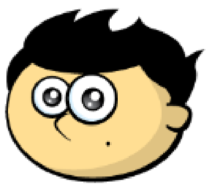
Mo



Eva

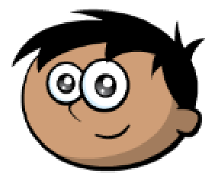


Alex

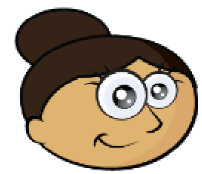


Jack

Whitney



Amir



Dora

Tommy

Dexter

Ron

Annie

<table>
<tr><th></th><th>Week 1</th><th>Week 2</th><th>Week 3</th><th>Week 4</th><th>Week 5</th><th>Week 6</th><th>Week 7</th><th>Week 8</th><th>Week 9</th><th>Week 10</th><th>Week 11</th><th>Week 12</th></tr>
<tr><td>Autumn</td><td colspan="4">Number: Place Value (within 10)</td><td colspan="4">Number: Addition and Subtraction (within 10)</td><td>Geometry: Shape</td><td colspan="2">Number: Place Value (within 20)</td><td>Consolidation</td></tr>
<tr><td>Spring</td><td colspan="4">Number: Addition and Subtraction (within 20)</td><td colspan="3">Number: Place Value (within 50) (Multiples of 2, 5 and 10 included)</td><td colspan="2">Measurement: Length and Height</td><td colspan="2">Measurement: Weight and Volume</td><td>Consolidation</td></tr>
<tr><td>Summer</td><td colspan="3">Number: Multiplication and Division (Reinforce multiples of 2, 5 and 10 to be included)</td><td colspan="2">Number: Fractions</td><td>Geometry: Position and Direction</td><td colspan="2">Number: Place Value (within 100)</td><td>Measurement: Money</td><td colspan="2">Measurement: Time</td><td>Consolidation</td></tr>
</table>

White Rose Maths

Autumn - Block 1

Place Value

Overview

Small Steps

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

NC Objectives

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

Count, read and write numbers to <u>10</u> in numerals and words.

Given a number, identify one more or one less.

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

Sort Objects

Notes and Guidance

Children need to sort groups by characteristics before they count. Children should be encouraged to sort objects into groups in a variety of ways, for example, sorting a group of children into girls and boys or sorting counters by colour.

Children should be encouraged to line sorted objects up to link to the early representations of bar models.

Mathematical Talk

How can you sort the objects?

Are there any different ways they could be sorted?

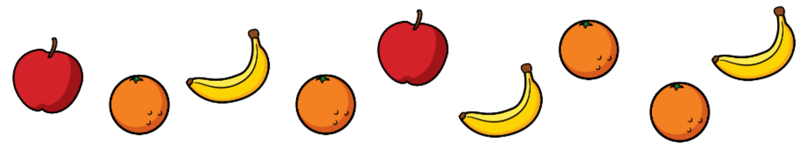
How have you grouped the objects?

How do you think these objects have been grouped?

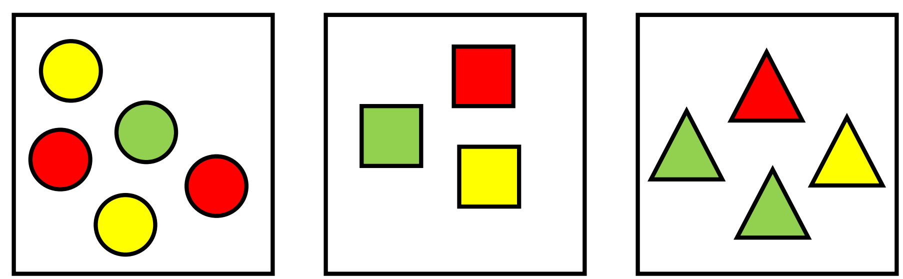
Can there be more than 2 groups?

Varied Fluency

- Sort the fruit into groups and explain how you have sorted them.



- How many ways can you sort the children into groups?

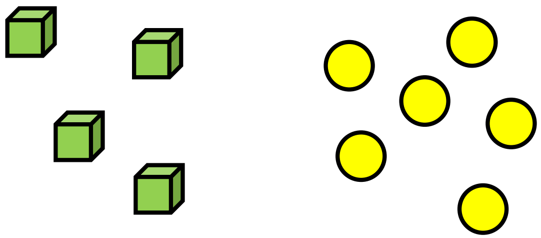
- 

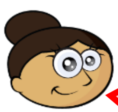
How have these objects been grouped?
How else could you group them?

Sort Objects

Reasoning and Problem Solving

Two children are discussing how some objects have been sorted.





Dora

These objects have been sorted into cubes and counters.

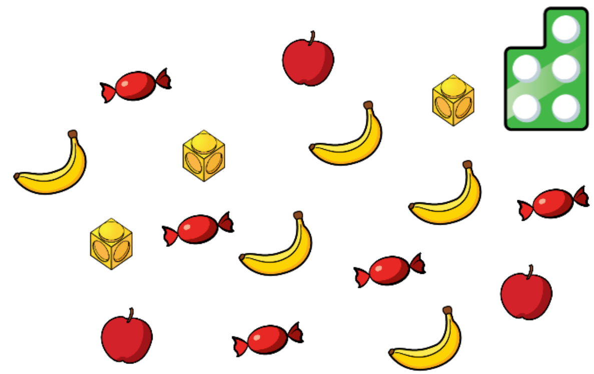
These objects have been sorted into green and yellow.

Jack

Who is correct? Convince me.

Both children could be correct as all of the cubes are green and all of the counters are yellow so it could have been sorted as either cubes and counters or green and yellow.

How many different ways can the objects be grouped?



They could be sorted into:

- Colours
- Food and not food
- 5s and 1s

Count Objects

Notes and Guidance

Once objects are sorted, children begin to count from 1 to 10 to work out how many there are.
It is important that they count one object at a time and that they understand the last number they count is the total amount.
Children should be encouraged to place the objects in a line to improve accuracy when counting. They should also be exposed to what zero looks like.

Mathematical Talk

Line up the objects. Is it easier to count now? Why?

What does one ______ represent?

What number will we say first when we are counting? Why?

How many are there in total?

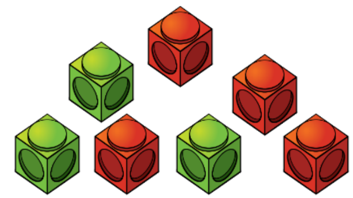
When would we count 0?

What does zero look like?

Can you show me a group of zero?

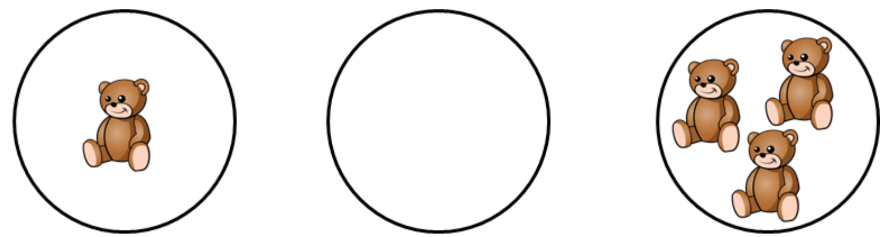
Varied Fluency

- How many red cubes and how many green cubes are there?



There are ______ red cubes.
There are ______ green cubes.
There are ______ cubes altogether.

- Match the numbers to the correct amount of teddies.



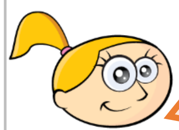
3 1 0

- Group the items, and then count how many there are in each group. Compare your groups with a partner's.

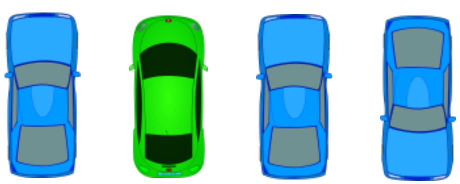
Count Objects

Reasoning and Problem Solving

Eva has grouped these cars into 3 groups.



One group has 3 cars.
One group has 1 car.
One group has no cars.



How could Eva have grouped the cars?

Eva could have grouped the cars by colour e.g. Blue cars, green cars and red cars. There would be zero cars in the red group.

Eva could have grouped the cars by the way they are facing e.g. Facing forward, facing backwards and facing sideways. There would be zero cars in the sideways group.

How many different ways can you find to group the objects and find the total?

They can be grouped by:

- Colour
- Ringed & not ringed
- Sprinkles and no sprinkles.

There are 9 doughnuts in total.

Represent Objects

Notes and Guidance

Children learn that one object can be represented by another. For example, one elephant can be represented by one cube or counter.
Children can also pictorially represent an object to aid understanding. The use of zero is important so children understand what zero means.
Although the use of numerals is modelled here, you could also introduce the written word too.

Mathematical Talk

How can the five frame help you to count the objects?

Can you write the number 3 in words?

How many ways can you draw 3?

Do we always have to use counters to show an amount?

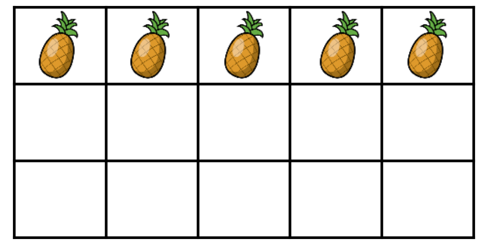
What can we use to represent the ______?

What does each ______ represent?

How many different ways can we represent ______?

Varied Fluency

- Using counters, show how many pineapples there are, then write the numerals for each.



- How many whales can you see on the wrapping paper?
Place counters on the whales to help you.
What else can you count?
Which animal is represented the most?
Which animal is represented the least?

- Complete the table.

Picture	Draw It	Number	Write It
			

Represent Objects

Reasoning and Problem Solving

How many ways can you represent 6 apples?

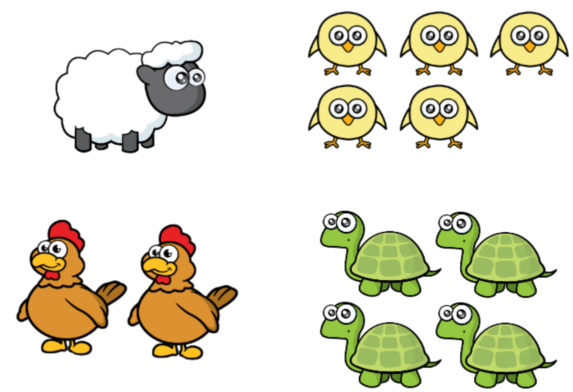
Can you show me fewer than 4 sweets? How many ways can you do this?

How can you show me that there are more green cars than blue cars?

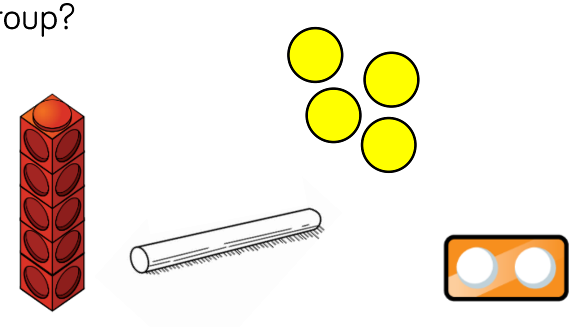
Children could line up 6 counters/cubes.

Children could line up 3, 2, 1 or get zero counters.

Children could get 1 blue cube and 2 green cubes etc.



Which representation matches which group?



Explain how you know.

Cubes represent chicks.
Counters represent turtles.
The number shape represents the hens.
The straw represents the sheep.

Count Forwards

Notes and Guidance

Children develop counting to continue a number sequence forwards. Problems should be presented in a variety of ways e.g. numerals, words and images. Children should be able to find consecutive and non-consecutive missing numbers in sequences.
When counting a set of objects, children need to be able to visualise what zero looks like and know that this comes before one.

Mathematical Talk

What can we use to represent the strawberries?

Do we always have to count from 0 or 1?

Can anything in our classroom help you with the words? (on a number line/working wall ensure words are matched with the numeral)

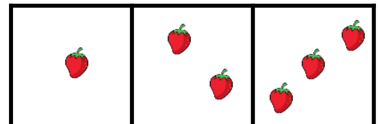
Are the numbers getting greater or smaller?

What is the next number?

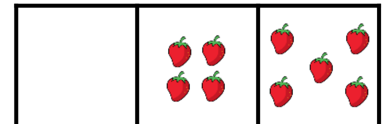
Can you use the resources or images to help you count?

Varied Fluency

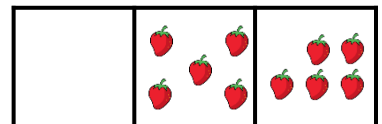
Complete the number tracks.



1	2	



Three		Five



4	5	

Complete the number tracks.

1		3	4	5	6		8	9	10

one		three	four	five	six		eight	nine	ten

Fill in the missing numbers.

____, 1, 2, 3

3, 4, ____, 6

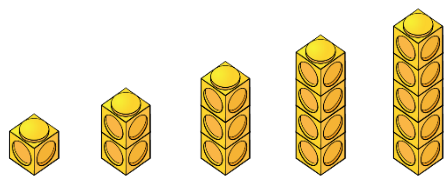
1, ____, 3, ____

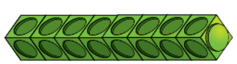
six, ________, ________, nine

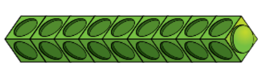
Count Forwards

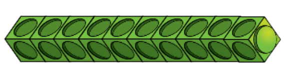
Reasoning and Problem Solving

Spot the mistakes, and correct the sequences.

- 0, 2, 3, 4, 5
- 

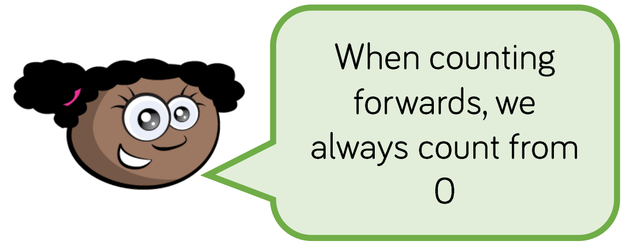
  0 1 2 3 4
- 1 

  2 

  3 

- Missed out '1' The sequence should be 0, 1, 2, 3, 4, 5
- The sequence starts from 0 whereas the number of cubes starts from 1
- The number of cubes doesn't match the sequence.

Whitney says,



Do you agree?
Explain why.

Whitney is wrong, we can start counting forwards from any number.

Count Backwards

Notes and Guidance

Children develop counting to continue a number sequence backwards. Problems should be presented in a variety of ways, e.g. numerals, words and images.

Children should continue sequences, and also find consecutive and non-consecutive missing numbers in sequences.

Mathematical Talk

How can we use our counting skills?

Do we always have to start at 10 when counting backwards?

Will all the boxes have dots in?

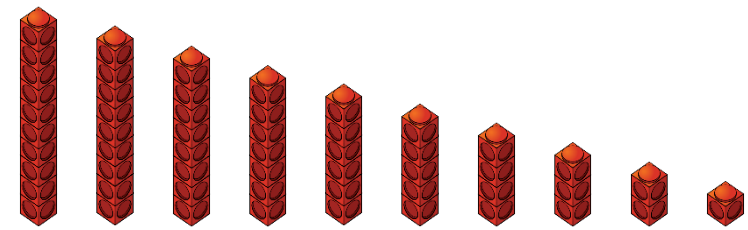
Are the numbers getting greater or smaller?

What comes before ____?

Can you use the manipulatives and images to help you count?

Varied Fluency

- Write the numerals to match the cubes.
  Can you describe the pattern?

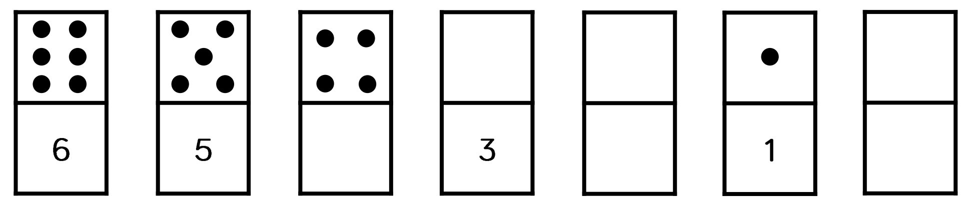


- Complete the number tracks.

10		8	7	6			3	2	1

ten	nine	eight		six		four	three	two	

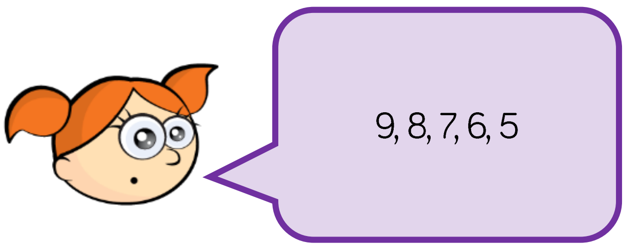
- Fill in the empty boxes.



Count Backwards

Reasoning and Problem Solving

Alex is counting.



How do you know that Alex is counting backwards?

Alex is counting backwards because the numbers are getting smaller.

