Autumn
Scheme of learning
Year 1

White Rose MATHS

#MathsEveryoneCan

The **White Rose Maths** schemes of learning

Teaching for mastery

Our research-based schemes of learning are designed to support a mastery approach to teaching and learning and are consistent with the aims and objectives of the National Curriculum.

Putting number first

Our schemes have number at their heart.
A significant amount of time is spent reinforcing number in order to build competency and ensure children can confidently access the rest of the curriculum.

Depth before breadth

Our easy-to-follow schemes support teachers to stay within the required key stage so that children acquire depth of knowledge in each topic. Opportunities to revisit previously learned skills are built into later blocks.

Working together

Children can progress through the schemes as a whole group, encouraging students of all abilities to support each other in their learning.

Fluency, reasoning and problem solving

Our schemes develop all three key areas of the National Curriculum, giving children the knowledge and skills they need to become confident mathematicians.

Concrete – Pictorial – Abstract (CPA)

Research shows that all children, when introduced to a new concept, should have the opportunity to build competency by following the CPA approach. This features throughout our schemes of learning.

Concrete

Children should have the opportunity to work with physical objects/concrete resources, in order to bring the maths to life and to build understanding of what they are doing.



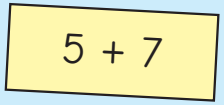
Pictorial

Alongside concrete resources, children should work with pictorial representations, making links to the concrete.
Visualising a problem in this way can help children to reason and to solve problems.



Abstract

With the support of both the concrete and pictorial representations, children can develop their understanding of abstract methods.



If you have questions about this approach and would like to consider appropriate CPD, please visit whiteroseeducation.com to find a course that's right for you.

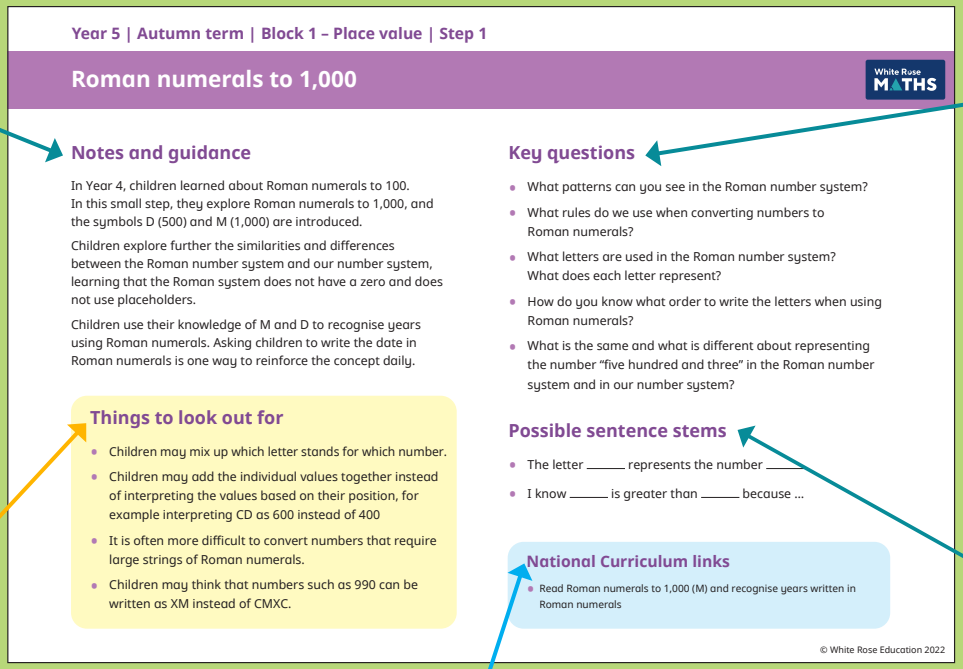
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Teacher guidance

Every block in our schemes of learning is broken down into manageable small steps, and we provide comprehensive teacher guidance for each one. Here are the features included in each step.

Notes and guidance that provide an overview of the content of the step and ideas for teaching, along with advice on progression and where a topic fits within the curriculum.



Year 5 | Autumn term | Block 1 – Place value | Step 1

Roman numerals to 1,000

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Notes and guidance

In Year 4, children learned about Roman numerals to 100. In this small step, they explore Roman numerals to 1,000, and the symbols D (500) and M (1,000) are introduced.

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

Children use their knowledge of M and D to recognise years using Roman numerals. Asking children to write the date in Roman numerals is one way to reinforce the concept daily.

Things to look out for

- Children may mix up which letter stands for which number.
- Children may add the individual values together instead of interpreting the values based on their position, for example interpreting CD as 600 instead of 400
- It is often more difficult to convert numbers that require large strings of Roman numerals.
- Children may think that numbers such as 990 can be written as XM instead of CMXC.

Key questions

- What patterns can you see in the Roman number system?
- What rules do we use when converting numbers to Roman numerals?
- What letters are used in the Roman number system? What does each letter represent?
- How do you know what order to write the letters when using Roman numerals?
- What is the same and what is different about representing the number "five hundred and three" in the Roman number system and in our number system?

Possible sentence stems

- The letter _____ represents the number _____
- I know _____ is greater than _____ because ...

National Curriculum links

- Read Roman numerals to 1,000 (M) and recognise years written in Roman numerals

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Key questions that can be posed to children to develop their mathematical vocabulary and reasoning skills, digging deeper into the content.

Things to look out for, which highlights common mistakes, misconceptions and areas that may require additional support.

National Curriculum links to indicate the objective(s) being addressed by the step.

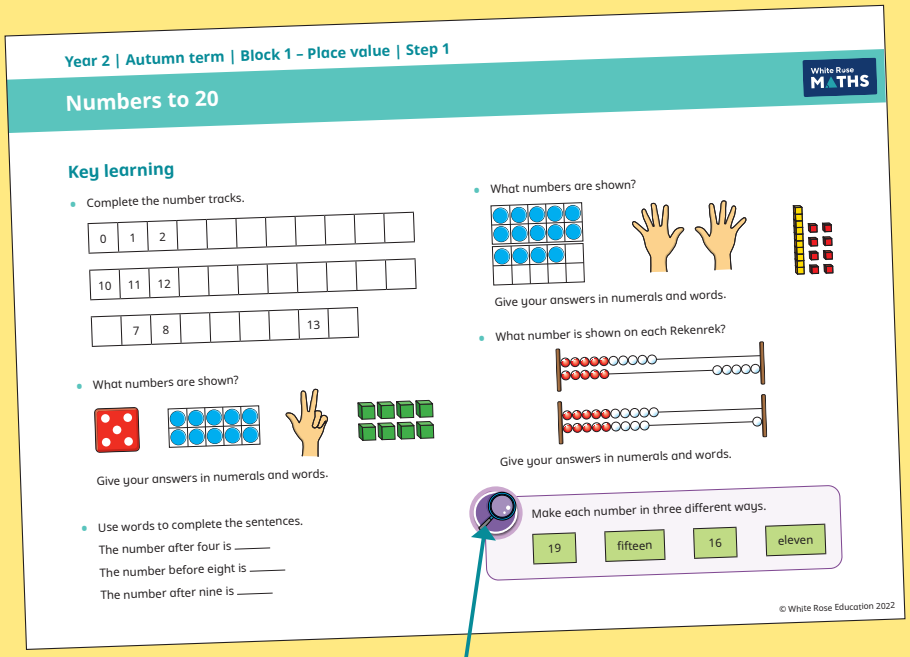
Possible sentence stems to further support children's mathematical language and to develop their reasoning skills.

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Teacher guidance

A **Key learning** section, which provides plenty of exemplar questions that can be used when teaching the topic.



Year 2 | Autumn term | Block 1 – Place value | Step 1

Numbers to 20

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Key learning

- Complete the number tracks.

0 1 2

10 11 12

7 8 13

- What numbers are shown?

Give your answers in numerals and words.

- Use words to complete the sentences.

The number after four is ____

The number before eight is ____

The number after nine is ____

- What numbers are shown?

Give your answers in numerals and words.

- What number is shown on each Rekenrek?

Give your answers in numerals and words.

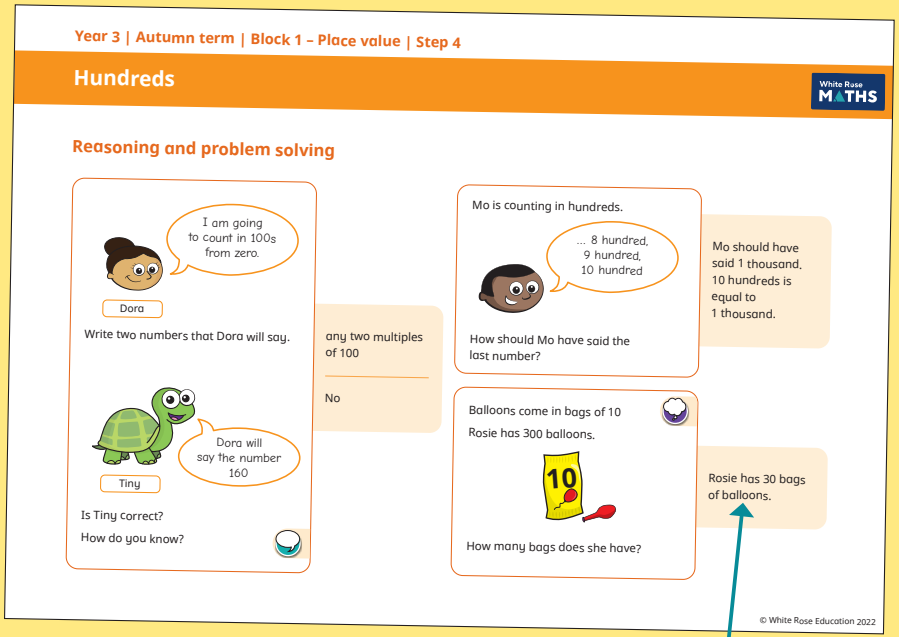
Make each number in three different ways.

19 | fifteen | 16 | eleven

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Activity symbols that indicate an idea can be explored practically

Reasoning and problem-solving activities and questions that can be used in class to provide further challenge and to encourage deeper understanding of each topic.



Year 3 | Autumn term | Block 1 – Place value | Step 4

Hundreds

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Reasoning and problem solving

Dora: I am going to count in 100s from zero.

Write two numbers that Dora will say.

any two multiples of 100

Tiny: Dora will say the number 160

Is Tiny correct?

How do you know?

No

Mo is counting in hundreds.

... 8 hundred, 9 hundred, 10 hundred

How should Mo have said the last number?

Mo should have said 1 thousand, 10 hundreds is equal to 1 thousand.

Balloons come in bags of 10

Rosie has 300 balloons.

How many bags does she have?

Rosie has 30 bags of balloons.

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Answers provided where appropriate

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Activities and symbols

Key Stage 1 activities

Key Stage 1 includes more hands-on activities alongside questions.

An activity to be led by the teacher



Use a Rekenrek in the ready position.



Ask children to show a number on their Rekenrek.

Can they write the number in numerals?

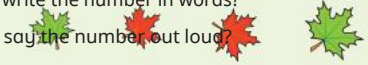
Can they write the number in words?

Can they say the number out loud?

An outside activity or one that uses resources from nature



Find some seeds and leaves to represent Autumn.

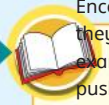


Get children to work with a partner to make numbers and write them in both numerals and words.

Ask children to sort the objects in three different ways and then compare their answers with a partner.