Children could show this using concrete manipulatives.

How many different starting points could you have if you wanted to count backwards and stop at 3?

There are 7 different possibilities within 10

10, 9, 8, 7, 6, 5, 4, 3

9, 8, 7, 6, 5, 4, 3

8, 7, 6, 5, 4, 3

7, 6, 5, 4, 3

6, 5, 4, 3

5, 4, 3

4, 3

Count One More

Notes and Guidance

Once children are confident placing numbers on a track, the language of one more can be introduced.
Children need to know that one more is the number after and they should use their counting skills or a number track to help them.
The use of a dice and dominoes should be used to reinforce subitising skills.

Mathematical Talk

How can counting help us with finding 1 more?

Where can one more than ______ be found on a number track?

What does one more mean?

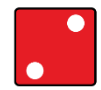
Will the number get greater or smaller? Why?

How can we show one more?

Do we need to count from 0 every time we find one more?

Varied Fluency

- Complete each box using a picture, a numeral and a word.



one more →

3 one more →

six one more →

- Roll a dice, represent the number using counters on a track, and add 1 more. Then complete the sentences.

1 more than ______ is ______

______ is one more than ______

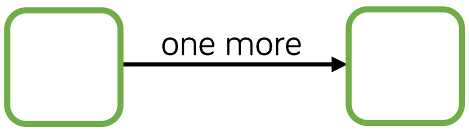
- Choose a number card from 0 to 9 then complete the table.

Number in numerals	Number in words	Number track
Sentence One more than ______ is ______		

Count One More

Reasoning and Problem Solving

Using number cards 0 to 10, how many different ways can you complete the boxes below?



Look to see if children are working systematically, e.g. 1 and 0, then 2 and 1 etc.

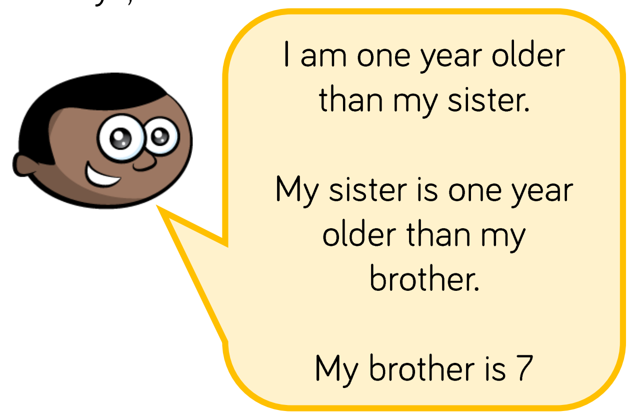
Teddy rolls the number that is 1 more than the dice below.

He says that he rolls 2

Explain his mistake.

2 is smaller than 3 and when we find one more the number gets bigger.

Mo says,



How old is Mo?
Who is the oldest?
Explain why.

His sister is 8 because she is one more than 7

Mo is 9 because he is one more than 8

Mo is the oldest because 9 is bigger than 7 and 8

Count One Less

Notes and Guidance

Children should relate one less to one more and understand that it is the opposite.

It should be made clear that 1 less is the number before the starting number.

The use of dice and dominoes should be used to reinforce subitising skills.

Mathematical Talk

How can counting help us with finding 1 less?

Where can 1 less than ______ be found on a number track?

What does one less mean?

Will the number get greater or smaller? Why?

How can we show one less?

Varied Fluency

- Complete each box using a picture, a numeral and a word.

 $\xrightarrow{\text{one less}}$ ☐

1 $\xrightarrow{\text{one less}}$ ☐

nine $\xrightarrow{\text{one less}}$ ☐

- Roll a dice, represent the number using counters on a track, and find 1 less. Then complete the sentences.

1 less than ______ is ______

______ is one less than ______

- Choose a number card from 1 to 10 then complete the table.

Number in numerals	Number in words	Number track
More than sentence		Less than sentence

Count One Less

Reasoning and Problem Solving

True or False?

One more than 7 is the same as 1 less than 9

Use a number track to help you.

Can you think of another statement like this?

It is true because one more than 7 is 8, and one less than 9 is also 8

Other example could be: 1 more than 5 and 1 less than 7 are the same.

Complete the sentence stems.

One less than 9 is ______

One less than ______ is 7

One less than ______ is 6

What pattern do you notice with the numbers?

What would the next sentence be?

8
8
7

The numbers are counting backwards and children should recognise that one less than any number is the number before it when counting.

The next sentence would be:
'one less than 6 is 5'

One-to-One Correspondence

Notes and Guidance

Children match one object with another. Children should be exposed to situations where there are too many, not enough or just the right amount.

Children do not need to know the exact difference between the groups.

Mathematical Talk

How can we show we've matched the objects/images?

What does match mean?

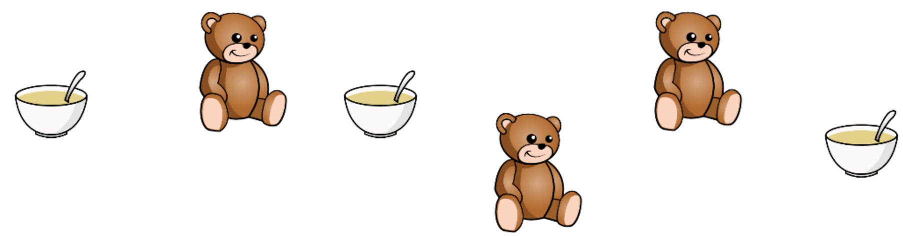
What can we use to represent the sweets, to show each person has one each?

Are there enough objects/images to match them all up?

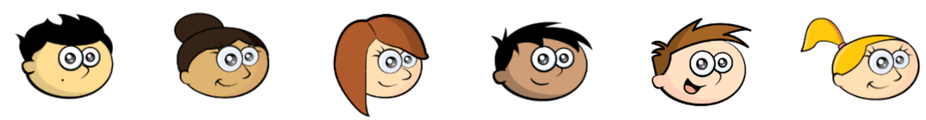
Are there any left over? Why has that happened?

Varied Fluency

- Are there enough bowls for the bears? Draw lines to check.



- Draw sweets for each child so they all get 1 each.



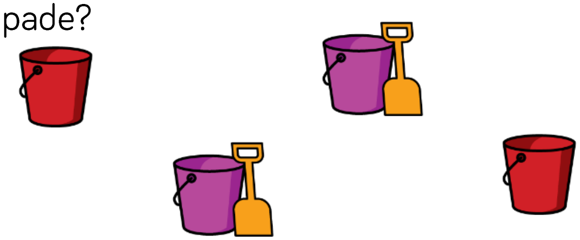
- Six children are going to the beach.
  Are there enough caps for everyone?

If not, how many more caps are needed?

One-to-One Correspondence

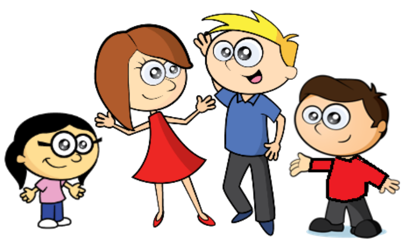
Reasoning and Problem Solving

There are four children going to the beach.
Can every child have a bucket and spade?



If not, why not?

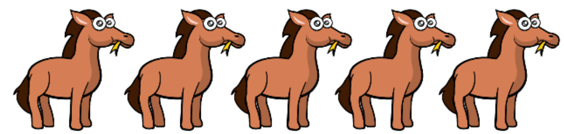
No, there are enough buckets for one each but not enough spades.

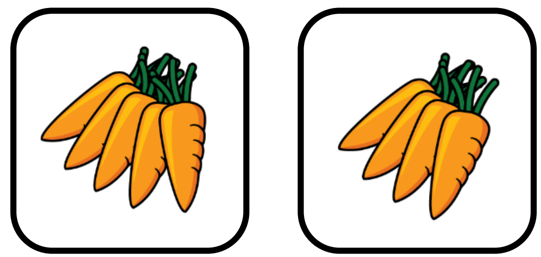


Can the family all travel in a 5 seater car?
Explain how you know.

Yes. There are 5 seats and 4 people.

Which group of carrots matches the number of horses?
Explain why.





There are 5 horses, so the box with 5 carrots in matches the horses.

Compare Objects

Notes and Guidance

Children use the language 'equal to', 'more', 'less', 'greater than', 'fewer' and 'less than' to compare groups of objects.

Children do not need to know the difference between the groups, just that one group is greater or less than another or that the groups are equal to each other.

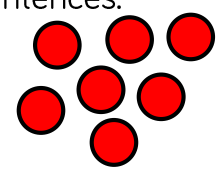
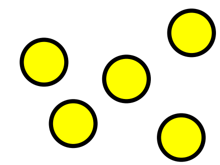
Mathematical Talk

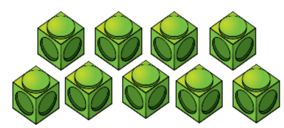
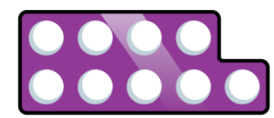
Can you compare the same objects using the word 'fewer' and then using the word 'more'?
Is there more than one answer?
How many answers can you find?
What do you notice about the numbers or amounts that are less than/fewer?
How can you tell which has the least/most?
What does 'more/greater than' mean?
What does 'less/fewer than' mean?
What does 'is equal to' mean?

Varied Fluency

- Circle the picture with more trees.

- Use **greater than**, **less than** or **equal to**, to complete the sentences.

 is ________________ 

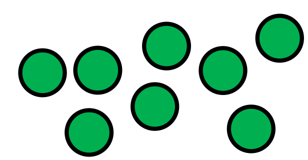
 is ________________ 

- Draw counters in the box to represent the sentence.

Eva's counters

Tommy's counters

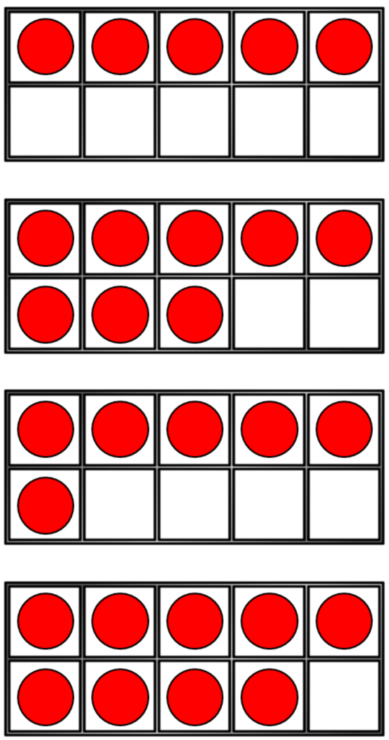
Eva has fewer counters than Tommy.



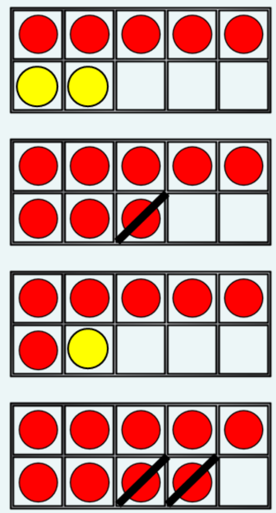
Compare Objects

Reasoning and Problem Solving

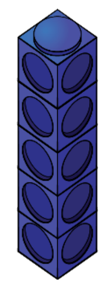
Move **three** counters so that all the ten frames show the **same** amount.



Create your own problem like this.



Whitney has this many cubes in one hand.



She has fewer cubes in the other hand.

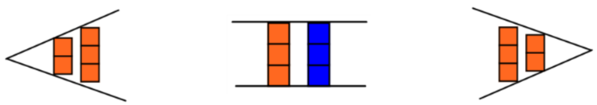
How many cubes could she have in her other hand?

She could have:
4 cubes
3 cubes
2 cubes
1 cube
0 cubes.

Introduce <, > and =

Notes and Guidance

Inequality symbols are not introduced in the National Curriculum until Year 2. However, it is a good opportunity to introduce them when working with smaller numbers and concrete materials.
For example:



Mathematical Talk

Which symbol shows 'greater than'?

Which symbol shows 'less than'?

Which symbol shows 'is equal to'?

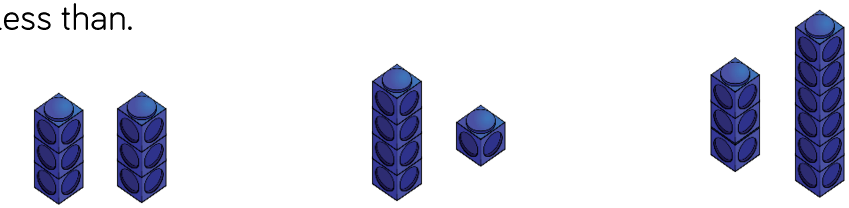
Is ______ greater than, less than or equal to ______?

How can we show that using words?

What can we use to represent the seven, to help us compare the two amounts?

Varied Fluency

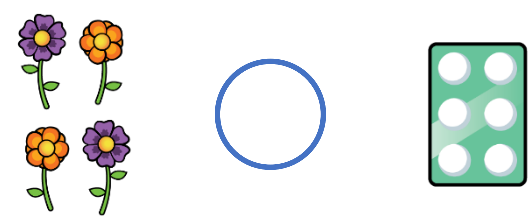
- Draw the symbols around the cubes to show greater than, equal to or less than.

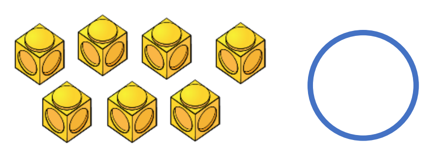


- Use cubes to show that,

$3 < 4$
$6 > 2$
$5 = 5$

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





Seven

Introduce <, > and =

Reasoning and Problem Solving

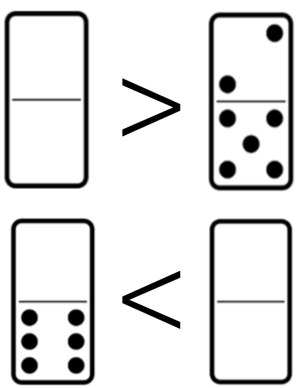
Circle all the numbers from the track that **cannot** go in the box. Explain why.

$6 < \boxed{}$

1	2	3	4	5	6	7	8	9

6, 5, 4, 3, 2, 1 because 6 < means '6 is less than', so the other number needs to be greater than 6

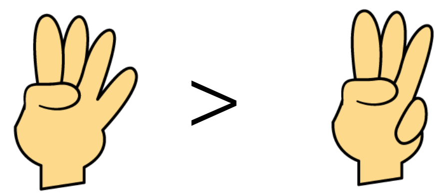
Complete the blank dominoes.



The first blank domino should have more than 7 dots.
The second blank domino should have 7 or more dots.

Game

- Both children make a fist.
- On 3, show some fingers.
- Use <, > or = to compare.



This game can be extended to develop fluency. To extend:

- Can we move places to change the sign?
- How can we change fingers to use the '=' sign?
- Can we use two hands each?

Compare Numbers

Notes and Guidance

Children use previous learning to choose an efficient method to compare numbers. They will use their understanding of a number's value to compare them.
Children may draw on prior knowledge such as counting, sorting, grouping etc. to help them compare.
Children should be given access to a variety of concrete resources and images to support them.

Mathematical Talk

What happens to the sign when you swap the numbers around?
Will zero always be the smallest?
What strategies did you use?
Which number is the largest? How do you know?
Which number is the smallest? How do you know?
Which symbol represents _____?
How can you describe these two numbers?

Varied Fluency

- Here are two number cards.

  9   4

  Use resources to make these numbers. Which is greater? Can you use a number track to check your answer?

1	2	3	4	5	6	7	8	9	10

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

  5 ◯ 6

  8 ◯ 1

  10 ◯ 0

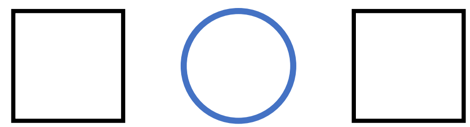
- Choose your own numbers to complete the statements.

  _____ < _____   _____ > _____   _____ = _____

Compare Numbers

Reasoning and Problem Solving

One of these statements is incorrect. Use cubes to prove which one. 8 > 4 7 < 10 3 > 6	3 > 6 is incorrect.
Using number cards 0 – 10, how many ways can you make the statement correct? ______ is more than ______	Numerous answers. Check if children are working at random or working systematically.

Children should roll two dice and fill in their total in blank boxes. They should then choose the correct inequality symbol to compare their numbers. 	

Order Objects

Notes and Guidance

Children should order three groups of objects. They should be exposed to different methods for comparing such as comparing two groups initially, and lining groups up.

Children should be introduced to the vocabulary ‘greatest’ and ‘smallest’ and begin to use it correctly.

Mathematical Talk

How did you compare the piles or groups?

How do you know group ______ is the greatest?

How do you know group ______ is the smallest?

Group ______ has the greatest amount of ______

Group ______ has the smallest amount of ______

Varied Fluency

- Grab a small handful of counters and put them in **three** piles. Order the piles from greatest to smallest.