Encourage them to talk about how they have made the number, for example to make 15, they need to push 1 whole ten and then 3 more.

An activity introduced by a reading from an appropriate fiction or non-fiction book



Read *The Button Box* by M Reid.

Give children a selection of buttons and ask them to sort the buttons in as many different ways as they can.



Encourage them to think about size, shape, colour and number of holes.

An investigation



Give children a selection of 3D shapes.

Ask children to sort the objects into two groups and then challenge a partner to say how the objects have been sorted.



Key Stage 1 and 2 symbols

The following symbols are used to indicate:



concrete resources might be useful to help answer the question



a bar model might be useful to help answer the question



drawing a picture might help children to answer the question



children talk about and compare their answers and reasoning

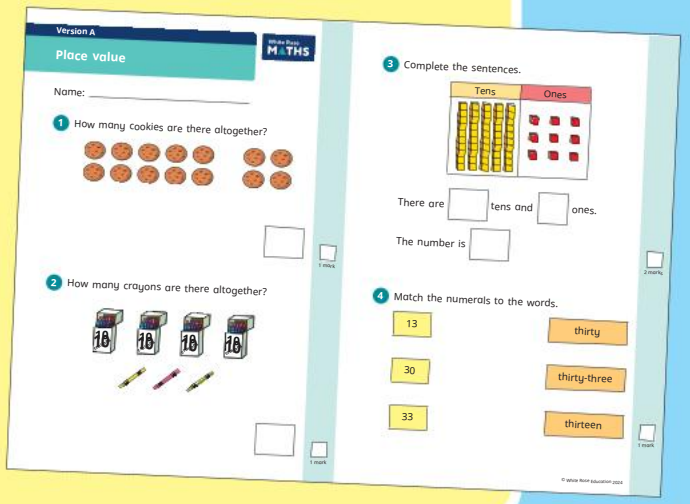


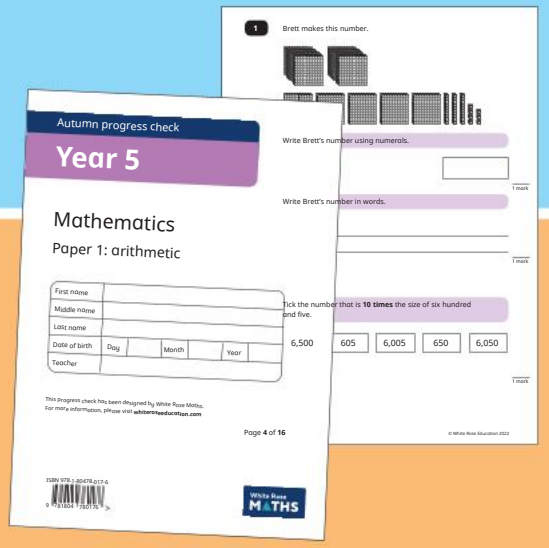
a question that should really make children think. The question may be structured differently or require a different approach from others and/or tease out common misconceptions.

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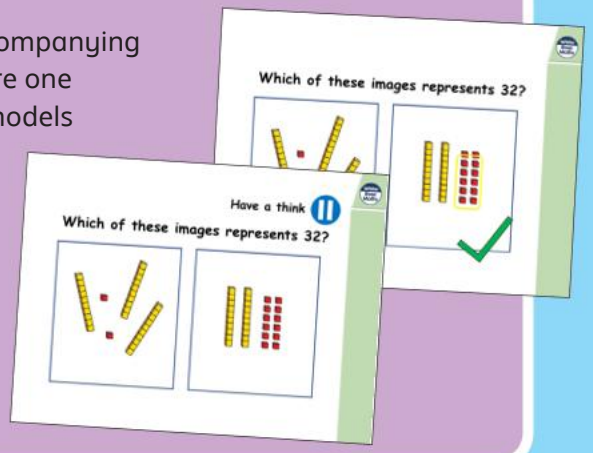
Free supporting materials

End-of-block assessments to check progress and identify gaps in knowledge and understanding.





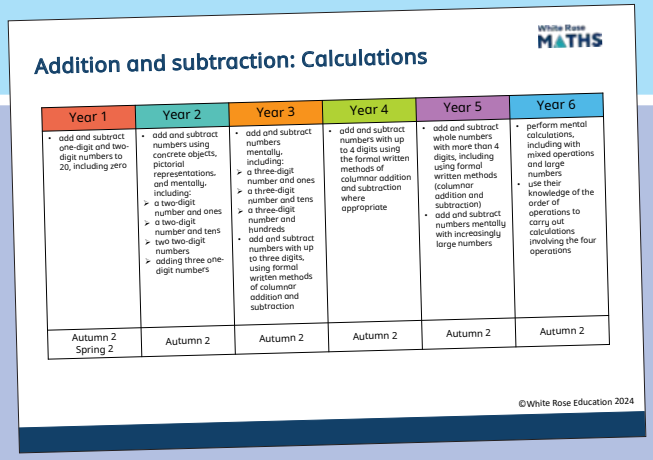
Each small step has an accompanying **home learning video** where one of our team of specialists models the learning in the step. These can also be used to support students who are absent or who need to catch up content from earlier blocks or years.



End-of-term assessments for a more summative view of where children are succeeding and where they may need more support.

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Free supporting materials



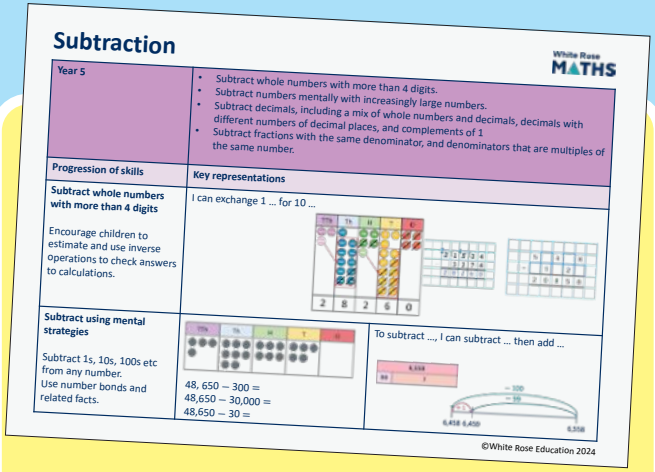
Addition and subtraction: Calculations

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Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• add and subtract one-digit and two-digit numbers to 20, including zero	• add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ➢ a two-digit number and ones ➢ a two-digit number and tens ➢ two two-digit numbers ➢ adding three one-digit numbers	• add and subtract numbers mentally, including: ➢ a three-digit number and ones ➢ a three-digit number and tens ➢ a three-digit number and hundreds • add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	• add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	• add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers	• perform mental calculations, including with mixed operations and large numbers • use their knowledge of the order of operations to carry out calculations involving the four operations
Autumn 2 Spring 2	Autumn 2	Autumn 2	Autumn 2	Autumn 2	Autumn 2

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National Curriculum progression to indicate how the schemes of learning fit into the wider picture and how learning progresses within and between year groups.



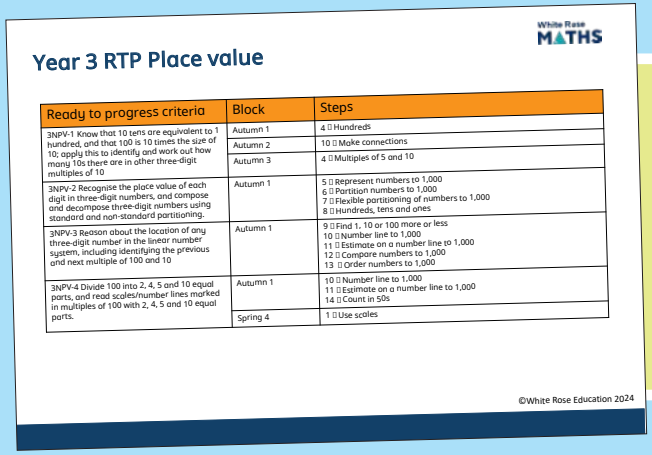
Subtraction

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Year 5	• Subtract whole numbers with more than 4 digits. • Subtract numbers mentally with increasingly large numbers. • Subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 • Subtract fractions with the same denominator, and denominators that are multiples of the same number.
Progression of skills	**Key representations**
Subtract whole numbers with more than 4 digits Encourage children to estimate and use inverse operations to check answers to calculations.	I can exchange 1 ... for 10 ...
Subtract using mental strategies Subtract 1s, 10s, 100s etc from any number. Use number bonds and related facts.	48, 650 − 300 = 48,650 − 30,000 = 48,650 − 30 = To subtract ..., I can subtract ... then add ...

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Calculation policies that show how key approaches develop from Year 1 to Year 6.



Year 3 RTP Place value

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Ready to progress criteria	Block	Steps
3NPV-1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10	Autumn 1	4 Hundreds
	Autumn 2	10 Make connections
	Autumn 3	4 Multiples of 5 and 10
3NPV-2 Recognise the place value of each digit in three-digit numbers, and compose and decompose three-digit numbers using standard and non-standard partitioning.	Autumn 1	5 Represent numbers to 1,000 6 Partition numbers to 1,000 7 Flexible partitioning of numbers to 1,000 8 Hundreds, tens and ones
3NPV-3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10	Autumn 1	9 Find 1, 10 or 100 more or less 10 Number line to 1,000 11 Estimate on a number line to 1,000 12 Compare numbers to 1,000 13 Order numbers to 1,000
3NPV-4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts.	Autumn 1	10 Number line to 1,000 11 Estimate on a number line to 1,000 14 Count in 50s
	Spring 4	1 Use scales

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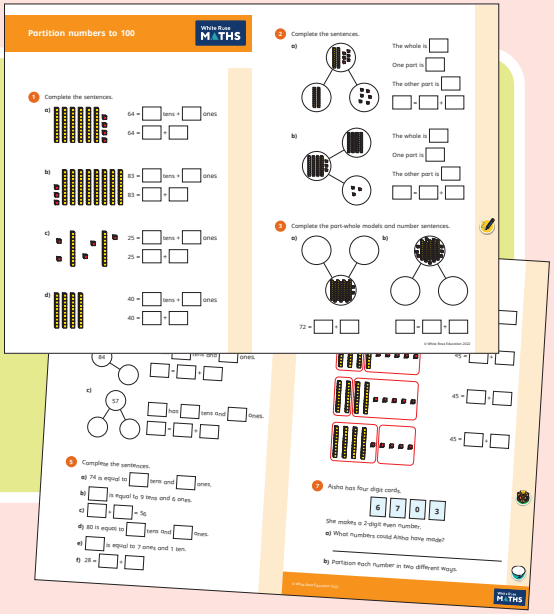
Ready to progress mapping that shows how the schemes of learning link to curriculum prioritisation.