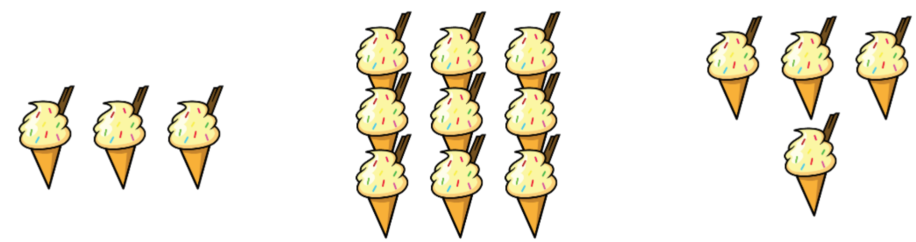
- Order the groups of cars from greatest to smallest.

Group 1 

Group 2 

Group 3 

- Complete the statements.



____ ice creams ____ ice creams ____ ice creams

The smallest amount of ice creams is ______
The greatest amount of ice creams is ______

Order Objects

Reasoning and Problem Solving

Whitney is ordering the amount of spots on these three ladybirds, from the greatest amount of spots to the least.

She says,

I can just compare the first two to work out the answer.

Do you agree? Explain why.

No, she needs to know how many spots are on the third ladybird to correctly place them all.

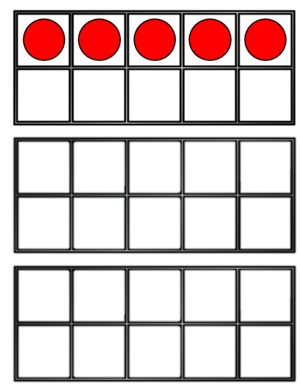
Jack has 6 sunflowers.
Rosie has more sunflowers than Jack.
Amir has more sunflowers than Rosie.

Who has the least amount of sunflowers?

Jack has the least amount of sunflowers.

Draw counters on the ten frames so that they are ordered from greatest to smallest.
How many ways can you find?

Greatest



Smallest

There are various solutions. Children could even add to the first ten frame which give even more combinations.

Order Numbers

Notes and Guidance

Children order numbers from smallest to greatest or greatest to smallest. Children should use concrete and pictorial representations to prove or check their answers.

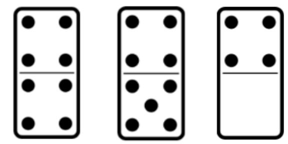
Children use the vocabulary 'smallest' and 'greatest' and may also use the $<$ or $>$ symbols to show the order of their numbers.

Mathematical Talk

Explain how you ordered the dominoes.
Can you use the inequality symbols to compare/order numbers?
How many answers are there? Can you prove it with cubes?
Which is/has the greatest? How do you know?
Which is/has the smallest? How do you know?
How are you going to order the amounts?
How have these objects/numbers been ordered? How do you know?

Varied Fluency

Order the dominoes from smallest to greatest.



Complete the sentences:
- The greatest number is ______
- ______ is the smallest number.

Order the number cards from smallest to greatest.

1 ten 7

- ______ is the greatest number.
- ______ is the smallest number.
- ______ is greater than ______
- ______ is smaller than ______

Use $<$ or $>$ to make the statement correct.

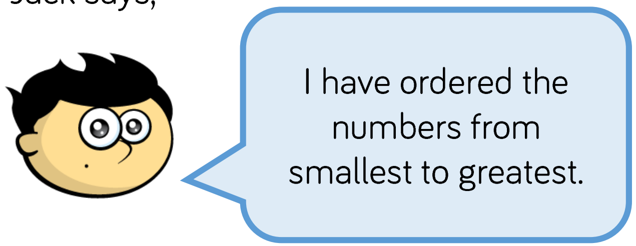
9 ◯ 8 ◯ 7

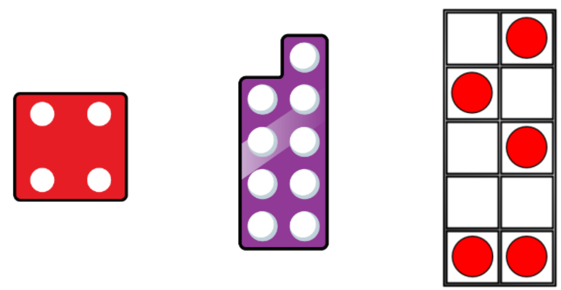
Order Numbers

Reasoning and Problem Solving

Use 10 cubes. Place them into 3 piles. Order the piles from greatest to smallest. How many different ways can you find?	Possible answers: 7, 2, 1 6, 3, 1 5, 3, 2 Etc.

Jack says,	Jack is incorrect because his ten frame isn't full, it only had 5 in it so this should be in the middle.





Do you agree with Jack?
Explain your reasoning.

Ordinal Numbers

Notes and Guidance

This is a non-statutory statement in the Year 1 curriculum. It has been included to see numbers as positional. It also links to previous lessons such as ordering numbers.

Stem sentences support children with using new mathematical language correctly.

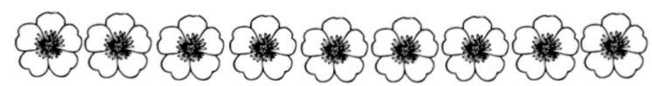
Mathematical Talk

When would I use 'last' place? Explain how you know.
How can you work out where ______ is?
When might we use ordinal numbers?
What does first mean?
Which is the first cube in the tower?
What does last mean?
Where is the last cube in the tower?
Is there always a first and last? Why?
Is there always a 4th? Why?

Varied Fluency

- Create a tower using different coloured cubes. Describe the order of the colours using 'first', 'second' 'third' and 'last' etc. Can you give your partner accurate instructions so that they can create the same tower?

- Colour the 7th flower blue. Start counting from the left.



Colour in another flower and complete the sentence.

The ______ flower is __________.

- Three children have a race.

Alex finishes first.
Amir finishes third.
What position does Whitney finish in?

Ordinal Numbers

Reasoning and Problem Solving

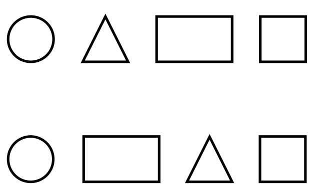
Two children have used the instructions to make a pattern.

> There are four shapes.
>
> The first is a circle.
>
> The last is a square.
>
> The other two shapes are a triangle and a rectangle.

Here are their patterns.

Amir

Dora



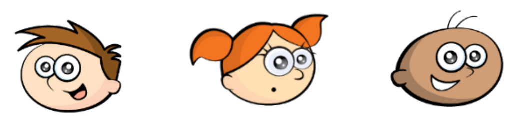
Who is correct?

They could both be correct because the instructions aren't clear, it doesn't state which order the middle two shapes need to be in.

Tommy, Teddy and Alex take part in a race.

The results are:

Teddy Alex Tommy



1st 2nd 3rd

Fill in the blanks:

Tommy finished behind ___________.

Teddy finished in front of ___________.

Alex finished in front of ___________ but behind ___________.

Tommy finished behind Teddy/Alex.

Teddy finished in front of Alex/Tommy.

Alex finished in front of Tommy but behind Teddy.

The Number Line

Notes and Guidance

Children will use a number line to practise and consolidate skills learnt so far. They should use the number line to:

- Count to 10
- See one more/one less
- See greater than/less than statements
- Order numbers

Using a number line gives children the opportunity to count from zero.

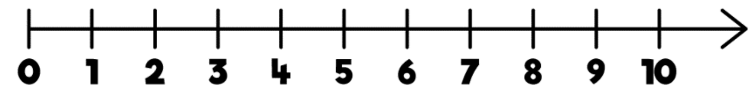
Mathematical Talk

Can you label the number line?
How do you know where to put the numbers?
How are numbers presented on a number line?
What does each mark on the number line represent?
Where does the number line start?
How did you choose where to put them?
Where does the number line end?
Do we have to start counting from 0 every time?
Which way will we 'jump' when we find one more/less?

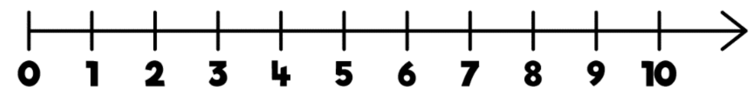
Varied Fluency

On the number line,

- Circle the number 7
- Underline a number **greater** than 7
- Draw an arrow to the number that is **one less** than 5
- Put a box around the **smallest** number.



How many jumps from zero is eight?



Is this more or less than the number of jumps to nine?

Write 5, 9 and 2 in the correct order on the number line.

The Number Line

Reasoning and Problem Solving

Game

Roll a die.

Place a counter on the number line covering the number shown by the die.

Work out how many jumps to 0 and how many to 10
Which is closer?

If you rolled a 6 and did three jumps, what numbers could you land on?

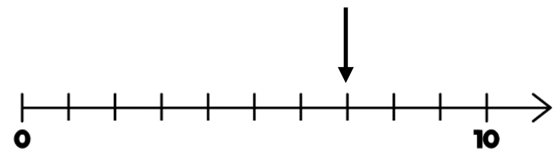
Can you roll a number where there are 7 and 3 jumps to 10 or 0?
Which numbers could they be?

Open ended. For example, if they roll a 4, they are 6 jumps from 10 and 4 from 0, so they are closer to 0

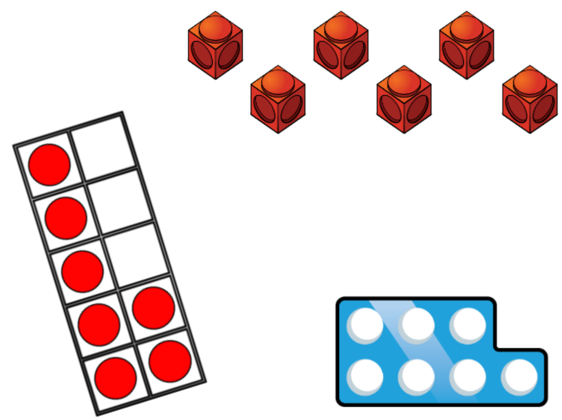
3 or 9 depending which way they jumped.

Children might work out this could be 3 or 7, but because there isn't a 7 on a dice it must be 3

Mo points to a number on the number line.



Which of these could **not** represent this number?



The cubes couldn't because there are only six of them and Mo has pointed to seven. The number piece and ten frame both show seven.

White Rose Maths

Autumn - Block 2

Addition & Subtraction

Overview

Small Steps

- Part-whole model
- Addition symbol
- Fact families – addition facts
- Find number bonds for numbers within 10
- Systematic methods for number bonds within 10
- Number bonds to 10
- Compare number bonds
- Addition – adding together
- Addition – adding more
- Finding a part
- Subtraction – taking away, how many left? Crossing out
- Subtraction – taking away, how many left? Introducing the subtraction symbol
- Subtraction – finding a part, breaking apart
- Fact families – the 8 facts
- Subtraction – counting back

NC Objectives

Represent and use number bonds and related subtraction facts <u>within 10</u>

Read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs.

Add and subtract one digit numbers <u>to 10</u>, including zero.

Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number problems.

Overview

Small Steps

- Subtraction – finding the difference
- Comparing addition and subtraction statements $a + b > c$
- Comparing addition and subtraction statements $a + b > c + d$

NC Objectives

Represent and use number bonds and related subtraction facts <u>**within 10**</u>

Read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs.

Add and subtract one digit numbers <u>to 10</u>, including zero.

Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number problems.

Part-whole Model

Notes and Guidance

Children need to understand that a number can be partitioned into two or more parts. This will help them with number bonds and addition.
They will be introduced to the part-whole model to show this concept clearly, and should get used to seeing it in different orientations.
Children should use and understand the language part, part, whole.

Mathematical Talk

What does whole mean?

What does part mean?

How can we represent the whole/parts?

Are the parts smaller or larger the more you partition them? Why?

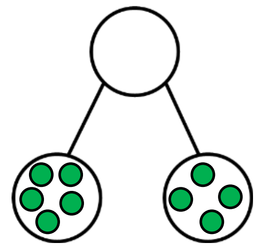
Can zero be a part?

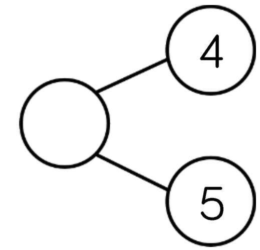
Can the parts be swapped around?

Can the whole be swapped with a part?

Varied Fluency

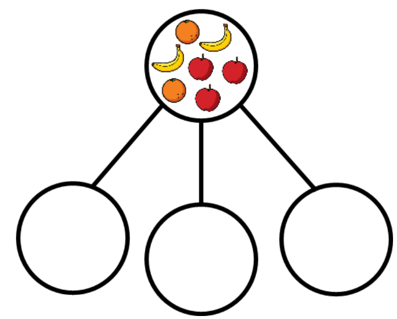
- Complete the part-whole models by drawing counters and then writing the numerals.





- Here are seven pieces of fruit.

Put the fruit into a part-whole model.
Complete the sentences.

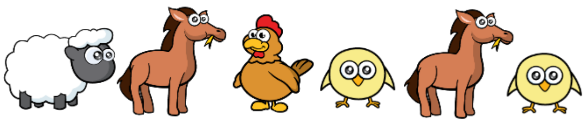


______ is the whole.
______ is a part, ______ is a part and ______ is a part.

- Draw the part-whole model that represents the stem sentences:
  - A part is 4
  - A part is 3
  - The whole is 7

Part-whole Model

Reasoning and Problem Solving

There are 6 animals.  How many different ways can you sort the animals? Complete a part-whole model for each way. Can you partition the animals into more than 2 groups?	Various answers. E.g. brown & not brown 4 legs & 2 legs Multiple groups could be the type of animal. Part-whole models should accurately represent children's sorting.
4 is the whole. How many **different** part-whole models can you draw to show this? Use different numbers for the parts every time. Are any the same? Why?	4 and 0, 0 and 4 1 and 3, 3 and 1 2 and 2 Children should recognise 4 and 0 and 0 and 4 being the same etc.

Work in groups of up to 8 children. Can you split yourselves into different groups? Think of different ways to group yourselves: hair colour, eye colour, gender, shoe size etc. Complete a part-whole model for each way. Can you partition into more than 2 groups?	Children may split themselves into groups in many different ways. E.g. hair colour, month of birth, shoe size, gender etc. Part-whole models should accurately represent children's sorting.

The Addition Symbol

Notes and Guidance

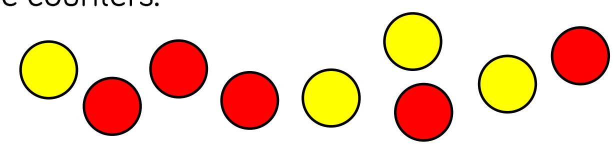
Children are introduced to the addition symbol ($+$) for the first time. They combine this with the 'equal to' symbol ($=$) to create their first number sentences e.g. $3 + 2 = 5$
At this stage, children focus on a specific order to the number sentence ($a + b = c$). They focus on the language associated with this number sentence. For example, 7 apples plus 3 apples is equal to 10 apples. First, then, now stories and bar models may help children understand the number sentences.

Mathematical Talk

How many were there at the start?
Then how many more were added?
What is the total?
What does the $=$ mean?
Which number tells us how many we had to start?
Which number shows what has been added?
Which number represents the total?
How many green cubes could we use?
How many yellow cubes could we use?
Which part do the cubes represent?

Varied Fluency

- Here are some counters.

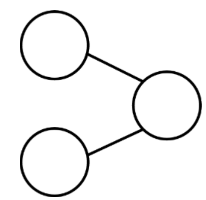


Group the counters by colour.
Fill in the gaps in the sentence and say it out loud.

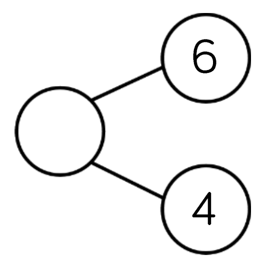
______ red counters plus ______ yellow counters is equal to ______ counters.

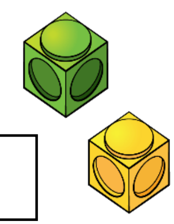
Complete the part-whole model and the number sentence.

$\square + \square = \square$



- Use cubes to solve the following calculations.



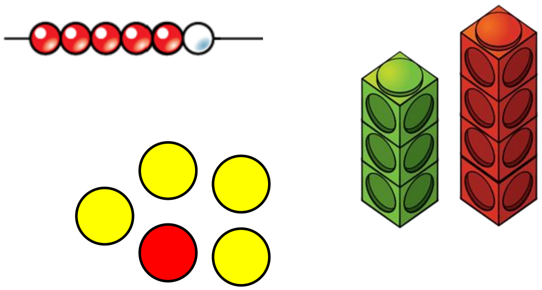


$5 + 3 = \square$

$8 + 1 = \square$

The Addition Symbol

Reasoning and Problem Solving



_____ + _____ = 6

Which of the images could help to complete the number sentence? Explain why.

Can you think of a number sentence for each of the other two images?