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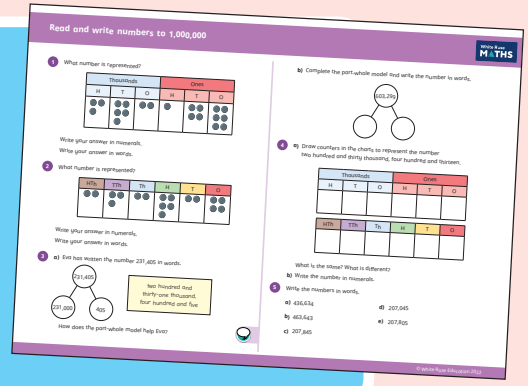
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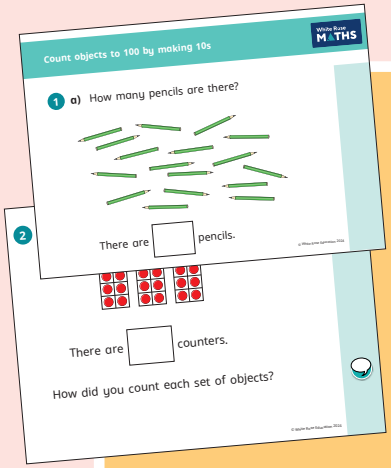
Premium supporting materials

Worksheets to accompany every small step, providing relevant practice questions for each topic that will reinforce learning at every stage.



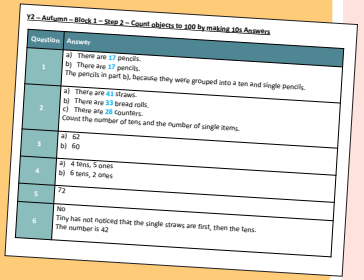
Display versions of the worksheet questions for front of class/whole class teaching.

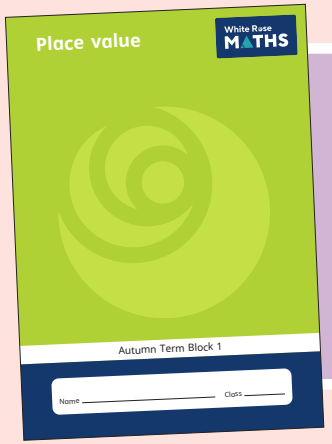




PowerPoint™ versions of the worksheet questions to incorporate them into lesson planning.

Answers to all the worksheet questions.





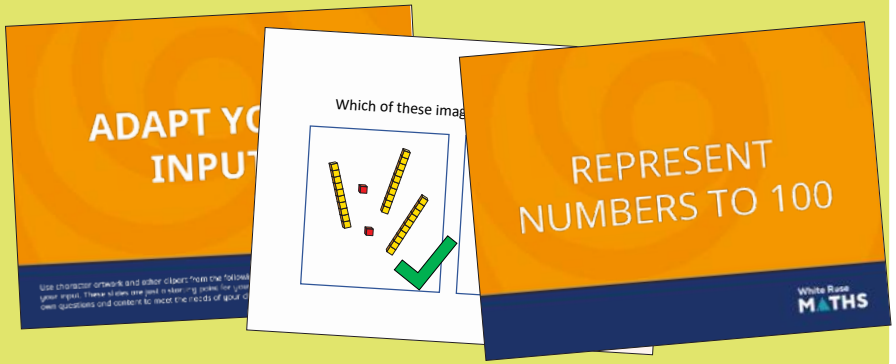
Also available as printed **workbooks**, per block.

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Premium supporting materials

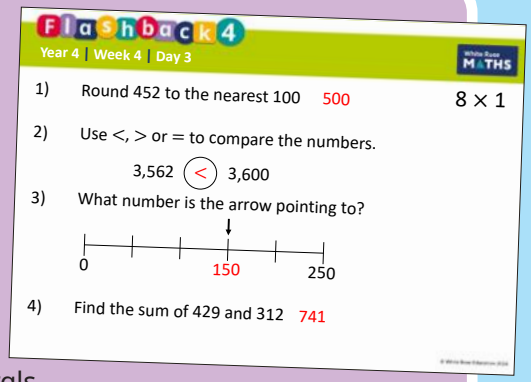
Adaptable input slides that mirror the content of our home learning videos for each step. These are fully animated and editable, so can be adapted to the needs of any class.



A **true or false** question for every small step in the scheme of learning. These can be used to support new learning or as another tool for revisiting knowledge at a later date.



Flashback 4 starter activities to improve retention.
Q1 is from the last lesson;
Q2 is from last week;
Q3 is from 2 to 3 weeks ago;
Q4 is from last term/year.
There is also a bonus question on each one to recap topics such as telling the time, times-tables and Roman numerals.





Topic-based CPD videos
As part of our on-demand CPD package, our maths specialists provide helpful hints and guidance on teaching topics for every block in our schemes of learning.

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Meet the characters

Our class of characters bring the schemes to life, and will be sure to engage learners of all ages and abilities. Follow the children and their class pet, Tiny the tortoise, as they explore new mathematical concepts and ideas.



Yearly overview

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

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value (within 10)**					Number **Addition and subtraction (within 10)**					Geometry **Shape**	Consolidation
Spring	Number **Place value (within 20)**			Number **Addition and subtraction (within 20)**			Number **Place value (within 50)**		Measurement **Length and height**		Measurement **Mass and volume**	
Summer	Number **Multiplication and division**			Number **Fractions**		Geometry **Position and direction**	Number **Place value (within 100)**		Measurement **Money**	Measurement **Time**		Consolidation

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Autumn Block 1

Place value (within 10)

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Small steps

Step 1	Sort objects
Step 2	Count objects
Step 3	Count objects from a larger group
Step 4	Represent objects
Step 5	Recognise numbers as words
Step 6	Count on from any number
Step 7	1 more
Step 8	Count backwards within 10

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Small steps

Step 9	1 less
Step 10	Compare groups by matching
Step 11	Fewer, more, same
Step 12	Less than, greater than, equal to
Step 13	Compare numbers
Step 14	Order objects and numbers
Step 15	The number line

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Sort objects

Notes and guidance

In this small step, children learn that collections of objects can be sorted into sets based on attributes such as colour, size or shape. Sorting enables children to consider what is the same about all the objects in one set and how they differ from the objects in other sets.

Children need to understand that the same collection of objects can be sorted in different ways and should be encouraged to come up with their own criteria for sorting objects into sets.

Practical activities should be used to support the learning in this step and ideas are suggested in Key learning. The concept of sorting can also be reinforced during daily activities such as lining up. Children could be asked to line up based on certain criteria, for example whether they have a sister.

Things to look out for

- Children may think that a group of objects can only be sorted in one way.
- Children may not focus on a single similarity, but instead on different attributes, leading to incorrect placement of objects in some sets.

Key questions

- What is the same about all the objects in the set?
- What is different about the sets?
- Can you find an object that belongs to this set?
- Can you find an object that does not belong to this set? Why does it not belong?
- Can you think of a different way to sort the objects?

Possible sentence stems

- This set of objects has been sorted by _____
- I could also sort the objects by _____
- _____ does belong in the set because ...
- _____ does not belong in the set because ...

National Curriculum links

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

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Sort objects

Key learning

Find some seeds and leaves to represent Autumn.



Ask children to sort the objects in three different ways and then compare their answers with a partner.

Read *The Button Box* by M Reid.

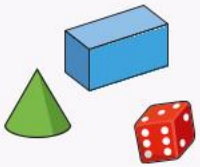
Give children a selection of buttons and ask them to sort the buttons in as many different ways as they can.



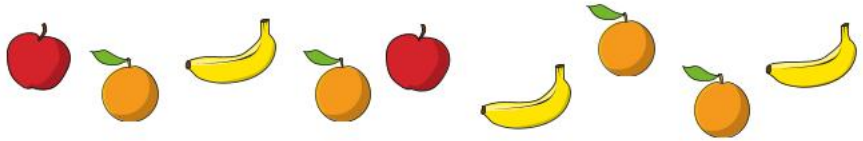
Encourage them to think about size, shape, colour and number of holes.

Give children a selection of 3-D shapes.

Ask children to sort the objects into two groups and then challenge a partner to say how the objects have been sorted.

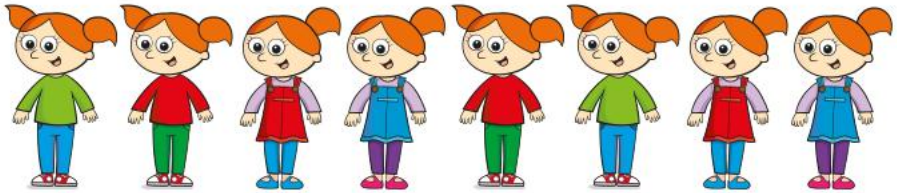


- Sort the fruit into groups.



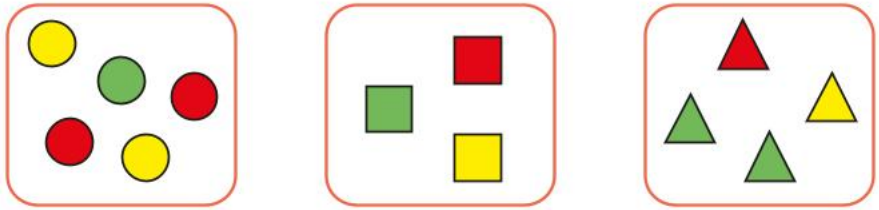
Explain how you have sorted them.

- Look at the pictures of Alex.



How many different ways can you find to sort them?

- How have the shapes been sorted?



How else could you sort them?

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Sort objects

Reasoning and problem solving



Begin with a large pile of objects such as buttons.

Tell the children you have a sorting rule, and they need to work out what it is.

One at a time, place an object into your set that fits the rule.

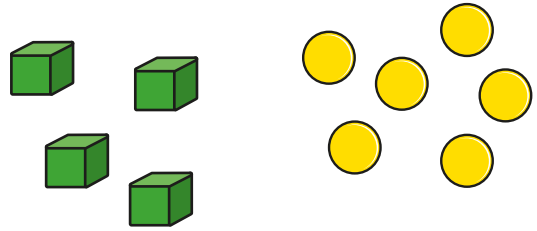
What do children notice first? How long does it take them to work out the sorting rule?

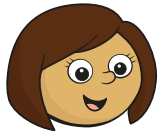
When they think they know your sorting rule, ask the children to choose an object that belongs in your set. Tell them if they are correct or incorrect.

Challenge the children to create their own sorting rule for you to work out.

Answers will vary depending on the rule chosen.

Kim and Mo are trying to find the sorting rule.





The objects are sorted into cubes and counters.

Kim

The objects are sorted into green and yellow.



Mo

Who is correct? How do you know?

Kim and Mo could both be correct, as all the cubes are green and all the counters are yellow.

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Count objects

Notes and guidance

The aim of this small step is for children to be able to fluently count to 10 when counting objects. Focus on the five counting principles when assessing children's ability to count accurately.

The one-to-one principle: Children assign one number name to each object that is being counted.

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

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

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

The order-irrelevance principle: The order in which they count a group of objects is irrelevant. There will still be the same number.

Things to look out for

- Children may count objects more than once or miss an object out. Encourage them to line up objects and touch each one as they count, saying one number per object.

Key questions

- How many objects are there?
- If I move them around, are there still the same number of objects? Count and check.
- Does it matter which object you count first?
- Can you count how many claps I do?
- Should you start counting at 1 or zero?
- How do you know you have counted all the objects?
- How do you know you have not counted any objects more than once?

Possible sentence stems

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

National Curriculum links

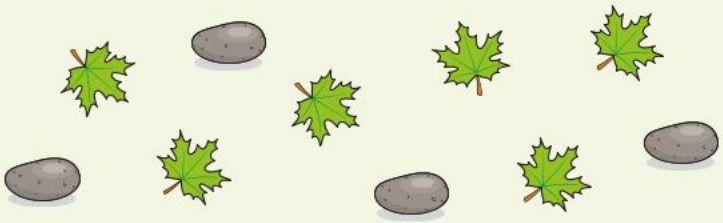
- Count to and across 100, forwards and backwards, beginning with zero or 1, or from any given number
- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least

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Count objects

Key learning

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



How many stones are there?