The bead string as there are 6 beads in total, 5 red and 1 white, so
$5 + 1 = 6$ or
$1 + 5 = 6$

The cubes could represent
$3 + 4 = 7$ or
$4 + 3 = 7$

The counters could represent
$4 + 1 = 5$ or
$1 + 4 = 5$

Using the numbers 0 – 9, how many ways can you fill in the boxes to make the calculation correct?
You can only use each number once.

$$\square + \square = \square$$

How many different calculations are there?

What do you notice?

Examples may include:
$5 + 1 = 6$
$3 + 4 = 7$
There are 32 in total.

Children should recognise that the parts can be swapped to create a difference number sentence. There should be a discussion as to why we haven't/can't include 0 in our calculations.

White Rose Maths

Fact Families – Addition Facts

Notes and Guidance

Children build on initial number sentences by looking at addition fact families. They can see that the order of an addition sentence can be varied, and they begin to discover that addition is commutative.

E.g. $3 + 2 = 5$ $\quad 2 + 3 = 5$

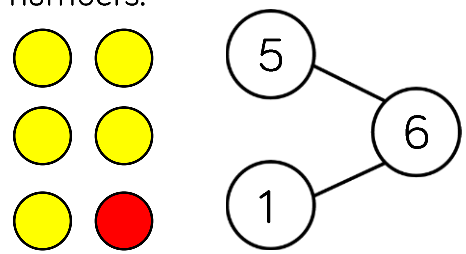
$5 = 3 + 2$ $\quad 5 = 2 + 3$

Mathematical Talk

Which number(s) represent a part?
Which number represents the whole?
Is the equals sign always at the end of a number sentence?
What's the same/different about the four addition sentences?
If two of the numbers in the part-whole model are the same, can we still write four addition sentences? Prove it.
Can we make another addition calculation using the same 3 numbers?
Can the parts change place? Can the whole change place? Why?

Varied Fluency

- Use the counters and the part-whole model to fill in the missing numbers.



1 + ___ = 6
___ + 1 = 6
___ = ___ + 1
6 = ___ + ___

- Complete the number sentences.

___ + ___ = 7 $\quad$ 7 = ___ + ___
___ + ___ = 7 $\quad$ 7 = ___ + ___

- Use the number cards to make 4 addition sentences.

4 $\quad$ 7 $\quad$ 3

Fact Families – Addition Facts

Reasoning and Problem Solving

Eva has 3 number cards.

3 5 2

She has written two number sentences.

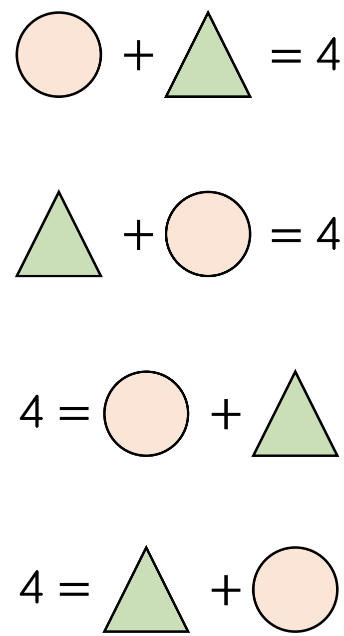
$3 + 5 = 2$ $3 = 5 + 2$

Explain what Eva has done wrong.

Correct her number sentences and complete the fact families.

Eva has placed the numbers in the order she was given them, rather than moving them to make the number sentence correct.

It should be:
$3 + 2 = 5$
$2 + 3 = 5$
$5 = 3 + 2$
$5 = 2 + 3$



What could the circle and the triangle be worth?

Possible answers:

Circle: 2
Triangle: 2

Circle: 3
Triangle: 1

Circle: 1
Triangle: 3

Circle: 0
Triangle: 4

Circle: 4
Triangle: 0

Number Bonds within 10

Notes and Guidance

Children combine their knowledge of the part-whole model and addition facts to explore number bonds within 10
Starting with the whole, children break numbers into parts and explore how many different ways a number can be partitioned.

E.g. $5 = 3 + 2$

$5 = 4 + 1$

Mathematical Talk

What is the whole?

What are the parts?

Does the whole always stay the same?

How can we partition the whole?

Do the parts stay the same or change?

If 8 is the whole, what could the parts be?

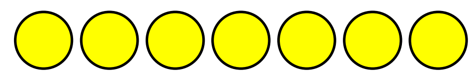
What number sentence would represent the parts we have partitioned the whole into?

Varied Fluency

- Here are 5 cubes.

Break them apart in different ways to find all the number bonds to 5
One has been done for you.

$5 = 3 + 2$

- Use seven double sided counters. 

How many different ways to make 7 can you find?
Record your findings in number sentences.

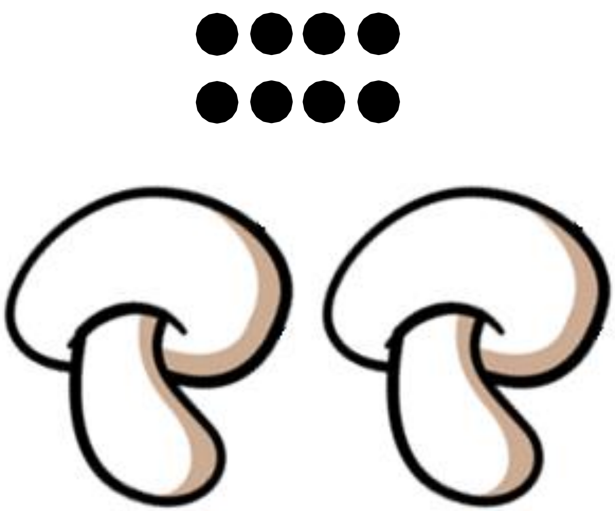
- If 9 is the whole, what could the parts be?

Show your findings in part-whole models.
Can you write an addition sentence for each part-whole model?

Number Bonds within 10

Reasoning and Problem Solving

All the dots have fallen off 2 toadstools.



How many different ways can you put them back on?

There are 9 different ways altogether.
8 and 0,
0 and 8,
7 and 1,
1 and 7,
6 and 2,
2 and 6,
5 and 3,
3 and 5
4 and 4

Always, Sometimes, Never

The greater the number, the more number bonds it has.

Sometimes.
Children can prove this by comparing the number bonds for a few numbers. For example, 6 has more bonds than 5, but 7 has an equal number of bonds to 5

Which number bond is the odd one out?

$3 + 4$ $5 + 2$ $6 + 1$ $3 + 5$

Explain your answer.

$3 + 5$ is the odd one out because this is a bond to 8 and the others are number bonds to 7

Systematic Number Bonds

Notes and Guidance

Children apply their partitioning skills to work systematically starting with the whole. E.g.

$7 + 0 = 7$
$6 + 1 = 7$
$5 + 2 = 7$
$4 + 3 = 7$

This is supported through the use of equipment, for example cubes, bead strings, double sided counters.

Mathematical Talk

What two numbers can be added together to make ______?

Write the number sentence to represent this number bond.

Are there any more ways to make this number bond?

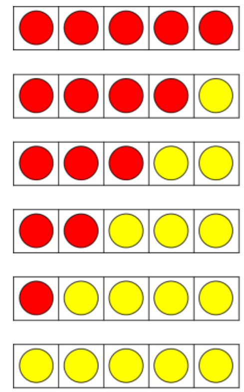
Can you see a pattern in the numbers?

What is happening to the parts each time?

Does the amount of number bonds change as the number gets bigger or smaller?

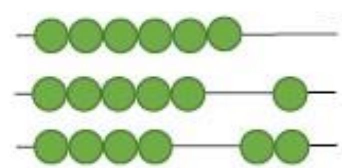
Varied Fluency

- Complete the number sentences.



$5 = 5 + 0$
$5 = 4 + 1$
__ = __ + __
__ = __ + __
__ = __ + __
__ = __ + __

- Complete the next bead strings in the sequence.



$6 = 6 + 0$
$6 = 5 + 1$
$6 = 4 + 2$

- Can you use a ten frame to show all the number bonds to 7? Remember to be systematic.

Systematic Number Bonds

Reasoning and Problem Solving

Jack found the following number bonds to 8

3 + 5   0 + 8

1 + 7   4 + 4

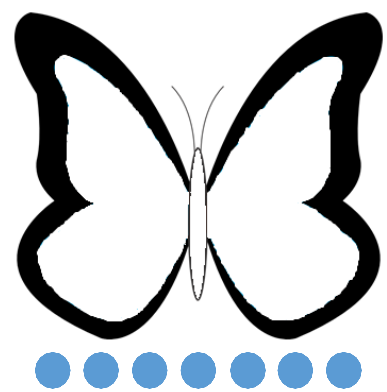
2 + 6

What order would Jack have found them in if he'd have worked systematically?

There are 9 different ways altogether.
8 and 0
0 and 8
7 and 1
1 and 7
6 and 2
2 and 6
5 and 3
3 and 5
4 and 4

A butterfly's spots have fallen off.
How many different ways can you put the spots back on?

Remember to be systematic.



Possible answers:

0 + 7 = 7

1 + 6 = 7

2 + 5 = 7

3 + 4 = 7

Children may choose to use:
7 + 0 = 7
6 + 1 = 7
5 + 2 = 7
4 + 3 = 7

Number Bonds to 10

Notes and Guidance

Focusing on the number 10, children use a variety of representations to explore number bonds to 10 systematically e.g. ten frames, bead strings, fingers.

The children should also see the number sentence alongside the representation to help further develop their conceptual understanding.

Mathematical Talk

What number have you started with?

How many more do I need to make 10?

How many number bonds can I make if 10 is the whole?

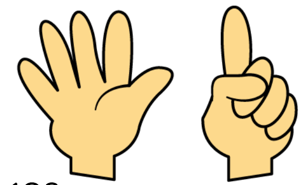
What would these bonds look like as a number sentence?

Can I order the number bonds systematically?

Do number bonds to 10 only contain one digit numbers?

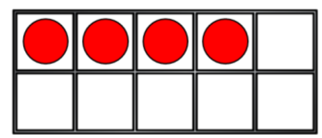
Varied Fluency

- Amir shows a number on his fingers.

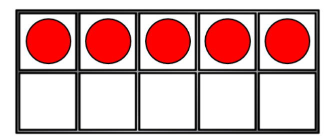


How many more fingers are needed to make 10?
What would this look like as a number sentence?

- Use the ten frames to complete the number bonds to 10



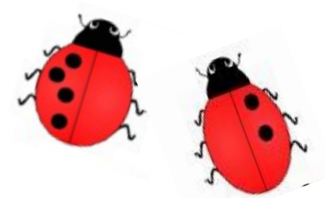
4 + ___ = 10



5 + ___ = 10

Can you make the ten frame that comes before in the sequence?
Can you make the ten frame that comes next in the sequence?

- All the ladybirds should have 10 spots. Some of the ladybirds have lost their spots. Complete the spots and write the number sentences.



Number Bonds to 10

Reasoning and Problem Solving

Always, Sometimes, Never

Number bonds to 10 have two different numbers added together.

Sometimes, there is one case where it is two of the same number.
$5 + 5 = 10$

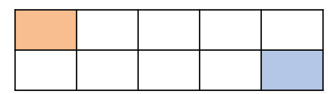
Dora has 10 p to spend.

Which two items could she buy?
How many different ways can she do it?

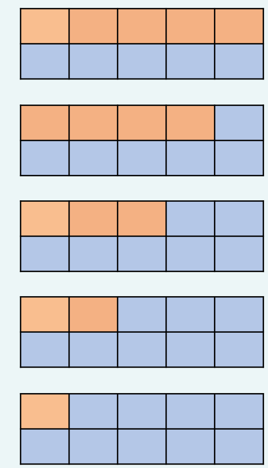
A chew bar and a muffin.
A banana and a chocolate bar.
A banana and a bottle of pop.
An apple and a chocolate bar.
An apple and a bottle of pop.

Tommy needs to colour in **all** of the boxes using two different colours.

One box of each colour has been done for him.



How many different ways can he colour the boxes?



This can also be the other way where there are 9 oranges and 1 blue, 8 oranges and 2 blues, 7 oranges and 3 blues, 6 oranges and 4 blues.

Compare Number Bonds

Notes and Guidance

Children use their knowledge of place value and number bonds to compare numbers and number sentences. They should use the correct language and symbols to compare.

E.g. $5 + 5 = 10$ and 10 is greater than 8, so $5 + 5 > 8$

Using concrete manipulatives will support their emerging knowledge of number bonds and can be used to develop a deeper understanding by proving why they know one number is greater than another.

Mathematical Talk

What does compare mean?

Do we know what each side is worth?

How can we work out the total of each side?

Can you use equipment to prove that the number bonds are equal/unequal?

Do I have to solve both sides to see if the number bonds are equal?

Which calculation gives the largest answer?

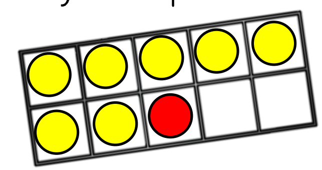
Which calculation gives the smallest answer?

Which symbol can you use to show this?

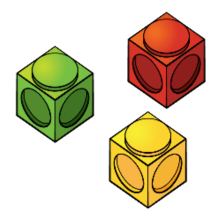
Varied Fluency

- Match the number bonds that are equal.
  Can you use ten frames and counters to prove they are equal?

$4 + 5$	$7 + 1$
$2 + 6$	$6 + 3$
$4 + 2$	$3 + 3$



- Use cubes to help you fill in $<$, $>$ or $=$ to make the statements correct.



$5 + 5$ ◯ 10

$5 + 5$ ◯ 8

$2 + 5$ ◯ $5 + 3$

- Complete the number sentences.

$5 + 3 = 4 + \_\_\_$

$7 + 3 > \_\_\_ + 2$

Compare Number Bonds

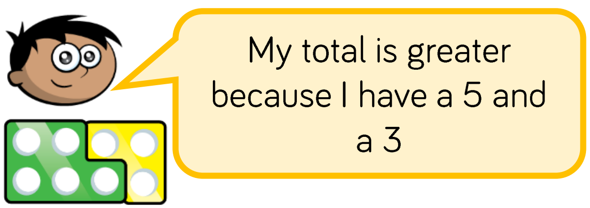
Reasoning and Problem Solving

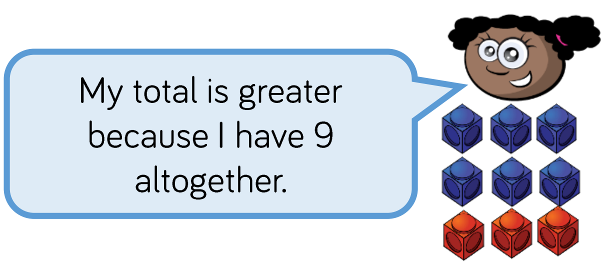
How many different ways can you complete the number sentence?

3 + ___ < 3 + ___

Any combination where the number on the right is larger than the one on the left.

Amir and Whitney have both created their own number bonds.

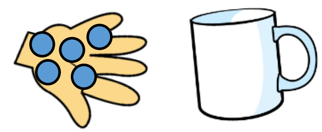




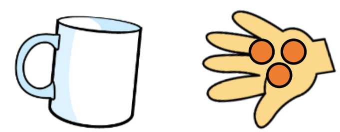
Who do you agree with? Explain your answer.

Whitney is correct because 9 ones is greater than 3 ones and 5 ones (8 ones).

Teddy has 5 counters in his hand and some in a cup.



Tommy has 3 counters in his hand and some in a cup.



They each have the same number of counters in total.

They each have less than 10 counters.

How many counters could be in Teddy's cup?

How many counters could be in Tommy's cup?

Possible answers:
Teddy could have 1 and Tommy could have 3
Teddy could have 2 and Tommy could have 4
Teddy could have 3 and Tommy could have 5
Teddy could have 4 and Tommy could have 6

Add Together

Notes and Guidance

Children will use a part-whole model to understand the concept of addition. They should be accurately using the '+' and '=' symbols.

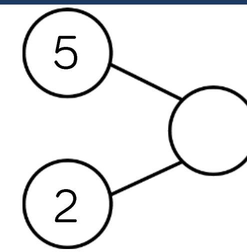
Children should also become familiar with language related to addition such as 'total' and 'altogether'.

Mathematical Talk

What does each circle represent on a part-whole model?
Which of the numbers are parts?
Which of the numbers is the whole?
What else can we use to represent the cars? Can we only use counters and ten frames?
How many did you have to start with? Then what happened?
How many do you have now?
How does the ten frame help us when finding the total? Did we need two ten frames for 5 and 4? Why?
What number sentence would represent this?

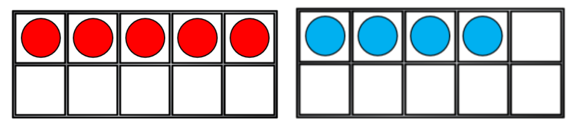
Varied Fluency

- If 2 is a part and 5 is a part, what is the whole?



$\square + \square = \square$

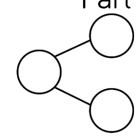
- There are 5 red cars and 4 blue cars. How many cars are there altogether?



$\square + \square = \square$

$\square = \square + \square$

- Complete the table to represent the owls.