How many leaves are there?

How many objects are there in total?

What happens if I arrange them differently? Is there still the same number of objects?

- Here are some spiders.



How many spiders are there?

How did you count them?

- Here are some dogs.



How many dogs are there?

How many eyes are there?

- Here are some children.



How many children are there?

How many children have glasses?

How many children have a hat?

- What number is on each dice?



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Count objects

Reasoning and problem solving



Ask children to count how many times you clap.



Can they count along while you clap?

What number do they always start from?

What happens if you clap at a different speed?

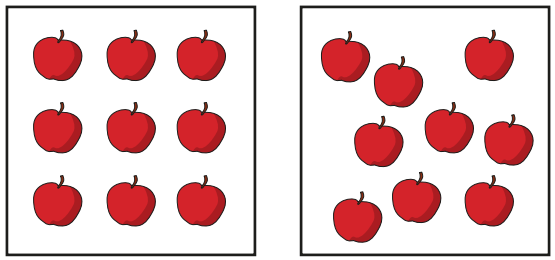
Pause for different amounts of time between claps and ask children if it changes how many claps there are.

Ask children to clap 7 times, counting each clap.

Ask them to clap 10 times.

various possible answers

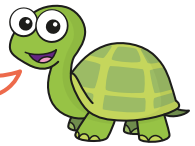
The apples show two numbers.





The numbers are the same.

Mo



The numbers are not the same.

Tiny

Who do you agree with?

Why?

Mo

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Count objects from a larger group

Notes and guidance

In this small step, children continue to count objects, but this time they are asked to count a specific number of objects from a larger group. This requires children to be more organised and careful when counting.

From a larger group, children select a given number of objects and count them out. When asked "How many?", they should be able to recall the final number they said. Children who have not grasped the cardinal counting principle will recount the whole group again.

To support children, it may be useful to ask them to count the objects onto a mat or into a container before moving on to pictorial representations.

Things to look out for

- Children may count objects more than once or miss an object out that needs to be counted. Encourage children to line up objects and touch each one as they count, saying one number per object.
- The objects that have been counted may get mixed up with the rest of the objects. Encourage children to place the objects that they have counted onto a mat or into a container to help them.

Key questions

- How many objects are there? If I move them around, are there still the same amount? Count and check.
- Does it matter which object you count first?
- How do you know which objects you have counted and which you have not counted?
- Did you need to count them all?
- How many are left?

Possible sentence stems

- The last number I said was _____, so there are _____ objects in total.
- I need to count _____ objects from the group.
- There are _____ objects left in the group.

National Curriculum links

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

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Count objects from a larger group

Key learning



Put children in pairs and give them 10 cubes.

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

While one child says the number, the other should count it out in cubes.



Give children number cards from 1 to 10

Ask them to pick a card, and then go outside and find that number of leaves, conkers or pine cones.





Read *The Button Box* by M Reid.

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

- 5 buttons with two holes
- 7 blue buttons
- 9 circular buttons with four holes



- Count 3 balloons.



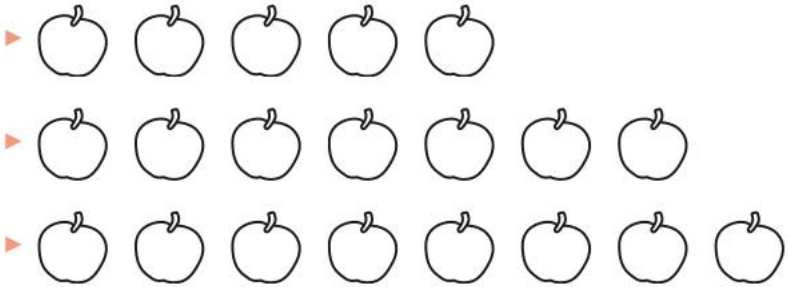
- Count 6 dogs.



- Count 4 trees.



- Colour 5 apples in each set.



What do you notice?

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Count objects from a larger group

Reasoning and problem solving

Circle a group of 2 cats.



Circle a group of 5 cats.



Circle a group of 6 cats.

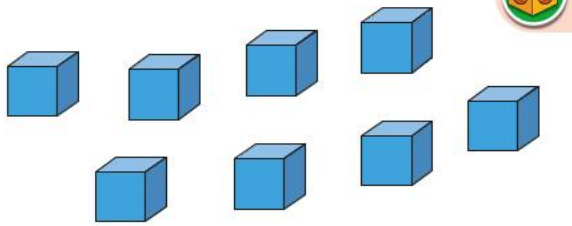


How many cats are **not** circled in each set?

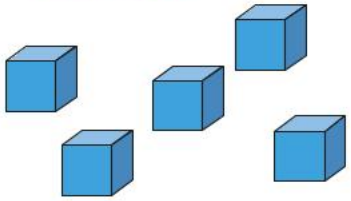
correct number of cats circled

5, 2, 1

Tiny wants to count 3 cubes from this group.







Explain the mistake that Tiny has made.

Tiny is showing the amount **not** counted, rather than the amount counted.

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Represent objects

Notes and guidance

In this small step, children learn to represent real-life objects such as apples, leaves and sweets using manipulatives such as counters and cubes. They also match numerals to a set of objects, but do not yet use the written words. The purpose is to ensure that children realise that they can represent anything with mathematical equipment or pictures and it can still be counted in the same way.

Children also have the opportunity to practise writing numerals to match a set of objects.

Ten frames are particularly useful for this small step, as they allow children to organise their manipulatives in a structured way.

Things to look out for

- Some children may miscount when representing objects. Encourage them to touch each image or object as they say each number.
- Children may be able to say the correct number of objects but write the wrong numeral.
- Children may write numerals back to front. At this stage, it is nothing to worry about, but children could be provided with templates to trace as extra practice.

Key questions

- How many apples are there?
- So how many counters do you need?
- How can you use cubes to show how many leaves you have?
- Draw circles to show the sweets. How many circles will you draw?
- I have 7 counters. Which picture do they match?

Possible sentence stems

- I can use a _____ to represent each _____
- There are _____ carrots.
  I am using 1 counter to represent each carrot.
  I need _____ counters.
- There are _____ frogs, so I need _____ cubes/counters.

National Curriculum links

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

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Represent objects

Key learning



Give children a selection of natural objects.



Ask children to take it in turns to show the class their natural objects while everyone else uses counters to represent the number of objects.







Give each child or pair of children a set of digit cards from 0 to 10, some counters or cubes and a ten frame.

Show an image of some objects, such as 6 balloons or 5 elephants.

Ask children to represent the objects using their counters and ten frame.

Then ask children to hold up the digit card that matches what they have made.

Repeat this with different objects.



Read *Mouse Count* by Ellen Stoll Walsh.

As you read the book, ask children to represent the mice using counters and a ten frame.

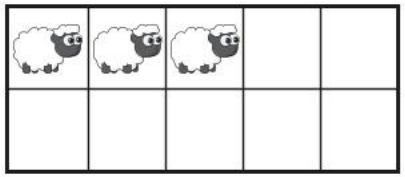
- Use counters and a ten frame to show the number of objects in each set.

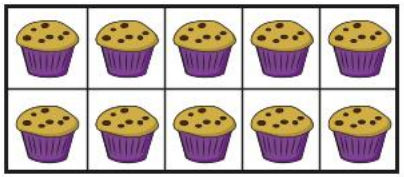


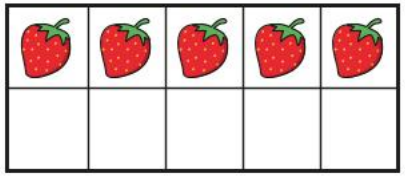


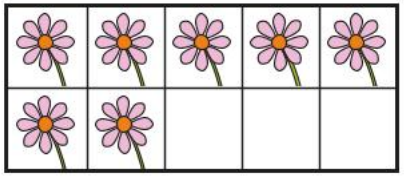


- Write the numeral to match each set of objects.









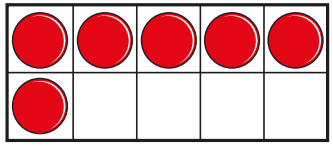
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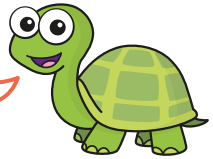
Represent objects

Reasoning and problem solving

Ron and Tiny are counting cars.







There are 6 cars.

Tiny



There are 5 cars.

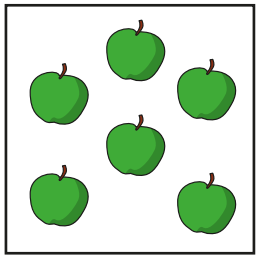
Ron

5

Who do you agree with?

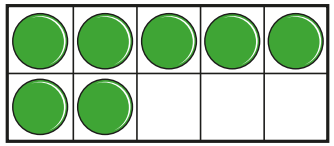
Tiny

Here are two sets of objects.





Which set of objects does the ten frame show?

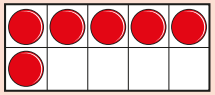


How many objects are there?

Show the other set of objects on a ten frame.

balloons

7



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Recognise numbers as words

Notes and guidance

Children should now be confident representing and counting numbers to 10. They can say the numbers to 10 verbally, represent objects and images using counters and cubes, and write the numeral to match. In this small step, children learn to recognise each numeral as a word.

At this point, children are not expected to write the words independently. Instead, they use matching activities to help build recognition and confidence.

Things to look out for

- Children are likely to be confident with the words one, two and three, but may get mixed up after this point. In particular, words that start with the same letter, for example four/five and six/seven, can cause confusion.
- Children may struggle to associate the sound of the word eight with the spelling. In contrast, they may find six easier due to it starting with the "ssss" sound.
- Seven is the only two-syllable word, but it has the same number of letters as three and eight. Children may find this confusing and look for a longer word for 7

Key questions

- How many words can you match to the numerals? Which ones are left?
- Which word begins with the letter "n"? Which numeral does this match?
- Which word begins with the letter "z"? Which numeral does this match?
- Does the greatest number always have the most letters in the word?
- Does the smallest number always have the fewest letters in the word?

Possible sentence stems

- The numeral for five is _____
- The numeral for _____ is _____

National Curriculum links

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

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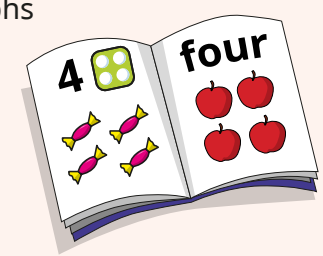
Recognise numbers as words

Key learning



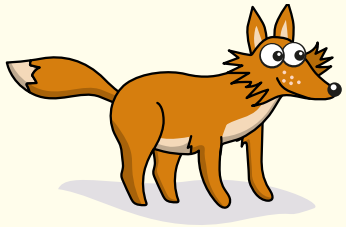
Make a class counting book, with a double-page spread for each number from zero to 10

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





Read *One Fox* by Kate Read.



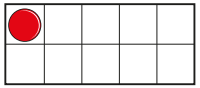
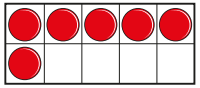
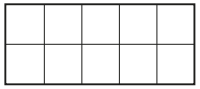
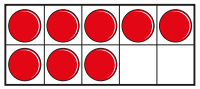
The book tells the story of a hungry fox visiting a hen house. It helps children to associate each numeral with an image and the word to represent it.

- Match the numerals to the words.

5	two
2	nine
7	five
9	seven

- How many counters does each ten frame show?

  Match the ten frames to the words.

zero

eight

six

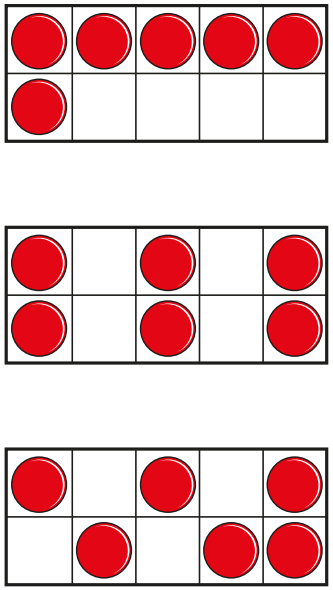
one

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Recognise numbers as words

Reasoning and problem solving

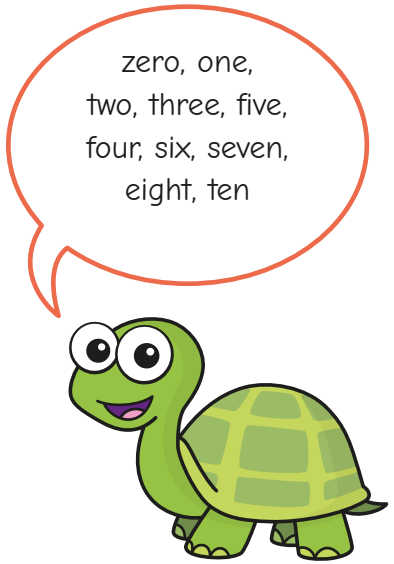
Which ten frames show six?



How do you know?

all of them

Tiny is counting to 10



What mistakes has Tiny made?

Tiny has mixed up four and five and missed out nine.

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Count on from any number

Notes and guidance

In this small step, children count on from any number while staying within 10. For example, they may be given a starting number of 4 and asked to continue "5, 6, 7, 8, 9, 10".

Ten frames and number tracks are useful tools to support children with this concept. When used side by side, they help children to continue to link a representation to the numeral and/or the word. Note that children have not yet been formally introduced to the number line, so using this representation at this stage could be confusing.

Being able to count on is an important skill to develop in preparation for addition, where children can start with an amount and count on to get the total.

Things to look out for

- Children who are not yet confident with counting may want to go back to starting at zero or 1 rather than starting at a different number. Using a ten frame and counters can help with this. Start with 4 counters on a ten frame, for example, then add another counter and say "5", add another and say "6", and so on.

Key questions

- What number are you starting from?
- What number comes next?
- If I add another counter, what number is shown?
  If I add another counter, what number is shown now?
- Do you always need to start at zero to count to 10?
- Which numbers did you not need to say? Why?

Possible sentence stems

- I need to start counting from _____
- The number that comes after _____ is _____
- I will say the number _____ because ...
- I will not say the number _____ because ...

National Curriculum links

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

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Count on from any number

Key learning



In pairs, children need a dice, a ten frame, 10 counters and a blank number track.

One child rolls a dice to get a starting number, for example 3

The first child makes the number 3 on the ten frame and the second child writes the number 3 in the number track.

Together, they then add a counter and continue the number track until they reach 10



In the playground, use a ready painted number track or draw one using chalk.



Throw a giant foam dice to get a starting number or pick a number at random.

Ask a child to go and stand on that number, then jump and count at the same time until they get to 10

- Complete the number tracks.

2	3	4						

5	6							

3								

- Count from five to ten.



Without using equipment or number tracks, shout out a starting number and ask children to continue from that number, chanting together.

Nominate some children to shout out a starting number in turn for everyone to continue.

To extend this activity, children could challenge you and you could make some deliberate mistakes for them to spot!

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Count on from any number

Reasoning and problem solving

Kim is counting to 10

She starts at 4



Which speech bubble belongs to Kim?

A one, two, three, four, five, six, seven, eight, nine, ten

B four, five, six, seven, eight, nine, ten

C five, six, seven, eight, nine, ten

How do you know?

B

Complete the number tracks.

				5		
				6		
4	5					

What do you notice where the tracks cross each other?

across:
4, 5, **6**, **7**, **8**, **9**, **10**

down:
4, 5, 6, **7**, **8**, **9**, **10**

They show the same number, 8

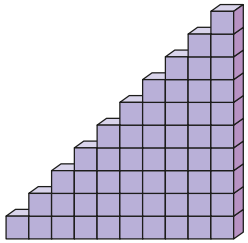
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1 more

Notes and guidance

Once children are confident placing numbers on a track, the language of "1 more" can be introduced. Children need to know that 1 more is the number after, and they should use their counting skills or a number track to help them.

Cubes are a useful manipulative to show the concept of "1 more", as children can link this to the everyday activity of climbing the stairs.



Things to look out for

- Children may not understand the meaning of the word "more". Use practical games to help them. For example, give them some cubes and then give them 1 more while saying, "You now have 1 more." Ask children to repeat to you, "You have given me 1 more cube."

Key questions

- What does "1 more" mean?
- How can you show 1 more?
- Where is 1 more than _____ on the number track?
- Do you need to count from zero every time you find 1 more?
- How many did you start with? Then what happened? How many are there now?
- What is 1 more than _____?

Possible sentence stems

- 1 more than _____ is _____
- _____ is 1 more than _____
- First there were ...
  Then ...
  Now there are ...

National Curriculum links

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

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1 more

Key learning



The following books/stories all link to the concept of "1 more": *One Fox* by Kate Read, *Counting Crocodiles* by Judy Sierra, *The Gingerbread Man* (traditional) and *The Enormous Turnip* (traditional).

Read one or more of the books/stories as a class.

Give the children cubes as you read the story, so that they can add 1 more cube while you read.



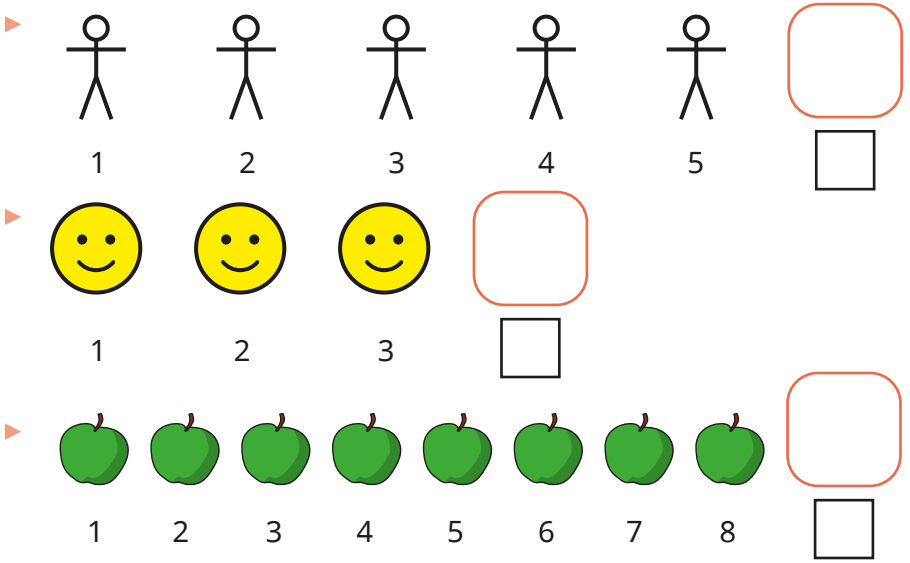
Use "first, then, now" to tell simple maths stories, such as this one, based around real-life events.

> First there were 4 children on the bus.
> Then 1 more child got on the bus.
> How many children are on the bus now?

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

- Draw 1 more.

  Write the number.



- Choose a digit from 0 to 9 to complete the table.

Number in numerals	Number in words	Number track
Sentence 1 more than _____ is _____		

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1 more

Reasoning and problem solving

Here are some digit cards.

0	1	2	3	4
5	6	7	8	9

Use the cards to complete the sentences.

1 more than ☐ is ☐

☐ is 1 more than ☐

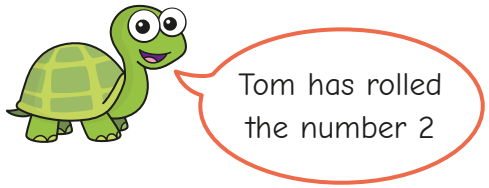
What do you notice?

0, 1

1, 0

Tom rolls a dice.

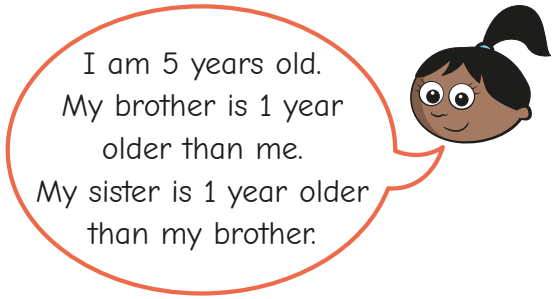
He rolls 1 more than 3



What mistake has Tiny made?

2 is 1 less than 3

Tom's number is 4



How old is Sam's brother?

Who is the oldest?

How do you know?

6 years old

Sam's sister

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Count backwards within 10

Notes and guidance

In this small step, children learn to count backwards within 10

Children can find counting backwards tricky. The use of songs and rhymes can be particularly useful to help develop this skill. As in the previous steps, it is also useful to use cubes and number tracks to support children.

Countdowns are a fun way to reinforce counting backwards, such as a countdown to a rocket launch or a countdown to the start of a race. Being able to count backwards will help children when they begin to learn about subtraction, where one method that they may use is counting back.

Things to look out for

- Up to this point, children have focused on counting forwards and will have got into a rhythm. Understandably, they will need some time to gather a rhythm for counting backwards. The main way for children to become fluent is plenty of verbal practice.
- Children may stop at 1, rather than continuing to zero.
- Children may miss out numbers or say them in the wrong order. Use completed number tracks to support them as they count backwards aloud.

Key questions

- What is the same and what is different about counting forwards to 10 and counting backwards from 10?
- When counting backwards, do you say the same words as when counting forwards?
- Should you stop counting at 1 or zero?
- Can you think of times you might need to count backwards in real life?
- When counting backwards, do the numbers get bigger or smaller?

Possible sentence stems

- The number that comes before _____ is _____
- When counting backwards from _____, the numbers I will say are ...

National Curriculum links

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

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Count backwards within 10

Key learning



Read *One to Ten and Back Again* by Nick Sharratt and Sue Heap.

Ask children to build their own count back pattern, starting the count at different places.



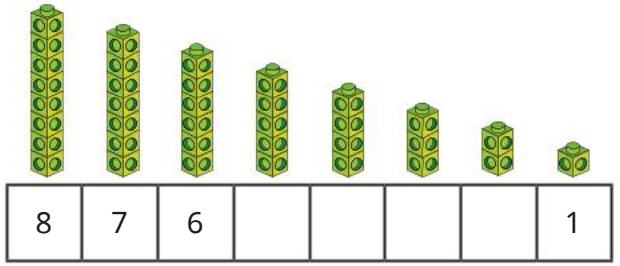
Get creative together and make some rockets.



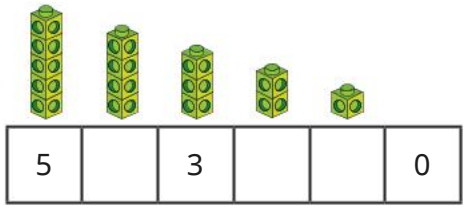
Ask children to "blast-off" their rockets, counting down from any given number to zero.