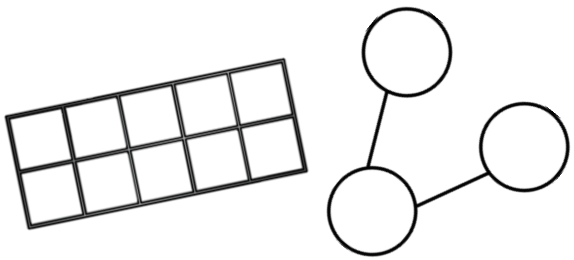
Ten Frame	Part Whole Model
	 $\square + \square = \square$ $\square = \square + \square$
Sentences ___ is a part. ___ is a part. The whole is ___ .	Make your own story

Add Together

Reasoning and Problem Solving

There are 8 cubes.
Some are red and some are yellow.

How many different ways can you make a total of 8?



You should show your working out on a ten frame and a part-whole model.

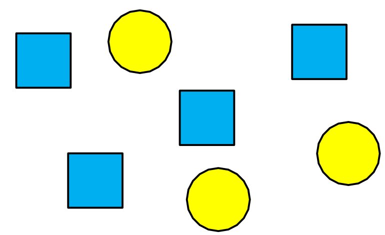
There could be:
7 red and 1 yellow,
6 red and 2 yellow,
5 red and 3 yellow,
4 red and 3 yellow,
3 red and 5 yellow,
2 red and 6 yellow
or 1 red and 7 yellow.

There are 9 sweets altogether.
3 have a red wrapper and 7 have a blue wrapper.
Is this correct?

Explain how you know.

Children could use cubes/ten frame to show that this is incorrect as 7 and 3 would make 10 not 9

Which sentence is correct?



A
5 is a part, 2 is a part and 7 is the whole.

B
4 is a part, 3 is a part and the whole is 8

C
4 is a part, 3 is a part and 7 is the whole.

What mistake has been made in the incorrect sentences?

A is wrong because the parts are not right.
B is wrong because the whole is not 8
C is correct.

Add More

Notes and Guidance

Children will move from counting all to counting on. It is important that they are exposed to calculations given to them in a different order, for example the smallest number first. This will lead to children understanding that addition can be done in any order.

Continue to use concrete and pictorial representations to support the children's conceptual understanding.

Mathematical Talk

How many did you have to begin with?

How many more have been added?

How many do you have now?

What number sentence will represent this?

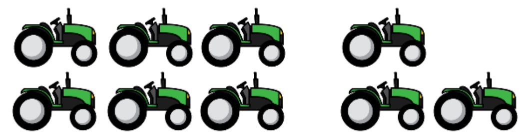
When using resources/images to find the answer, do I need to make/draw both numbers?

Do I have to start with the largest number?

Why is it more efficient to start with the larger number?

Varied Fluency

- How many tractors are there in total?



$6 + \_\_ = \_\_$

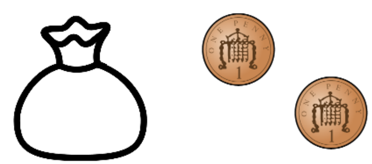
There are ___ tractors.

- There are 3 aeroplanes at the airport.
5 more aeroplanes land.
How many aeroplanes are there now?

Now there are ___ aeroplanes altogether.

How could we represent this as a number sentence?

- There are four pennies in a bag and I add two more.
How many pennies do I have now?



$\square = \square + \square$

There are ___ pennies.

White Rose Maths

Add More

Reasoning and Problem Solving

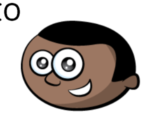
True or False?

If I add 0 to a number, the number stays the same.

Can you use a number line or counters to help you explain your answer?

True because when you add 0 you are not adding any more.

Mo has used the number track to complete 4 + 2
He thinks the total is 5



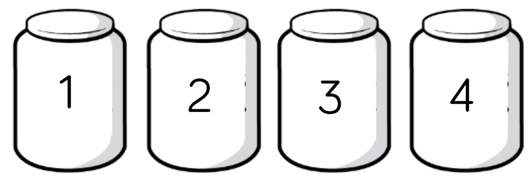
1	2	3	4	5	6	7	8

What mistake has he made?
How could Mo use the number track to find the correct answer?

He has included the starting number. To find the correct answer Mo could start counting from 5, or he could put the 4 on and then the 2 to show that the answer is 6

Sid has two bean bags.

He is throwing them into jars.
The number on the jar shows how many points he gets for a beanbag landing in that jar.
One of his beanbags lands in jar 2



What is the highest score he can get by throwing the second bean bag and adding the scores?

What is the lowest score he can get by throwing the second beanbag and adding the scores?

Explain why he can't get a total of 9

The highest score he can get is a 6 if his second beanbag landed in the 4 jar.
The lowest score he can get is a 2 if he misses the jars with his second beanbag.
He cannot get 9 because he got 2 with his first beanbag, so he would need 7 and there isn't a jar with 7 on.

Finding a Part

Notes and Guidance

Children should apply their understanding of number bonds to solve missing number problems. Building from counting on, children should start from the given part and count on to the whole, to find the missing part.
Children should also be exposed to problems with one part and the whole being the same so they understand the role of zero.

Mathematical Talk

Do you know the value of both parts?

Do you know the value of the whole?

How can we count on to find the missing part?

What number sentence would represent what we currently have/know?

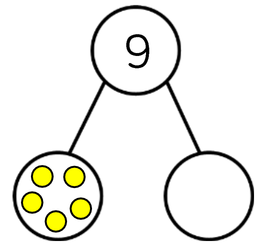
Where will the numbers from the word problem go in the part-whole model?

Where are we counting on from? How do you know?

Where are we counting to? How do you know?

Varied Fluency

- Complete the part-whole model and use it to fill in the number sentences.



☐ + ☐ = ☐

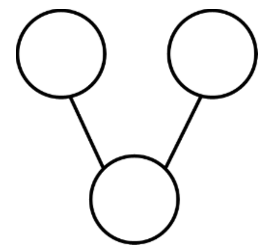
☐ = ☐ + ☐

5 is a part,
___ is a part,
9 is the whole.

- There are seven cars in total. Seven of them are green. How many of them are yellow?

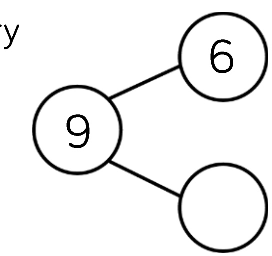
☐ + ☐ = ☐

☐ = ☐ + ☐



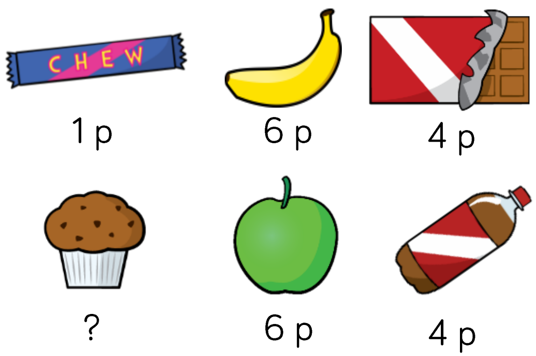
7 is a part,
___ is a part,
7 is the whole.

- Write your own story to complete the part-whole model.



Finding a Part

Reasoning and Problem Solving



Eva spends 10p on a chocolate bar and something else. What else could she have bought? Explain how you know.

Jack spent 9p on a banana and a muffin. How much is a muffin? Explain how you know.

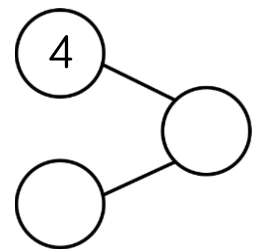
Rosie spent 6p on a chocolate bar and something for her brother. What did she buy for her brother? Explain how you know.

Eva could buy a banana or an apple as they are both 6 p and 4 p + 6 p = 10 p

A muffin costs 3 p because 6 p + 3 p = 9 p

Rosie bought her brother two chew bars because 4 p + 2 p = 6 p and 1 chew bar is 1 p and nothing else is 2 p

Using the digits 0 – 9, how many ways can you complete the part-whole model? One of the parts always has to be 4



You can only use each digit once.

Explain why you can't use 0

What other digits can't you use and why?

It could be:

- 4, 1 and 5
- 4, 2 and 6
- 4, 3 and 7
- 4, 5 and 9

You can't use 0 because the whole would have to be 4 and then it would be repeated.
You can't use 8 because if it was a part, the whole would be too big and if it was the whole we would need another 4

How Many Left? (1)

Notes and Guidance

Children are introduced to the language of subtraction rather than the subtraction symbol being explored straight away.
'Taking away' is used in a range of real life contexts such as flying away and eating.
The use of zero is important so children know that when nothing is taken away the whole remains the same.
First, then, now … story representations can help the children understand the concept of 'how many left'.

Mathematical Talk

How many objects were there to start with?

Do we need to count all the _____ or can we count on?

What could the story be? How many did we start with?

What number can we use to show that nothing has gone away/been taken away?

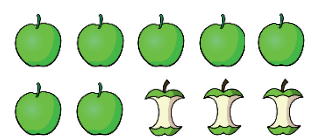
Varied Fluency

- There were 7 birds in a tree and 3 flew away. Complete the sentences.



At first there were ___ birds. Then ___ flew away. Now there are ___ birds in the tree.

- Complete the sentences to create a story and draw a part-whole model.



At first there were ___ apples.
Then ___ were eaten.
Now there are ___ apples.

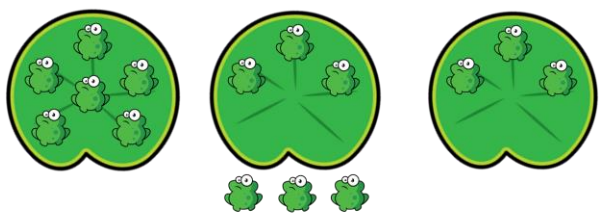
- Write a story to go with the pictures and draw a part-whole model.

First:  Now: 

How Many Left? (1)

Reasoning and Problem Solving

Some frogs are on a lily pad.
Three frogs jumped off and there are three frogs remaining.



Complete the sentences.

First there were ___ frogs. Then ___ frogs jumped off. Now there are ___ frogs on the lily pad.

In the 'then' picture, do the 3s show the same thing? Why not?

What if 4 jumped off, how many frogs would there have been at first?

Explain how you know.

At first there were 6 frogs.
Then 3 frogs jumped off. Now there are 3 frogs on the lily pad.

No, the 3 on the lily pad show how many are left. The 3 that are not on the lily pad show how many went away.

If 4 jumped off, the whole would have been 7 because 3 and 4 make 7

Some cakes have been eaten.

There are 2 cakes left.

How many cakes could there have been, and how many could have been eaten to be left with 2?

Explain your reasons.

There could have been 10 and 8 were eaten, 9 and 7 were eaten, 8 and 6 were eaten etc.
Children might use cubes/ten frames etc. to help them take away and finish with 2

How Many Left? (2)

Notes and Guidance

Once children understand the concept of taking away, the subtraction symbol can be introduced.

It is still important for children to create stories about the calculation and use concrete and pictorial representations so they can deepen their understanding of subtraction.

Mathematical Talk

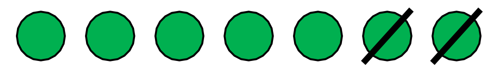
How many counters were there at first? How many were taken away? How many are there now? Can you draw an image to show this?

What else could we use to represent the cars? How many will you start with? Why? How many will you take away? Why?

What is the same and what is different about the calculations?

Varied Fluency

- Complete the number sentence.

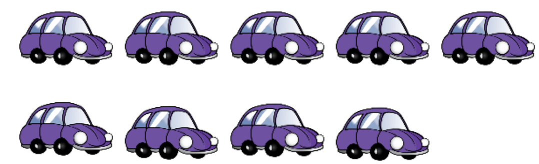


$7 - 2 =$ ___

Create a story to represent the calculation.

- Tom has 9 toy cars. He gives 5 of them away. How many does he have left?

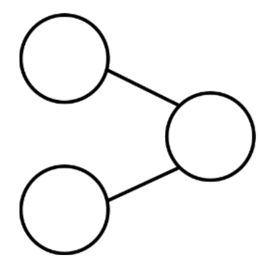
$\square - \square = \square$



- At first there were 10 bananas. 7 of them were eaten. How many bananas are left?

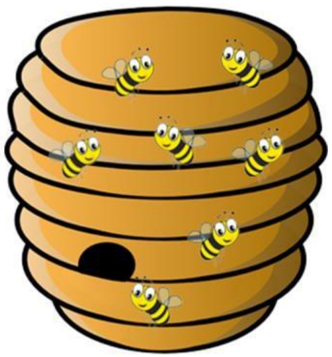
Use counters/cubes to help you solve and complete:

$\square - \square = \square$



How Many Left? (2)

Reasoning and Problem Solving

How many ways can you get an answer of 0? $\square - \square = 0$ What is the rule?	10 – 10, 9 – 9, 8 – 8 etc. The rule is that to get zero, you have to take away the same number you started with.
How many calculations can you complete?  $\square = 7 - \square$ Why can't the digits 8 or 9 be used?	Children could write: 6 = 7 – 1 5 = 7 – 2 etc. You can't use 8 or 9 because there are only 7 bees to begin with.

Subtraction – Breaking Apart

Notes and Guidance

Children continue using the subtraction symbol. Building on their understanding of finding a part, they are introduced to subtraction by partitioning.

Children break apart a number into two parts using concrete and pictorial representations to support.

Mathematical Talk

What is the whole? What are the parts?

If ___ is the whole, and ___ is a part, what is the other part?

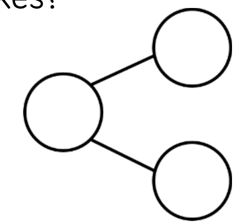
How can I use the array of party hats to convince someone else that my answer is right?

How many ways can I partition 8 into parts? Use two hoops and 8 counters to support.

Varied Fluency

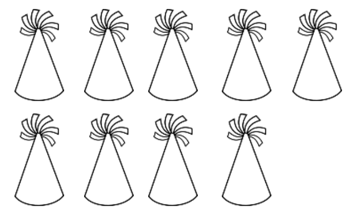
- How many ice creams do not have flakes?

6 – 2 = ___

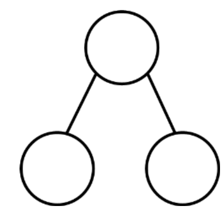


There are ___ ice creams that do not have flakes.

- There are 9 party hats altogether. 4 of them are red. The rest are blue. How many are blue?

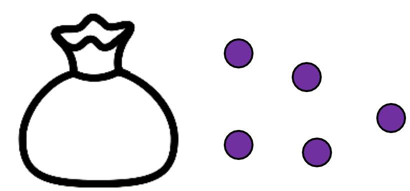


___ = 9 – 4



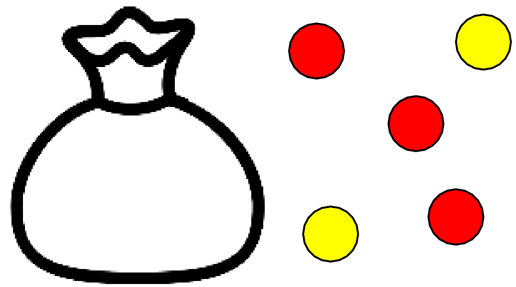
There are ___ blue party hats.

- In total there are 8 counters. How many counters are there in the bag? Show this in a part-whole model and as a calculation.



Subtraction – Breaking Apart

Reasoning and Problem Solving

Think of two questions to ask your friend about the image.  Represent your questions and answers in a part-whole model and as a number sentence.	Examples: There are 9 sheep in total. 5 of them are outside the barn. How many sheep are inside the barn? There are 9 sheep in total. 4 of them are inside the barn. How many sheep are outside the barn? Etc.
There are no more than 10 counters in total.  How many counters could be in the bag? Why can't it be six?	There could be 5, 4, 3, 2, 1 or 0 There can't be six because then there would be 11 counters in total, which is more than 10

Fact Families – 8 Facts

Notes and Guidance

Children will link addition and subtraction facts for the first time. It is important that children are able to show and understand this relationship. They should continue to be exposed to the use of zero.

Children can struggle with getting four calculations for subtraction e.g. $7 = 9 - 2$ and $2 = 9 - 7$ and should use concrete and pictorial representations to aid their understanding of this.

Mathematical Talk

How many counters were there at first? How many were taken away? How many are left? Can you draw an image to show this?

How many will you start with? Why?

How many will you take away? Why?

What is the same and what is different about the calculations?

Varied Fluency

- Using the image, how many calculations can you create?