To add an extra element to this activity, children could make numbered rockets with the correct number of windows.

- Complete the number tracks.



8	7	6					1



5		3			0

- Complete the number tracks.

6	5		3			0

10		8	7			

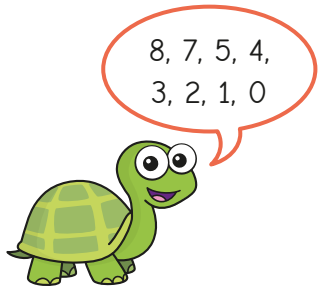
10	9							2		

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Count backwards within 10

Reasoning and problem solving

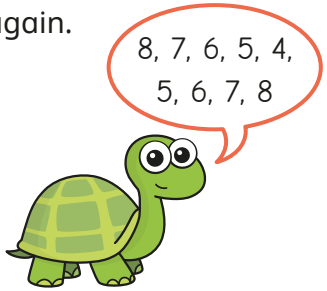
Tiny counts backwards from 8



What mistake has Tiny made?

Tiny has missed the number 6

Tiny tries again.

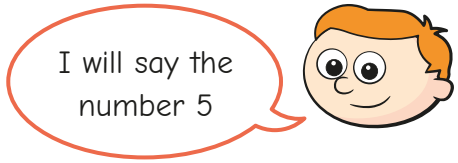


What mistake has Tiny made this time?

Tiny started counting backwards but then changed to counting forwards in the middle.

Work with a partner to help Tiny count backwards from 8

Ron counts backwards from 7



Do you agree with Ron?

Why?

Yes

Jo counts backwards from four.



Has Jo finished?

How do you know?

No

She has not said zero.

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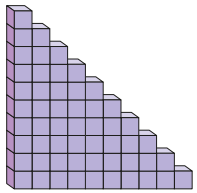
1 less

Notes and guidance

Once children are confident counting backwards and placing numbers on a track, the language of "1 less" can be introduced. In this small step, children need to know that 1 less is the number before and they should use their counting skills or a number track to help them.

It is important to make references back to previous learning on finding 1 more, so that children understand that finding 1 less is the opposite of finding 1 more.

Cubes are a useful manipulative to show the concept of "1 less", as children can link this to the everyday activity of walking down the stairs.



Things to look out for

- Children may not understand the meaning of the word "less". Use practical games to help them. For example, give them some cubes, then take one away while saying, "You now have 1 less." Ask children to repeat to you, "I have 1 less cube."

Key questions

- What does "1 less" mean?
- How can you show 1 less?
- How can counting help you with finding 1 less?
- Where is 1 less than _____ on the number track?
- What is 1 less than _____?
- What is the same and what is different about finding 1 more and finding 1 less?

Possible sentence stems

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

National Curriculum links

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

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1 less

Key learning

Work outside and put children in pairs to find the objects.

- 1 less than 3 leaves 
- 1 less than 5 sticks 

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

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

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

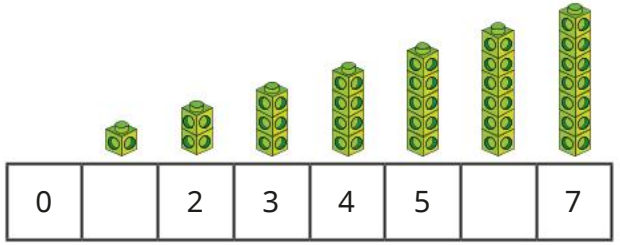
Ask children to roll a dice, represent the number using cubes and then find 1 less than the number.

Then ask them to complete the sentences.

1 less than _____ is _____

_____ is one less than _____

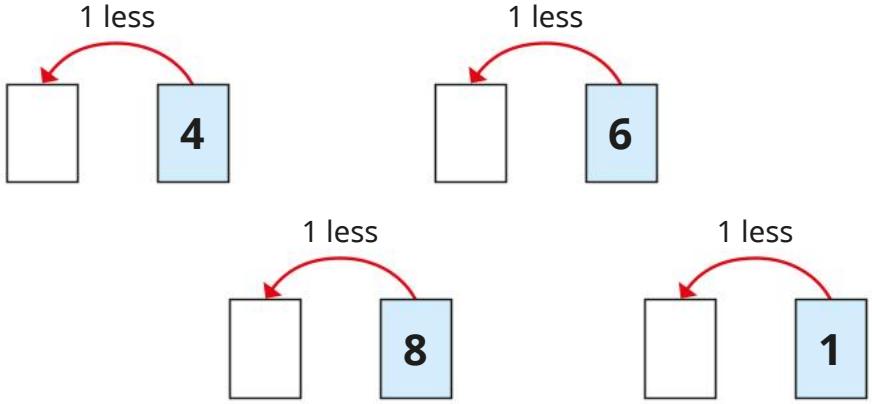
- Complete the number track.



Complete the sentences.

- 1 less than 7 is _____
- _____ is 1 less than 7
- 1 less than 2 is _____
- _____ is 1 less than 2

- Find 1 less than each number.

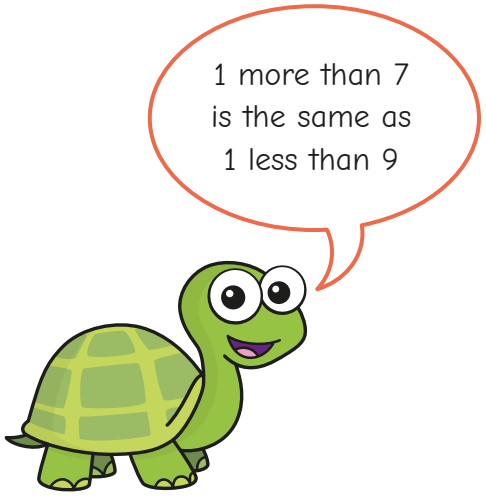


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1 less

Reasoning and problem solving

Tiny is counting 1 more and 1 less.



Is Tiny correct?

How do you know?

Think of another 1 more/1 less sentence.

Yes

Complete the sentences.

1 less than 9 is ☐

1 less than ☐ is 7

1 less than ☐ is 6

What pattern can you see?

What is the next sentence in the pattern?

8, 8, 7

The numbers are counting backwards.

1 less than 6 is 5

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Compare groups by matching

Notes and guidance

In this small step, children match one object with another to compare groups. This is sometimes referred to as one-to-one correspondence, where children check if, for example, there are enough presents for everyone to have one each. Children should be exposed to situations where there are too many, not enough or just the right amount.

Children should be encouraged to move physical objects or draw lines between pictorial representations to support them in matching.

At this stage, children do not need to know the exact difference between the groups if there is a difference.

Things to look out for

- Children may miscount one group and therefore make a mistake. Encourage children to touch each image or object as they count it and say the number as they touch.
- Children need to pay careful attention to the question. For example, if there are 5 presents and 4 children, each child can have a present. But if the words are the other way around – 5 children and 4 presents – then each child will not get a present.

Key questions

- What does "match" mean?
- How can you show you have matched the objects/pictures?
- What can you use to represent the picture? How can you check if the groups match?
- Are there enough objects/pictures to match them all up?
- Are there any left over? Why has that happened?

Possible sentence stems

- There are _____ children and _____ presents.
  Each child can/can not have a present because ...
- I know that there are/are not enough objects/pictures to match them all up because ...

National Curriculum links

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

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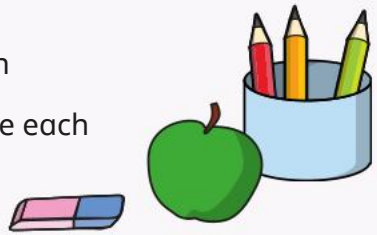
Compare groups by matching

Key learning

Use equipment and objects in the classroom.

As a class, check if there are enough:

- pencils for one each
- rubbers for one each
- pieces of fruit for one each



Tell children that they need to go outside on a secret mission!

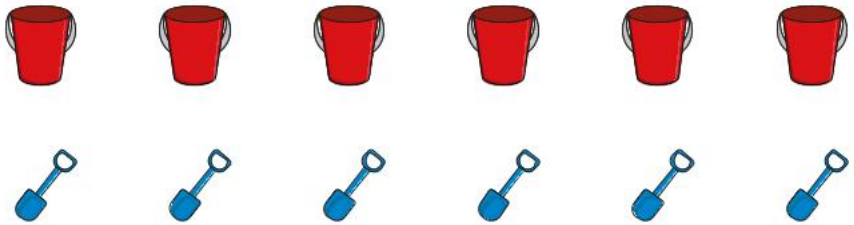
Tiny wants them to collect some natural objects for Jo, Max and Dan.

Jo, Max and Dan need 1 natural object each.

Ask children how many natural objects they need to collect.

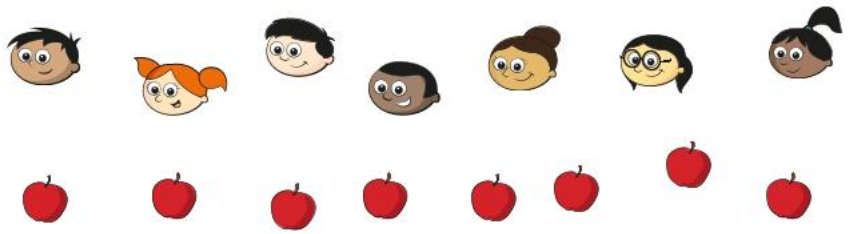
Put the collections together and tell children that Tiny will collect them at midnight in secret ... shhhh!

- Draw a line from each bucket to a spade.



Is there a spade for each bucket?

- Draw a line from each child to an apple.



Can each child have an apple?

- Can each bird have a wiggly worm?

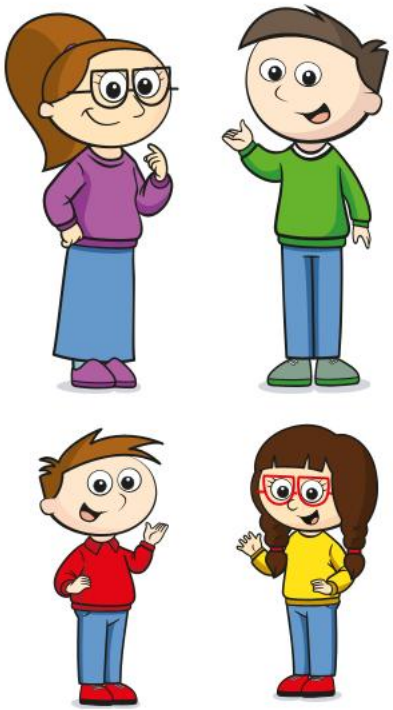


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Compare groups by matching

Reasoning and problem solving

Here is a family.

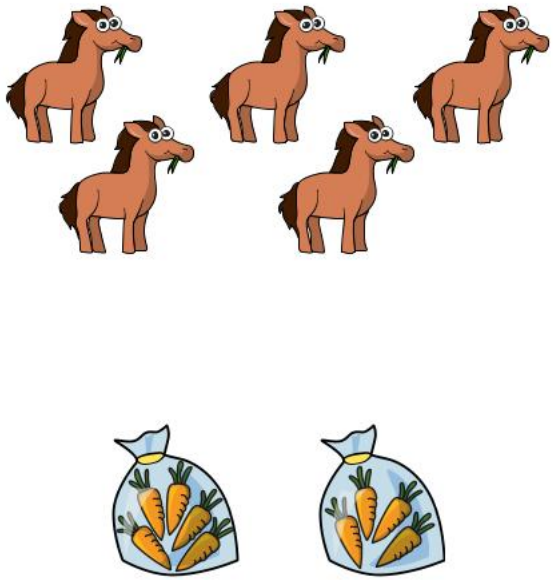


Can the family travel in a car that has 5 seats?