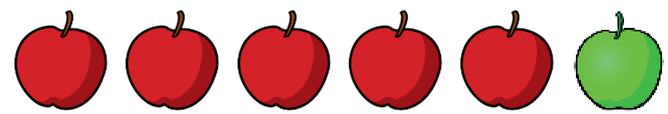
___ + ___ = ___ ___ = ___ + ___

___ + ___ = ___ ___ = ___ + ___

___ − ___ = ___ ___ = ___ − ___

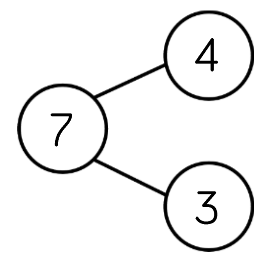
___ − ___ = ___ ___ = ___ − ___

- There are 6 apples. 5 of them are red and 1 is green.



Write 8 number sentences to show this.

- Write 8 number sentences to match the part-whole model.



Fact Families – 8 Facts

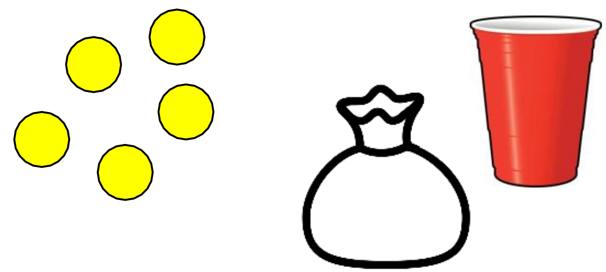
Reasoning and Problem Solving

Explain the mistakes that have been made.

$5 + 2 = 7$	$7 = 5 + 2$
$2 + 5 = 7$	$7 = 2 + 5$
$7 - 2 = 5$	$7 = 5 - 2$
$7 - 5 = 2$	$7 = 2 - 5$

The bottom two on the right should be:
$5 = 7 - 2$
and
$2 = 7 - 5$

Amir has 5 counters in total.
Each of his counters are either in a bag or a cup.
How many different ways could the counters be split between the bag and the cup?



Write 8 number sentences to go with each.

Are any of the sets of number sentences the same? Why?

There could be:
5 in the cup, 0 in the bag
4 in the cup, 1 in the bag etc.

Children should notice that number sentences are the same for “4 in the cup, 1 in the bag” and “1 in the cup, 4 in the bag” etc. because the parts are the same.

Count Back

Notes and Guidance

Children count backwards to subtract. It is an important step to help children work in the abstract.
Common misconceptions could be that the children include their starting number when counting, e.g. 5 – 3; 5, 4, 3 – therefore giving the wrong answer.
It is vital to model how to count backwards by 'putting the start number in our head and counting backwards'.

Mathematical Talk

What number should we start on?

What number comes before 6?

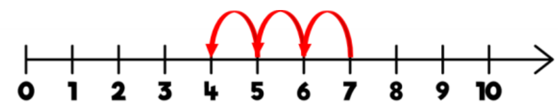
What could we say out loud to help?

Which calculations do you know match straight away?

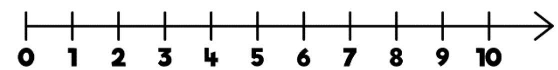
How do you know this?

Varied Fluency

- Complete:

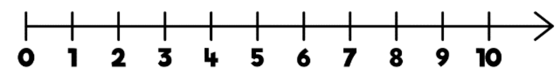


7 – 3 = ___



4 – 4 = ___

- Use the number line to count back and match the calculations with the same answers.



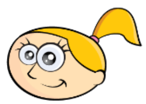
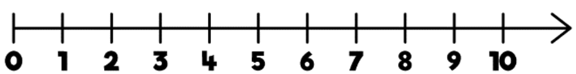
7 – 3 = ___	6 – 6 = ___	10 – 6 = ___
5 – 0 = ___	9 – 4 = ___	4 – 4 = ___

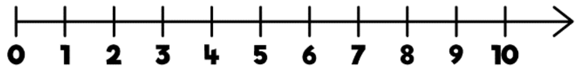
Can you think of any other number sentences which could match them?

- I count backwards from 9
How many steps does it take to get to two?
Show this in a number sentence.

Count Back

Reasoning and Problem Solving

Eva is calculating 7 — 2 and does this by counting backwards on a number line. She gets an answer of 6  What mistake has she made? What should the answer be?	Eva has included the starting number of 7 when she has been counting backwards. The answer is 5
The answer is 2 How many ways can you get to this by counting backwards on this number line? 	10 — 8, 9 — 7, 8 — 6 etc.

Game  Race to zero! Start at 10 on a number line. Roll a dice and subtract this amount. The first person to land on 0 wins. What would you like to roll? Why? Why would you not want to roll a 1?  	You might like to roll a 6 because it is a large amount to take away and so you would end up nearer to 0 You might not want to roll a 1 because it's a small amount and so it would take longer to get to 0

Find the Difference

Notes and Guidance

Children explore finding the difference as a form of subtraction. They often struggle with this concept because both parts are given.
Children could use their skills of counting back and counting on to help them find the difference. Alternatively, they can make both amounts and visually see how many more/less a number is.

Mathematical Talk

Who has more? How do you know? How many more does Whitney have?

What does difference mean? Which is most? How do you know? What strategy can we use to help us find the difference?

What image/resource can we use to show this?

How can we complete the sentences?

Varied Fluency

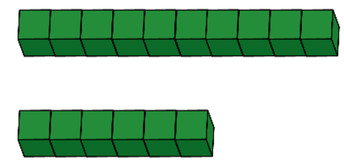
- How many more cakes does Whitney have than Teddy?

  Whitney 

  Teddy 

  Whitney has ___ more cakes than Teddy.

- What's the difference between 10 and 6?

  The difference between 10 and 6 is ___

  $10 - 6 =$ ___

- Eva has 7 sweets and Mo has 3 sweets.
  How many more sweets does Eva have?
  How can you show this using cubes, counters or as an image?

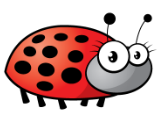
  Eva has ___ more sweets than Mo.

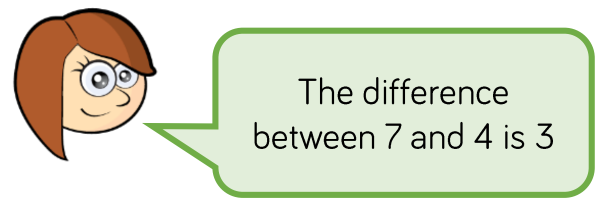
  The difference between 7 and 3 is ___

  $7 - 3 =$ ___

Find the Difference

Reasoning and Problem Solving

Two numbers have a difference of 4 The larger number is less than 10 What could the two numbers be?	9 and 5 8 and 4 7 and 3 6 and 2 5 and 1 4 and 0
Annie says,    Write a number sentence to show why Annie is correct.	$10 - 3 = 7$ or $7 = 10 - 3$

True or False? Rosie says,  Can you show this in more than one way?	Children could show this by representing both numbers using cubes, bead strings, straws etc. or relating it back to counting backwards on a number line.

Compare Statements (1)

Notes and Guidance

Children use the inequality symbols to compare statements. It is important that 'equal to' is also recapped at this stage with the correct language used.

Children should use concrete manipulatives and draw images to help them complete the statements.

Mathematical Talk

What does greater than mean?

How do we know that ___ + ___ is greater than ___?

What else can it be greater than?

What does less than mean?

How do we know that ___ + ___ is less than ___?

What else can it be less than?

What language is missing?

What steps do we need to take to help us complete the problem?

Varied Fluency

- Complete the sentences.

  3 + 1 is greater than ___
  3 + 1 is greater than ___
  3 + 1 is less than ___
  3 + 1 is less than ___

- One bird lays 3 eggs. Another bird lays 2 eggs.

  Complete the sentence using greater than, less than or equal to.

  2 plus 3 is ____________ 6

- Complete the number sentences.

  ___ + ___ is equal to 7

  ___ + 4 is less than 9

  5 + ___ is ___________ 2

Compare Statements (1)

Reasoning and Problem Solving

Would you rather have 6 sweets and 2 more sweets, or 8 sweets?  Explain your answer. Use cubes or draw an image to help you.	I don't mind because I know that 6 and 2 is equal to 8
Using the numbers 0 – 10, how many different ways can you complete the boxes? $\_\_ + 7 = \_\_$ $\_\_ + \_\_ > 4$ $\_\_ + \_\_ < 9$	Possible answers: $3 + 7 = 10$ $1 + 4 > 4$ $1 + 1 < 9$

What signs are missing? $7 + 3 \bigcirc 10$ $9 \bigcirc 3 + 7$ $9 > 10 \bigcirc 3$ Explain how you know.	$7 + 3 = 10$ because I know that 7 and 3 is equal to 10 $9 < 3 + 7$ because I know that 9 is less than 10 $9 > 10 - 3$ because I know that 9 is greater than 7

Compare Statements (2)

Notes and Guidance

Once children are able to compare a simple statement to an integer (whole number), they should begin to directly compare two calculations.

They should be exposed to both addition and subtraction calculations, and the symbols <, > and =

It is important that children know what the 'equal to' sign means,

and that we can use it to show that two calculations are equal.

Mathematical Talk

What's the same? What's different?

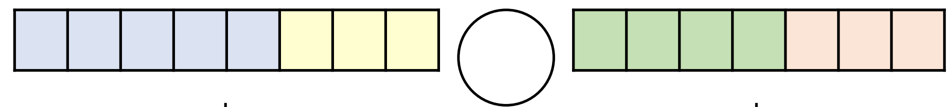
Do we always need to solve each calculation before we compare?

Which symbol should be used?

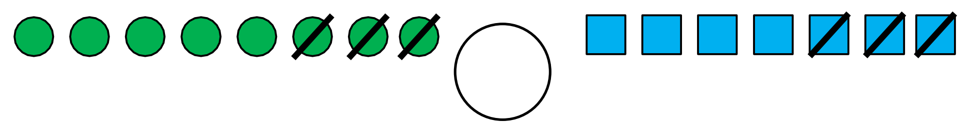
How can we prove that they are equal?

Varied Fluency

Complete using <, > or =



__ + __ ◯ __ + __



__ – __ ◯ __ – __

Dora has 8 sweets and eats 4 of them.
Mo has 7 sweets and eats some of them.
They now have the same number of sweets.
Can you draw a picture to represent this?
Use your picture to help you complete the number sentences.

8 – 4 ◯ 7 – __

8 – 4 is equal to 7 – __

Compare Statements (2)

Reasoning and Problem Solving

Tommy says,

5 + 2 is greater than 4 + 4 because 5 is greater than 4

Is he correct? Explain why.

No because

$5 + 2 = 7$

$4 + 4 = 8$

and

$7 < 8$

Use the digit cards to complete the sentences.

2	3	4	5

$\underline{\quad} + \underline{\quad} = \underline{\quad} + \underline{\quad}$

$\underline{\quad} - \underline{\quad} = \underline{\quad} - \underline{\quad}$

$\underline{\quad} - \underline{\quad} > \underline{\quad} - \underline{\quad}$

$\underline{\quad} - \underline{\quad} > \underline{\quad} + \underline{\quad}$

Can you write any more number sentences using these cards?

Possible answers:

$5 + 2 = 4 + 3$

$5 - 4 = 3 - 2$

$5 - 2 > 4 - 3$

$5 - 2 < 4 + 3$

Etc.

White Rose Maths

Autumn - Block 3

Shape

Overview

Small Steps

- Recognise and name 3-D shapes
- Sort 3-D shapes
- Recognise and name 2-D shapes
- Sort 2-D shapes
- Patterns with 3-D and 2-D shapes

NC Objectives

Recognise and name common 2-D shapes, including: (for example, rectangles (including squares), circles and triangles)

Recognise and name common 3-D shapes including: (for example, cuboids (including cubes), pyramids and spheres)

3-D Shapes

Notes and Guidance

Children name simple three dimensional shapes: cuboids (including cubes), cylinders, pyramids, cones and spheres. Ensure children see the shapes in a variety of orientations so they develop a deeper understanding of the shape.

Children start to consider the 2-D shapes they can see on the faces of the 3-D shapes which will support them when looking at 2-D shapes later in the block.

Mathematical Talk

What makes a shape 3-D?

Can we see any 3-D shapes in the classroom?

Can you name this 3-D shape?

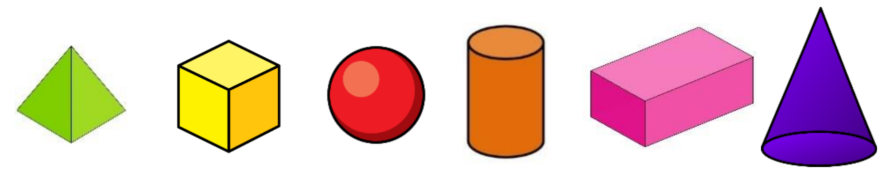
Do cubes all look the same?

Does the shape change when we turn it around?

Can you think of any everyday objects that are cones? Can you think of any everyday objects that are cubes? Can you think of any everyday objects that are …

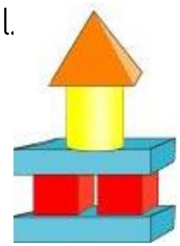
Varied Fluency

- Match the shape to its name.



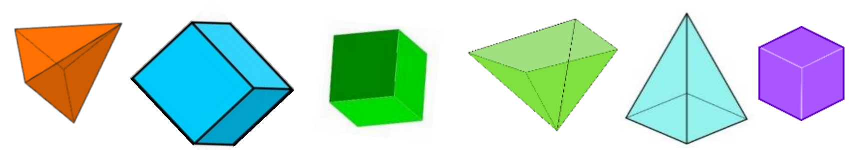
cube | cylinder | cuboid | pyramid | cone | sphere

- Complete the sentences to describe the model.
  There are ______ cuboids.
  There are ______ cylinders.
  There are ______ pyramids.
  There are ______ cubes.



  Build your own model using 3-D shapes and ask a partner to describe it.

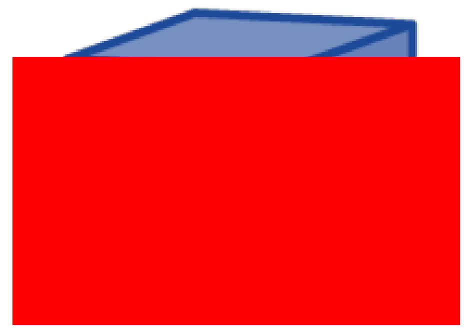
- Circle the cubes. Tick the pyramids.



3-D Shapes

Reasoning and Problem Solving

Put a selection of 3-D shapes in a feely bag. Choose a shape. What do you think it is?  Explain how you know.	Possible answer: I think it is a cuboid because I cannot feel any curved surfaces but I can feel a long and smaller face.
Use 3-D shapes to build a tower. Which shapes are the best for the bottom of the tower? Which shapes can only go on the top of the tower? Can you use any of the shapes only in one orientation?	Children may reason about different shapes depending on if the shapes have flat or curved surfaces.

The bottom of a 3-D shape is hidden.  What shape could it be? Explain how you know.	Possible answers: Cube Cuboid Pyramid

Sort 3-D Shapes

Notes and Guidance

Children sort and group 3-D shapes according to simple properties, including type, size, colour.
They also consider sorting shapes based on whether they roll or stack. This will lead children to think about why a shape rolls (curved face) or why it will stack (flat face).
Children should recognise that the orientation of a shape does not affect its properties.

Mathematical Talk

Why is the shape the odd one out?

What is the same about the shapes? What is different?

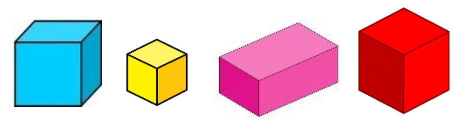
Can you find an everyday object to add to each of the groups?

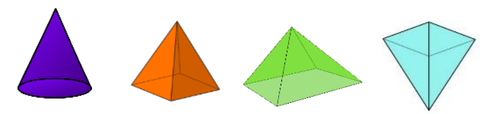
How can you test if the shapes roll? What do the shapes that roll have in common?

How can you test if the shapes stack? What do the shapes that stack have in common?

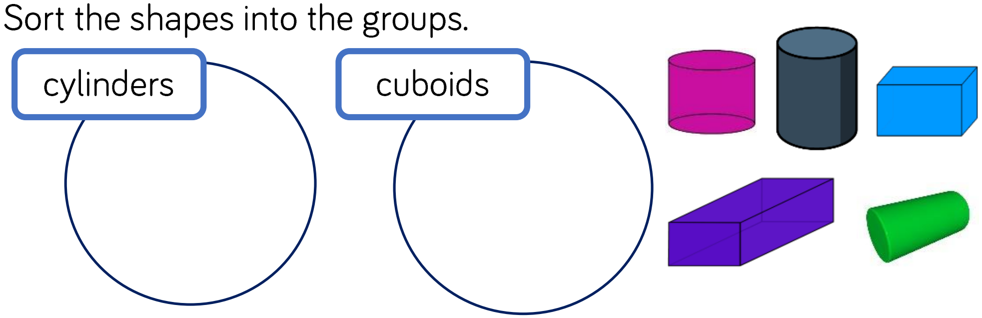
Varied Fluency

- Circle the odd one out in each group.

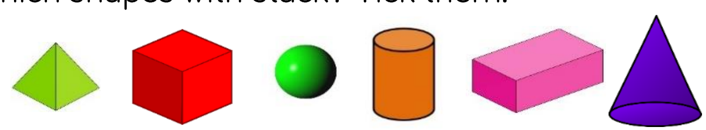




- Sort the shapes into the groups.



- Which shapes will roll? Circle them.
Which shapes with stack? Tick them.

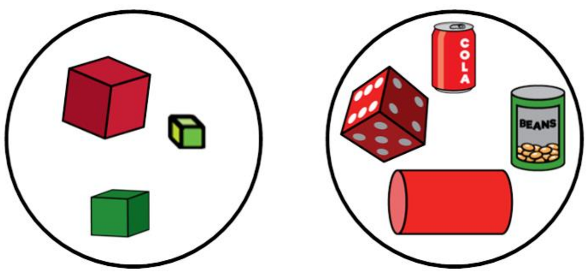


Will any of the shapes roll and stack?

Sort 3-D Shapes

Reasoning and Problem Solving

Some 3-D shapes have been sorted.



Have the shapes been sorted correctly?

Explain how you know.

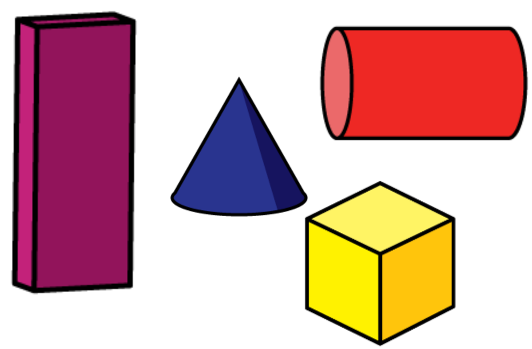
How else could the shapes be sorted?

Possible answers

The shapes have been sorted into cylinders and cubes. The dice needs to be moved.

The shapes have been sorted into colour. The green tin of beans and the red cube need to be moved.

How many ways can you sort the shapes into groups?



Possible answers:

Straight faces and curved surfaces.

Shapes with a circular face and shapes with a square face.

Big shapes and small shapes.

2-D Shapes

Notes and Guidance

Children see 2-D shapes on the surfaces of 3-D shapes.

Children can use the 3-D shapes as stencils or prints to make 2-D shapes. It is important that children see 2-D shapes are flat.

Looking at 2-D shapes, children name triangles, squares, rectangles and circles.

Mathematical Talk

What is the name of this 3-D shape?

What can you tell me about the surfaces?

What are the names of the shapes on the surfaces?

How many ______ are on the surface of this shape?

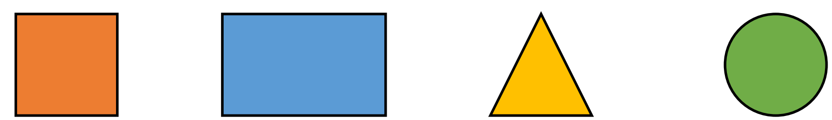
Is there more than one type of shape on the surfaces?

Where else can we see 2-D shapes around the classroom?

Varied Fluency

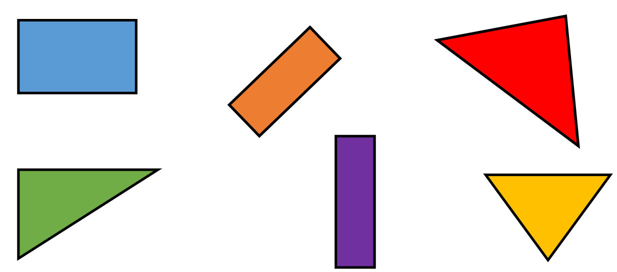
- Choose a 3-D object. Use one of the faces as a stencil to draw around. Name the shape that you have drawn.
  How many different 2-D shapes can you draw using 3-D shapes as a stencil?

- Match the 2-D shapes to their names.



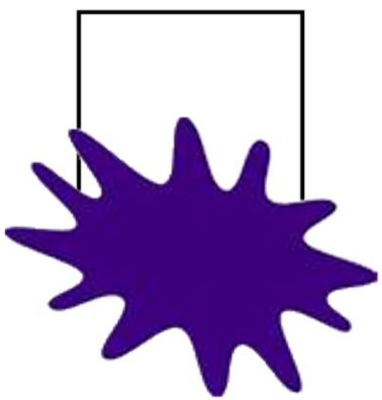
Rectangle Circle Square Triangle

- Circle the triangles, tick the rectangles and draw a circle and a square.



2-D Shapes

Reasoning and Problem Solving

Part of a shape is hidden.  What shape could it be? Is there more than one possibility? Explain your thinking.	It could be a square because it can have 4 sides the same length. It could be a rectangle because it could have 2 longer sides.
Here is part of a shape.  How many different ways can you complete the shape using one or more straight lines? Compare your shape with a partner. What is the same and what is different?	Children could continue the shape to make a square, rectangle or triangle.

Sort 2-D Shapes

Notes and Guidance

Children sort and group 2-D shapes according to simple properties, including type, size, colour. Children should recognise that the orientation of a shape does not affect its properties.
Children consider what is the same and what is different about the shapes. Teachers highlight the similarities between squares and rectangles, however, it is not vital that children understand that a square is a type of rectangle at this stage.

Mathematical Talk

What is the name of this shape?

Can you describe the shape?

Compare your shape to a different shape – what is the same and what is different?

Compare your shape to other shapes with the same name – what is the same and what is different?

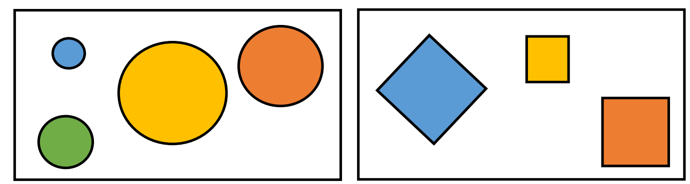
How have the shapes been sorted?

Could the shapes have been sorted in a different way?

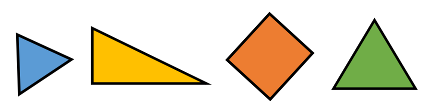
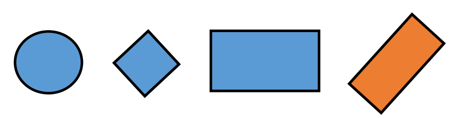
Varied Fluency

Go on a shape hunt around the school.
Take photos of 2-D shapes then sort them by their name.
Can you sort them any other way?

How are the shapes grouped? Label each group.

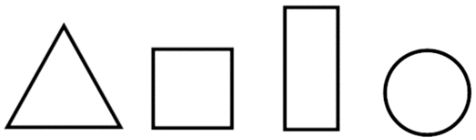


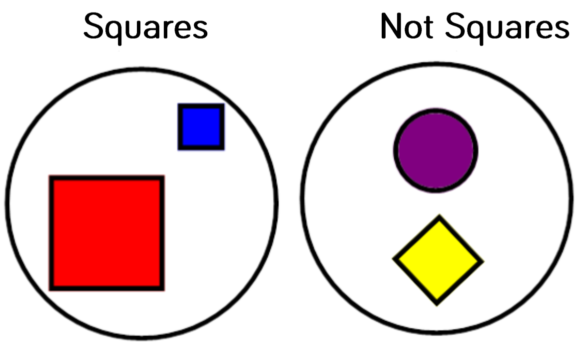
Circle the odd one out in each group.

- 
- 

Sort 2-D Shapes

Reasoning and Problem Solving

Use a selection of triangles, rectangles, squares and circles.  Put your shapes into groups. Ask a partner to label your groups. How many different groups can you create?	Possible ways of sorting: Colour, name of shape, number of sides etc.
Tommy says that all shapes with 4 sides are squares. Is Tommy correct? Prove it.	Tommy is incorrect as there are many other 4-sided shapes including rectangles.

Eva has sorted some shapes.  Has she sorted them correctly? Explain how you know.	She has not sorted them correctly. The yellow shape is a square in a different orientation.

Patterns with 3-D & 2-D Shapes

Notes and Guidance

Children use 2-D and 3-D shapes to complete and make simple patterns focusing on different shapes, sizes and colours. Encourage children to say the patterns aloud, consolidating shape names. Use shapes in different orientations to reinforce children's recognition of 2-D and 3-D shapes. Children recognise the core of each pattern (which part is being repeated) and use this to continue patterns in any direction as well as around a circle.

Mathematical Talk

What is the order of the shapes in the pattern?

How can we describe the pattern?

What is the same and what is different about the patterns?

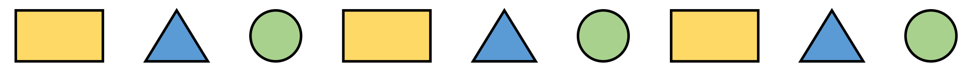
What will the next shape be?

What is the core of the pattern?

How many shapes (elements) are in each repeat?

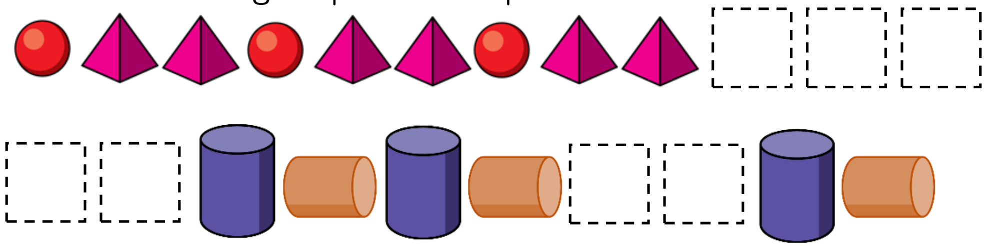
Varied Fluency

- Annie is making a pattern.

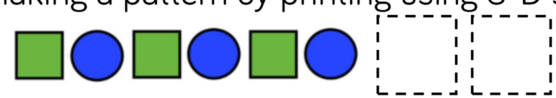


Can you say the pattern aloud? Rectangle, triangle, circle, rectangle, triangle, circle …
Which shape comes after the circle?
Which shape comes before the rectangle?

- Name the missing shapes in each pattern.



- Jack is making a pattern by printing using 3-D shapes.



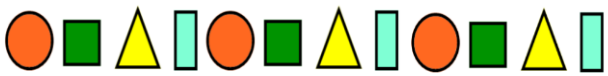
Which 3-D shapes could Jack use to continue the pattern?
Can you make your own printed pattern using 3-D shapes?

Patterns with 3-D & 2-D Shapes

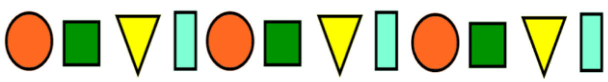
Reasoning and Problem Solving

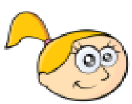
Amir and Eva are making patterns.

Eva



Amir





Our patterns are exactly the same.

Eva

Our patterns are different.

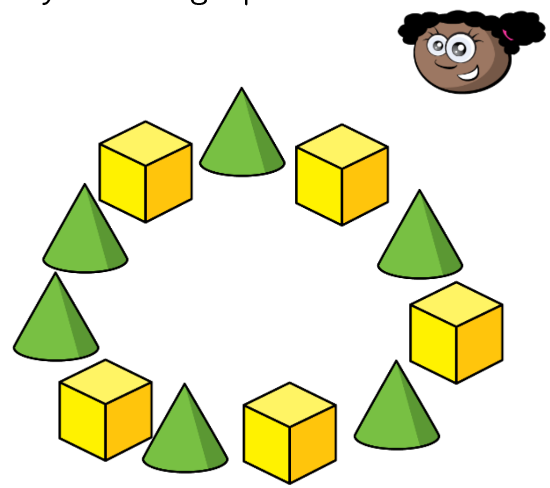
Amir

Who do you agree with?

Explain your answer.

Amir is correct because the triangle is in a different orientation.

Whitney is making a pattern in a circle.



Is Whitney's pattern correct?
Explain why.

Can you make your own circular pattern using 3-D shapes?

Whitney's pattern is incorrect. She has 2 cones together. She needs to make the circle a little bigger or smaller so the pattern continues all the way around the circle.

White Rose Maths

Autumn - Block 4

Place Value

Overview

Small Steps

- Count forwards and backwards and write numbers to 20 in numerals and words
- Numbers from 11 to 20
- Tens and ones
- Count one more and one less
- Compare groups of objects
- Compare numbers
- Order groups of objects
- Order numbers

NC Objectives

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

Count, read and write numbers to **20** in numerals and words.

Given a number, identify one more or one less.

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

Count & Write Numbers to 20

Notes and Guidance

Children are building on their existing knowledge of counting forwards and backwards by introducing the numbers 11-20
Children should explore the meaning of the suffix 'teen' and what this tells us about a number.
11, 12, 13 and 15 are usually difficult for children to understand because they cannot hear the single digit in the name like others e.g. sixteen – six ones and a ten.

Mathematical Talk

Let's count together from 9, 10, 11, 12, 13, 14, 15, 16

What do you notice about the sounds of the numbers?

Do you notice a pattern with the numbers?

What comes after the number 10?

What do you notice about the ends of most of these numbers?

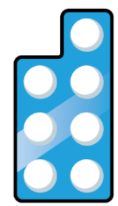
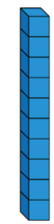
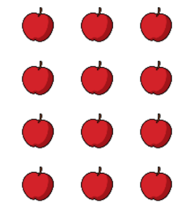
What does 'teen' tell us about a number?

How do we say this number?

How would we write ______?

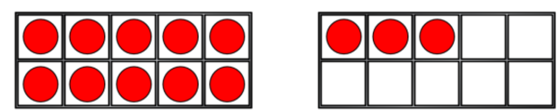
Varied Fluency

- Match the representations to the correct numeral.

12 7 10

- Write the number shown on the ten frames in numerals and words.



Use your own ten frames to show me the number:

Fourteen 18 Nine 16

- Fill in the missing numbers.

	15		17	

16					11

Count & Write Numbers to 20

Reasoning and Problem Solving

Circle the odd one out and explain why. 11 12 13 14 15 61 17 18	61 is the odd one out. It should be 16, the digits have been swapped round.
Mr Monaghan says,  Will Mr Monaghan say 11? Explain how you know.	Yes because 11 is between 8 and 20

Numbers from 11 to 20

Notes and Guidance

Children use concrete and pictorial representations to explore the different ways to represent a number.

Base 10 is formally introduced in the next step, but if children are familiar with this model then they can use it.

Children should be encouraged to use multiple representations.

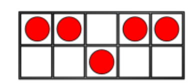
Mathematical Talk

How many ______ will you need to make ______?
How will you know if you've got enough?
What's the same and what's different about these representations?
How do we write the number ______?
What will the number ______ look like in ______?
What number has been made using the equipment?
How did you find out?
Do we have to count from 1 every time?

Varied Fluency

- Draw a picture to show me 13
Compare yours with a partner.
What's the same? What's different?

- Complete the table.

Numeral	Representation
17	
	
13	
	

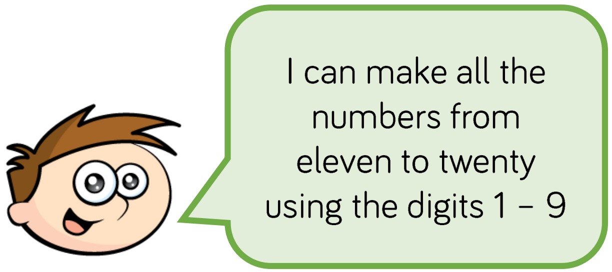
- Using two ten frames, show me a number:

More than 12 Less than 20 Equal to 10 + 10

Numbers from 11 to 20

Reasoning and Problem Solving

Teddy says,



Do you agree?
Explain your answer.

Teddy is wrong because you need a zero to make twenty (20).

Game

Use two sets of number cards.

1 set with numerals 1 – 20

1 set with words 1 – 20

Play in groups of 3 or 4

Take it in turns to pick a numeral card and a word card. Say the number on each card out loud. If they match you win the pair, if they don't you put them back.

Tens and Ones

Notes and Guidance

Children learn each number from 11 to 19 has '1 ten and some more'.
They will see 10 and 20 as having just tens and no ones.
Children still need to understand that numbers can be seen in different ways. Discuss 1 ten being equal to 10 ones.
Base 10 will be introduced in this step. Children can use these concretely but also draw them as 'sticks and bricks'. A line represents 1 ten and a dot represents 1 one.

Mathematical Talk

What numbers come after 10?
Which numbers have the 'teen' sound in them?
What does the number ______ look like?
Which is greater 1 ten or 1 one? How do you know?
What does 'teen' tell us about a number?
Can you swap tens for ones?
Will it change the amount? Explain.
Do we need to count the 10 individually?
Do we need to start counting from 0 every time?
Can you describe the number ______ using tens and ones?

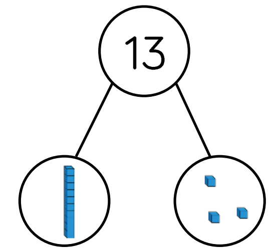
Varied Fluency

- Use the part-whole model to complete the sentences.