How do you know?

Yes

Tick the bag of carrots that matches the number of horses.



How did you choose?

bag of 5 carrots ticked

There are 5 horses, so the bag with 5 carrots matches the horses.

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Fewer, more, same

Notes and guidance

In this small step, children compare numbers of objects.

It is important to ensure that children have clear understanding of new vocabulary such as "fewer", "more" and "same". They need to practise using the words in a variety of contexts in the same way that they need to practise working with numbers in a variety of contexts. In particular, the word "fewer" can be tricky, as many adults tend to incorrectly use the word "less" instead. "Fewer" is used when talking about a number of things or objects, whereas "less" is used when talking about values. For example, "There are fewer blue cars than red cars" is correct, not "There are less blue cars than red cars."

Things to look out for

- Children may mix up the meaning of the words "fewer", "more" and "same". Ensure they get plenty of practice saying the words aloud, as well as placing the correct word (already written for them) between sets of objects.
- Use sets of objects that are clearly either fewer, more or the same, rather than scattered objects, for example towers of cubes or objects set out on a ten frame. Otherwise, children may focus more on counting than using the correct vocabulary.

Key questions

- How do you know the towers are the same?
- How do you know that tower has fewer/more cubes than this tower?
- Which ten frame has more? How do you know?
- Who has fewer/more cubes than you?
- Who has the same number of cubes as you?

Possible sentence stems

- Sam has _____ cubes than Mo.
- There are _____ counters in box A than box B.
- There are fewer/more _____ than _____
- There are the same number of _____ as _____

National Curriculum links

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

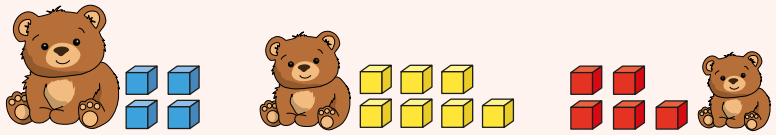
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Fewer, more, same

Key learning

Set up a teddy bears' picnic, giving each bear some treats. You could use cubes to represent some fruit or give the bears some toy objects.

Give daddy bear 4 cubes, mummy bear 7 cubes and baby bear 5 cubes.



Write the words "fewer", "more" and "same" on some big pieces of paper.

Complete the sentences together as a class.

Mummy bear has _____ cubes than daddy bear.

Baby bear has _____ cubes than mummy bear.

Daddy bear has _____ cubes than baby bear.

Then give children some cubes and ask them a variety of questions, such as, "Can you show me fewer cubes than mummy bear has?"

Discuss the different answers together.

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

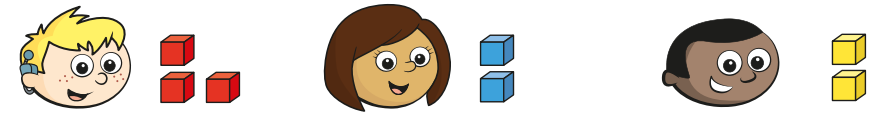
Children roll the dice to get a starting number.

Ask children to sort their dominoes into groups that show:

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

- Choose a word to complete the sentences.

fewer | more | same



Max | Kim | Mo

Kim and Mo have the _____ number of cubes.

Kim has _____ cubes than Max.

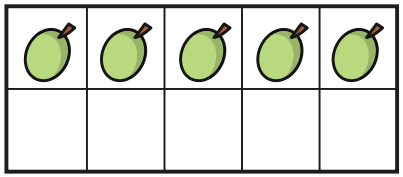
Max has _____ cubes than Mo.

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Fewer, more, same

Reasoning and problem solving

Ann has these grapes.



Ben has 7 grapes.

Draw counters to show Ben's grapes.



Who has fewer grapes?

Ron has more grapes than Ann.

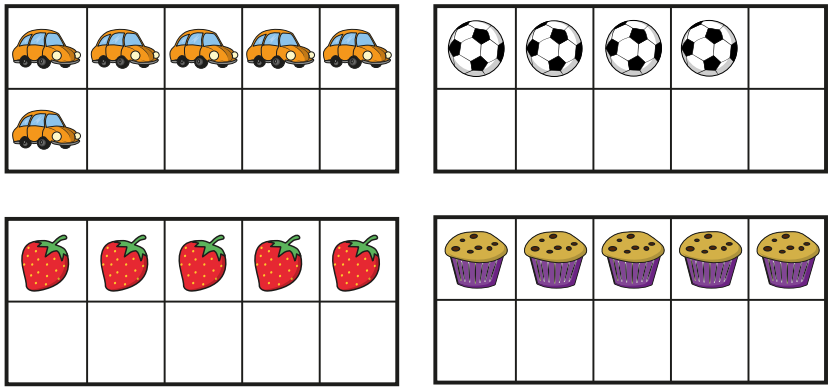
Ron has fewer grapes than Ben.

How many grapes does Ron have?

Ann

6

Tiny is practising using the words "fewer", "more" and "same".



Which sentence is correct?

There are more cars than balls.

There are fewer strawberries than balls.

There are the same number of cars as cakes.

Correct the mistakes.

There are more cars than balls.

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Less than, greater than, equal to

Notes and guidance

In this small step, children move on from describing whether there are "fewer", "more" or the "same" number of objects to comparing numerical values using the vocabulary "less than", "greater than" or "equal to" alongside the symbols <, > and =.

Number tracks are particularly useful in this step and children will begin to see that smaller numbers are to the left of greater numbers. Concrete resources can also be used, but make sure that children do not get confused with the previous step, where they were using words to describe sets of objects. It needs to be clear that they are now comparing the numbers not the objects.

Things to look out for

- Children may want to use the word "bigger" rather than "greater". For consistency of language, encourage children to use the word "greater". "Bigger" often refers to the size of an object rather than a number, for example a bigger teddy or a bigger slide.
- Children may get the symbols mixed up. Using cubes and straws to physically make the symbols can help children to understand them.

Key questions

- How can you use cubes to show that 6 is less than 7?
- How can you use a number track to find a number less than 5?
- How can you use cubes to show that 3 is equal to 3?
- How many different ways can you show that 7 is greater than 4?

Possible sentence stems

- _____ is less than _____
- _____ is greater than _____
- _____ is equal to _____
- _____ < _____
- _____ > _____
- _____ = _____

National Curriculum links

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

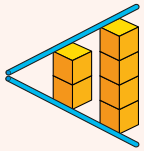
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Less than, greater than, equal to

Key learning

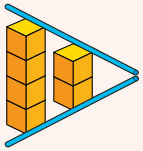


Use straws and cubes to introduce children to the less than, greater than and equal to symbols. Stick what you make together on your working wall, so that children have a visual reminder.



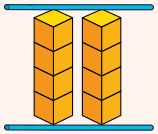
2 is less than 4

2 < 4



4 is greater than 2

4 > 2



4 is equal to 4

4 = 4

Ask children to use cubes to show that:

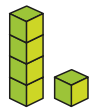
- 1 < 5
- 7 > 3
- 9 = 9

- Draw the greater than, less than and equal to symbols.
- Choose a phrase to complete the sentences.

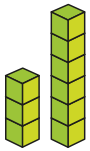
equal to	less than	greater than



3 is _____ 3

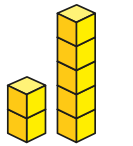


4 is _____ 1

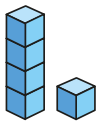


3 is _____ 6

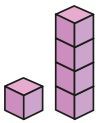
- Write <, > or = to compare the numbers.



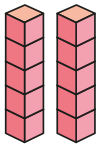
2 ◯ 5



4 ◯ 1



1 ◯ 4



5 ◯ 5

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Less than, greater than, equal to

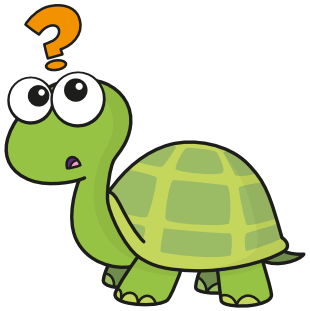
Reasoning and problem solving

What is the missing number?

$6 < \square$

Help Tiny to choose a number from the track.

1	2	3	4	5	6	7	8	9	10

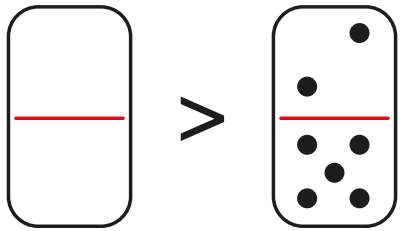


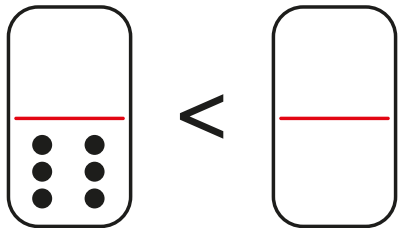
Is there more than one answer?

7, 8, 9, 10

Tom compares the number of dots on the dominoes.

Some of the dots are missing.





Draw the missing dots.

Is there more than one answer?

more than 7 spots

more than 6 spots

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Compare numbers

Notes and guidance

In this small step, children build on their learning from earlier in the block to compare pairs of numbers within 10

Children can use their knowledge of counting to support them, for example because they would say 6 after 5, they know that 6 is greater than 5. Children can also use their knowledge of representing numbers using objects to help them identify which of a pair of numbers is greater or less than the other.

In the previous steps, children were introduced to the language of "greater than", "less than" and "equal to" alongside the corresponding inequality symbols >, < and =. They use these throughout this step when comparing numbers. It is important that children use all the symbols, in order to reinforce their meaning.

In order to bring in other learning from this block, children could also compare numbers written as words.

Things to look out for

- Children may confuse the inequality symbols.
- When zero is involved in a question, children may find this more challenging, as they find it harder to picture.

Key questions

- When you count forwards from zero, which of the numbers do you say first?
- Which number is further along the number track?
- Which number is greater? How do you know?
- Which is the smaller number? How do you know?
- What does each symbol mean?
- If 5 is less than 6, what else do you know?

Possible sentence stems

- _____ is less/greater than _____
- _____ is equal to _____
- _____ </> _____
- _____ = _____

National Curriculum links

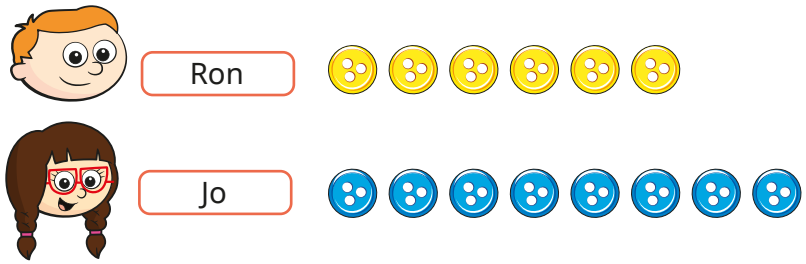
- Count to and across 100, forwards and backwards, beginning with zero or 1, or from any given number
- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least

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Compare numbers

Key learning

- Ron and Jo have some buttons.