My number is ______

One part is ______, the other part is ______

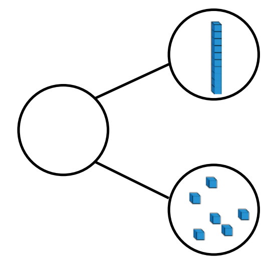
The whole is ______



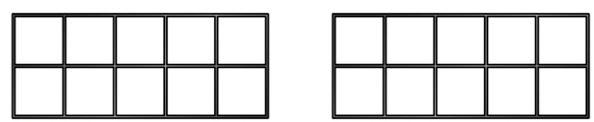
My number is ______

It has ______ tens and ______ ones.

The whole is ______



- Fill in the ten frames with counters to show 14 and complete the sentence.

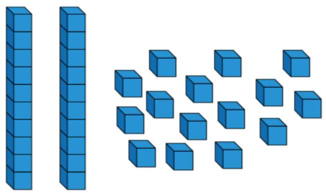


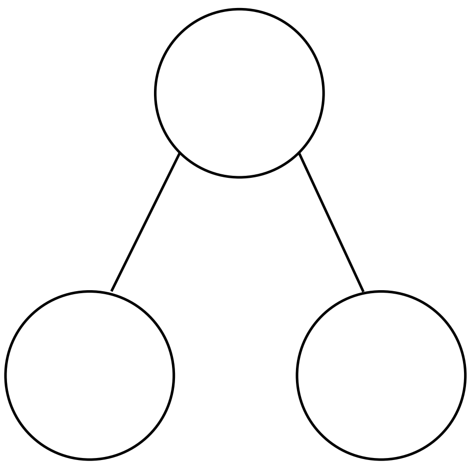
14 has ______ ten and ______ ones.

Tens and Ones

Reasoning and Problem Solving

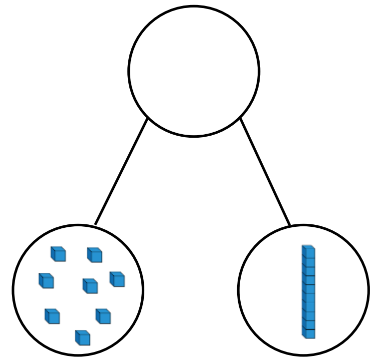
How many ways can you complete the part-whole model to show numbers up to 20, using the Base 10 equipment – you do not have to use it all.



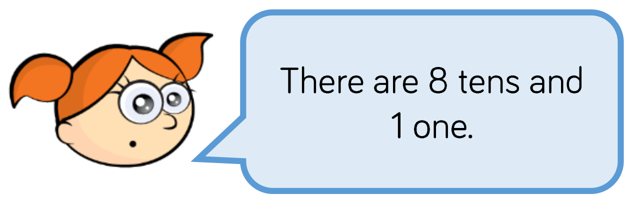


Open ended e.g. 1 ten and 5 ones make 15

Alex makes a part-whole model.



She says:



Explain her mistake.

What is her number?

Alex has counted the ones as tens and the tens as ones.

She should say there is 1 ten and 8 ones.

Her number is 18

Count One More and One Less

Notes and Guidance

Children will apply their counting skills to find one more and one less. Children have already been exposed to the language of more and less and used resources such as number lines and number tracks.
Children need to understand that one more, is one more 1 and not one more 10
To address this misconception, this should be clearly modelled using concrete resources.

Mathematical Talk

How can you represent the number ______?

How could we find one more?

How does this change the number?

Which digit changes?

How would we find one less?

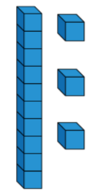
How does this change the number?

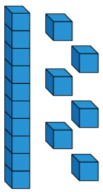
What's the same and what's different between 12 and 13?

Is it only ever the ones digit that changes?

Varied Fluency

- Make one more and one less than these numbers.





- Draw to complete.

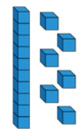
One less

13

One more

- Draw to complete.

One less

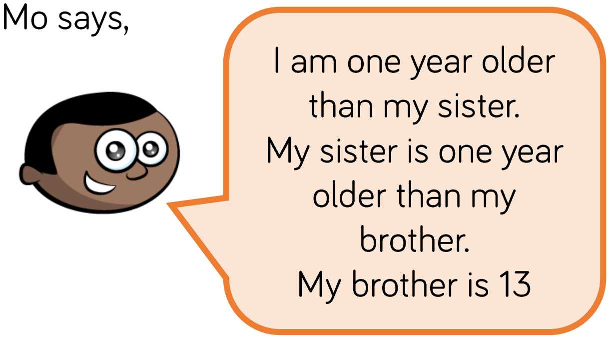


One more

Count One More and One Less

Reasoning and Problem Solving

Mo says,

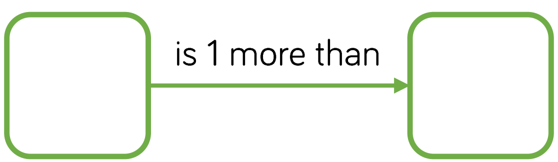


How old is Mo?
How old is his sister?

Mo is 15
Mo's brother is 13
So Mo's sister must be 14 –as she is one year older than Mo's brother. Mo must be 15 as he is one year older than his sister.

Use number cards 11 – 20

How many different ways can you complete the boxes?



Example answers:
18 is 1 more than 17
12 is 1 more than 11

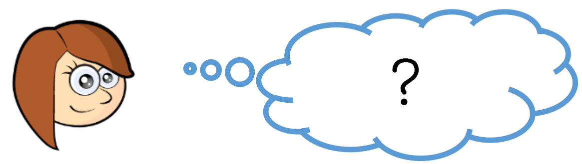
Teddy thinks of a number.

1 more than his number is 11

What is his number?
Prove it.

Teddy's number is 10

Rosie thinks of a number.



1 less than her number is 15

What is her number?
Prove it.

Rosie's number is 16

Compare Groups of Objects

Notes and Guidance

Once children are confident making and exploring numbers greater than 10, they can begin to build on this by comparing groups of numbers.

They continue to use vocabulary of comparison such as: greater than, less than and equal to.

Children have explored finding the difference and they can use this as a strategy to find out how many more.

Mathematical Talk

Can you see which group is greater without counting them?
How do you know?
How many in each group?
Which group has the most?
Which group has the least?
How do you know?
How many more does group ______ have than group ______?
Could you use the inequality symbols to compare the numbers?

Varied Fluency

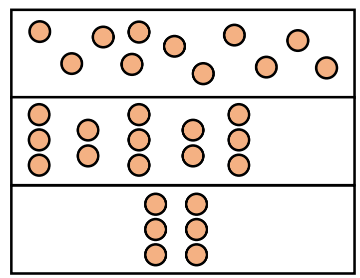
- Which is greater?

A 

B 

By how many?

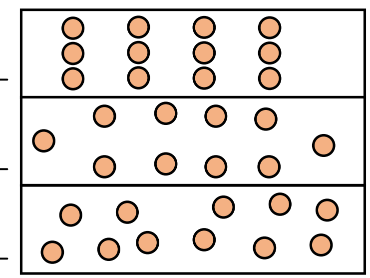
- Use '**less than**', '**greater than**', or '**equal to**' to complete the sentences.



is ______________

is ______________

is ______________

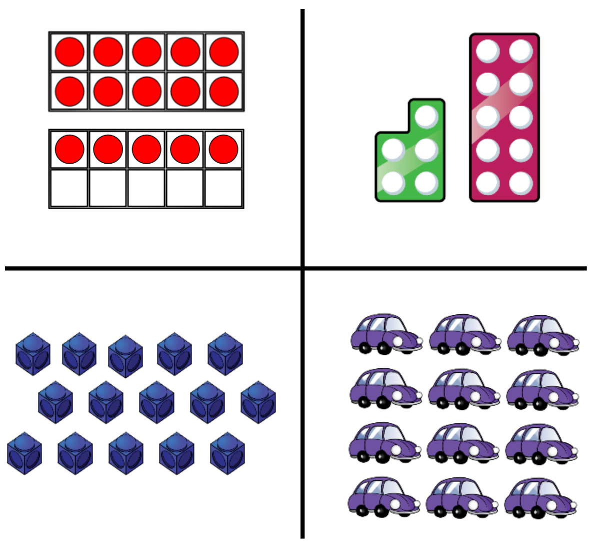


- In pairs, both make a number on a bead string (only use up to 20 beads). Compare bead strings in a sentence and using the inequality symbols.

Compare Groups of Objects

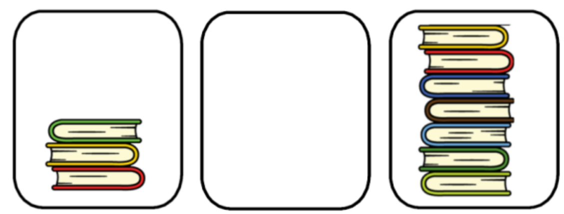
Reasoning and Problem Solving

Which image is the odd one out?
Why?



The cars because there are 12 and the rest are representations of 15

How many books can go in the empty box?



Least Most

Compare with your partners- have you drawn the same amount of books?

How many possibilities are there?

Is it possible to have 3 or 7 books in the middle pile?

The middle box could have 4, 5 or 6 books.

Compare Numbers

Notes and Guidance

Children build on comparing numbers to 10 by comparing numbers up to 20
In this step, children will be given abstract numbers written in digits and need to be encouraged to use previous learning to choose an efficient method to compare numbers.
Make sure children are also continuing to compare numbers below 10 as well as 10 and above.

Mathematical Talk

What happens to the sign when you swap the numbers around?
What does compare mean?
What language will you use when comparing?
Will zero always be the smallest number when comparing?
What numbers are you comparing?
Which number is the largest/greatest? How do you know?
Which number is the smallest? How do you know?
Which symbol can you use in your statement?

Varied Fluency

Circle the greatest number.

- Twelve Twenty
- 8 17

Here are two number cards. Use a number track to explain which one is smaller, and by how many.

13 17

11	12	13	14	15	16	17	18	19	20

Complete the statements.

14 ◯ 9

19 ◯ 20

13 < ____

Compare Numbers

Reasoning and Problem Solving

Dora has three jars of sweets.

A = 12 B = ___ C = 17

She says:

A has the least sweets.
C has the most sweets.

How many sweets could be in B?

Possible answers:
13, 14, 15, 16

Discussion point with class:
can it be 12 or 17?

It cannot because it would have to be phrased 'A and B have the least/most'.

Fill the gaps:

_____ is more than 15 but less than 20

_____ is less than eighteen but more than twelve.

What numbers could go in the gaps?

Explain your answer.

Possible answers:

16, 17, 18, 19

13, 14, 15, 16, 17

Order Groups of Objects

Notes and Guidance

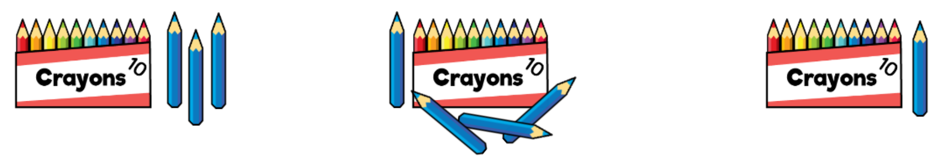
Children build on ordering groups up to 10 by applying the same skills to numbers up to 20
It is important for children to recap ordering numbers below 10
Children will now order three groups of objects in this step to support them in ordering 3 abstract numbers in the following step.
It is important to share different methods so children are continually exposed to more efficient ways.

Mathematical Talk

How can you order the groups?
How can you work out which is the largest/smallest?
Can you just look at two groups first? Why?
What is happening to the numbers when we order from largest to smallest?
Can you think of an amount less than the smallest group?
How is your drawing different to your partners?
Can you describe the order using largest and smallest?
What would happen to your description if we changed the numbers around?

Varied Fluency

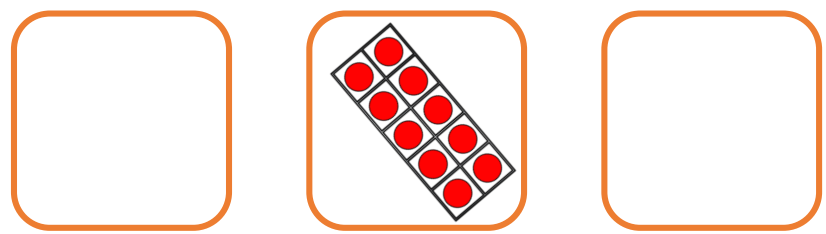
- Order the numbers of crayons from smallest to greatest.



- Use cubes to make these numbers and then order them from greatest to smallest.

19 3 14

- Draw counters in each box to make the increasing pattern correct.



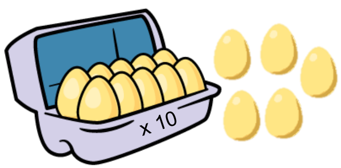
Smallest → Greatest

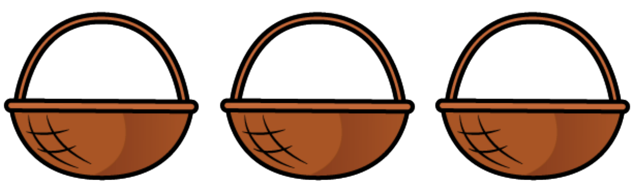
Order Groups of Objects

Reasoning and Problem Solving

All of the eggs are placed into baskets.

How many different ways can you make it correct?

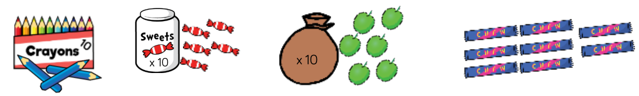




Greatest Least

Various answers.
E.g.
8, 5, 2
9, 4, 1 etc.

Alex orders the groups of objects from smallest to greatest.



Teddy says,

This is the incorrect order because there are more apples than chew bars.

Do you agree with Teddy?

Has Alex done anything else wrong?

I agree with Teddy, there are more apples than chew bars. There are also more sweets and crayons than chew bars.

The order should be:

chew bars, crayons, sweets, apples.

Order Numbers

Notes and Guidance

Children now order abstract digits from 0 to 20
They can choose to represent these with concrete materials or draw them pictorially to help them order.

Children need to apply their knowledge of tens and ones to help them work within the abstract. For example, when comparing 8 and 15 only the number 15 has a ten, therefore it must be greater.

Mathematical Talk

How have you been asked to order the numbers?
Which is the greatest? How do you know?
Which is the smallest? How do you know?
Is it easier to order groups of objects or numbers? Why?
If you have numbers, can you still use objects? Does this help? Why?
What was your strategy for comparing numbers?
Could you order the numbers in the opposite way?
Does any number stay in the same place when we do this? Why?

Varied Fluency

Order the numbers from greatest to smallest.

13 18 15

Three children were playing basketball.
The scoreboard shows how many hoops they scores each.
The winner is the child who scores the most hoops.

Eva: 9
Jack: 16
Tommy: 13

Place the children in 1st, 2nd and 3rd

Order the numbers from greatest to smallest:

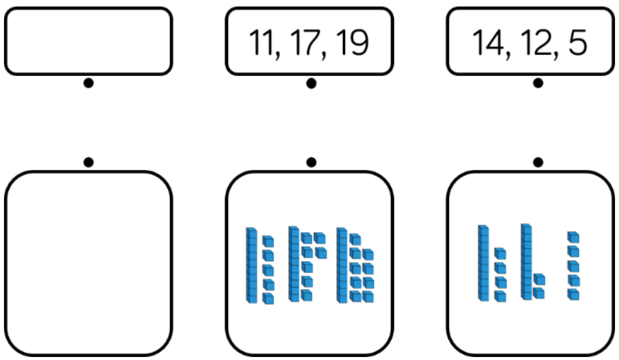
- 12, 5, 7
- 20, 17, 11

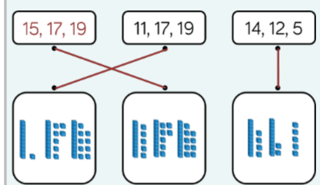
Now order them from smallest to greatest. What do you notice?

Order Numbers

Reasoning and Problem Solving

Complete the image and match the numerals to the correct picture.





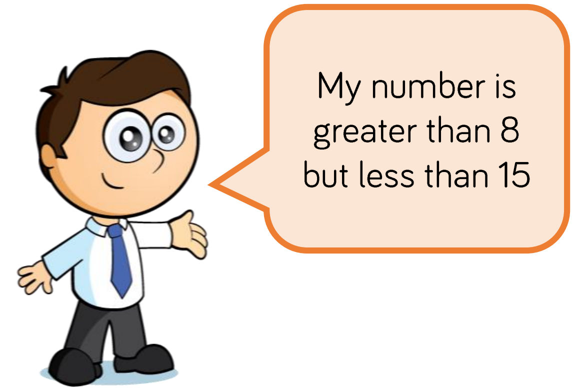
Order the numbers in each group from smallest to largest.

5, 12, 14
15, 17, 19
11, 17, 19

Order all of the numbers from smallest to largest.

5, 11, 12, 14, 15, 17, 17, 19, 19

Mr Monaghan says,



What could his number be?

Possible answers:

9, 10, 11, 12, 13 or 14