How many buttons does Ron have?

How many buttons does Jo have?

Who has more buttons?

-

1	2	3	4	5	6	7	8	9	10

Circle 3 and 9 on the number track.

- Write **less** or **greater** to compare the numbers.

3 is _____ than 9 9 is _____ than 3

- Write < or > to compare the numbers.

3 ◯ 9 9 ◯ 3

- Write the missing phrase.

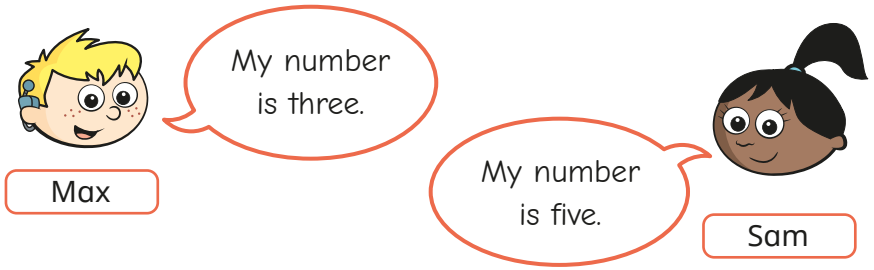
less than greater than equal to

- 1 is _____ 5
- 4 is _____ 0
- 7 is _____ 8
- 10 is _____ ten
- 6 is _____ three
- 1 is _____ zero

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

1 ◯ 5 7 ◯ 8 4 ◯ 0

- Max and Sam are thinking of a number.



Whose number is greater?

How do you know?

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Compare numbers

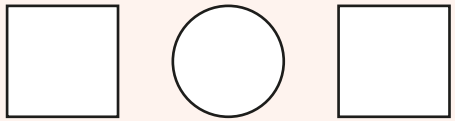
Reasoning and problem solving



Ask children to roll two dice.



Ask them to complete the sentence with their numbers and the <, > or = symbol.



Ask children what happens if you write the numbers in the opposite boxes.

What do they notice?

Get children to work in pairs to practise comparing numbers.

When the numbers are swapped, the inequality symbol changes to the opposite symbol.

One statement is false.

8 > 4	7 < 10
3 > 6	eight = 8

Use cubes to show which one is false.

Talk about it with a partner.

3 > 6

Here are some number cards.

1	2	3	4	5
6	7	8	9	10

Use the cards to complete the sentence.

☐ is greater than ☐

How many ways can you do it?

multiple possible answers, e.g.

7 is greater than 2

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Order objects and numbers

Notes and guidance

Now that children are confident counting and comparing numbers to 10, in this small step they move on to ordering three groups of objects.

Expose children to different methods for ordering, such as comparing two groups initially, and lining groups up. Children should use the language they learnt in the previous steps and be introduced to the vocabulary "most" and "fewest" and begin to use it.

Alongside the objects, introduce numbers so that children can begin to order a set of three numbers. They will need introducing to the language of "greatest" and "smallest" and should begin to use it. At this stage, it is not necessary for children to order more than three numbers, although children who are confident with three numbers can be challenged to do this.

Things to look out for

- Children may misunderstand the language. Ensure you are consistent with your wording, particularly with the word "greatest". Often it gets replaced with "largest" or "biggest", which can be confusing for young children.

Key questions

- How did you compare the piles/groups?
- How do you know that group _____ is the greatest?
- How do you know that group _____ is the smallest?
- How many answers are there? How can you show this with cubes?
- How have these objects/numbers been ordered?

Possible sentence stems

- Group _____ has the greatest amount of _____
- Group _____ has the smallest amount of _____
- Group _____ has the most _____
- Group _____ has the fewest _____

National Curriculum links

- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- Compare numbers using <, > and = signs
- Read and write numbers from 1 to 20 in numerals and words

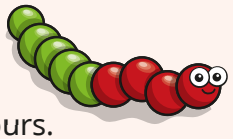
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Order objects and numbers

Key learning



Make a caterpillar by threading some beads onto a pipe cleaner.



Ask children to make caterpillars with more beads and fewer beads than yours.

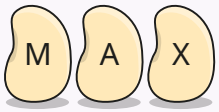
Ask them which caterpillar has the most beads and which has the fewest.

Ask children to arrange the caterpillars in order.



Ask children to build or write their name.

They could write it on butter beans.



Ask children how many letters they have in their name.

Ask if it has more letters, fewer letters or the same number of letters as their partner's.

In groups of three, get children to stand in order from the name with the fewest letters to the name with the most letters.

Ask them what happens if two names have the same number of letters.

- Order the groups of cars.

  Start with the the group that has the fewest cars.

group 1 

group 2 

group 3 

- Each domino shows a number.

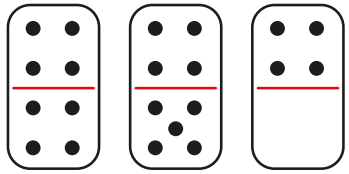
  Put the dominoes in order.

  Start with the smallest number.

  Complete the sentences.

  The greatest number is _____

  _____ is the smallest number.



- Order the numbers in each set.

  Start with the smallest number.

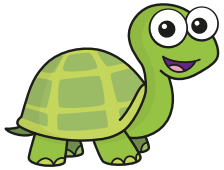
  ▸ 3, 1, 7 ▸ 6, 10, 9 ▸ three, zero, two

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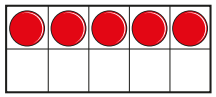
Order objects and numbers

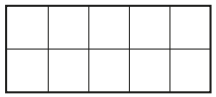
Reasoning and problem solving

Tiny is making numbers in order from greatest to smallest.

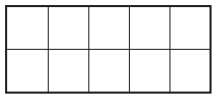


greatest





smallest



Draw counters to show the numbers Tiny could have made.

Is there more than one answer?

multiple possible answers, e.g.

5, 4, 1

5, 2, 0

Children could also add counters to the first ten frame, which gives even more possible answers.

Use 10 cubes.

Put them into 3 groups.

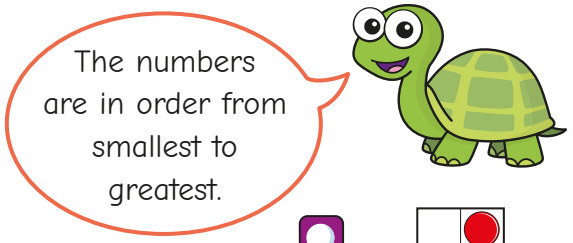
Order the groups from greatest to smallest.

How many different ways can you find?

four ways:

7, 2, 1 6, 3, 1

5, 4, 1 5, 3, 2



Do you agree with Tiny?

Why?

No

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The number line

Notes and guidance

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

The number line can be used to practise and consolidate the skills learnt so far in this block. Children recap counting from zero to 10 forwards when labelling a number line and can also practise counting backwards if they read from right to left. They can clearly see that 1 more is the next number to the right on the number line, while 1 less is the previous number.

The number line can also be used to consolidate comparison of numbers using both words and inequality symbols, as well as being used to order numbers. A number line is a good opportunity to count from zero, as children do not do this when counting objects.

Things to look out for

- Children may write the numbers in between divisions, rather than on divisions when labelling a number line.
- Children may confuse the inequality symbols when comparing numbers using a number line.

Key questions

- How can you label the number line? How do you know where to put the numbers?
- What does each mark on the number line represent?
- Where does the number line start/end?
- How do you find 1 more/less on a number line?
- How can you use a number line to decide which number is greater?
- How much is each jump on the number line?

Possible sentence stems

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

National Curriculum links

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

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The number line

Key learning

Get children to pace out a number line in the playground, counting each step from zero.

Use chalk to label the numbers.

Encourage children to count out loud to consolidate counting from zero to 10

Can children find different numbers on their number line?

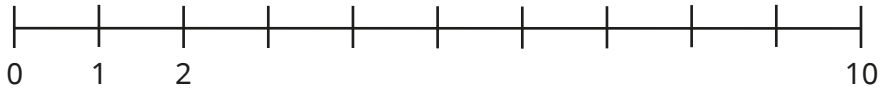
Can children use their number line to decide which of a pair of numbers is greater?

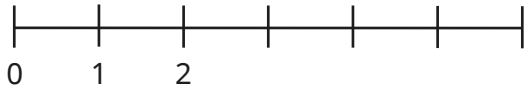
Can children use their number line to order numbers?

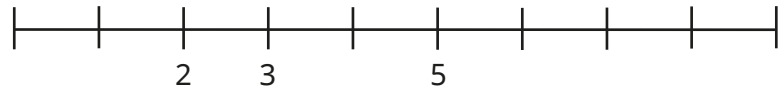
- On the number line:
  - circle the number 7
  - underline a number **greater** than 7
  - draw an arrow to the number that is **1 less** than 5
  - put a box around the **smallest** number



- Complete the number lines.







- 

  How many jumps are there from zero to 8?

  How many jumps are there from zero to 3?

- Write each set of numbers in order.

  Start with the smallest number.

  Use a number line to help you.

  3, 8, 4

  10, 0, 7

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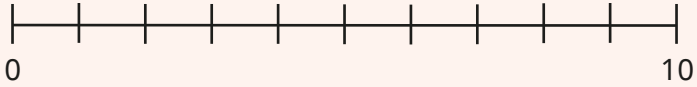
The number line

Reasoning and problem solving



Get children to play these games with dice to practise using a number line.





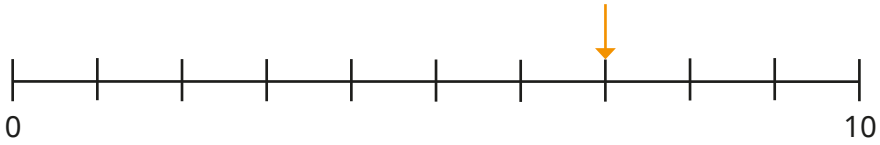
Game 1: Children roll two dice. They circle each number on a number line and then complete a number sentence to match. _____ > _____

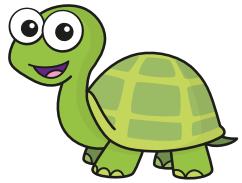
Game 2: Children roll three dice. They circle each number on a number line and then write the numbers in order, starting with the greatest.

Game 3: Children roll a dice and then place a counter on the number line to show their number.
Ask children these questions:

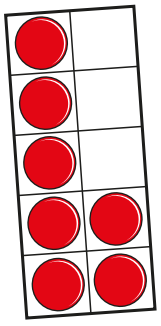
- How many jumps from zero is your number?
- How many jumps do you need to get to 10?
- Is your number closer to zero or 10?

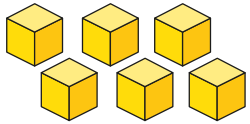
Tiny draws an arrow to a number on the number line.

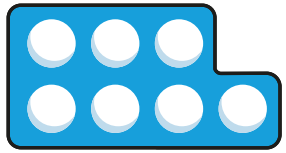




Which picture does **not** match Tiny's number?







Talk about it with a partner.



cubes

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Autumn Block 2

Addition and subtraction (within 10)

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White Rose MATHS

Small steps

Step 1	Introduce parts and wholes
Step 2	Part-whole model
Step 3	Write number sentences
Step 4	Fact families – addition facts
Step 5	Number bonds within 10
Step 6	Systematic number bonds within 10
Step 7	Number bonds to 10
Step 8	Addition – add together

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Small steps

Step 9	Addition – add more
Step 10	Addition problems
Step 11	Find a part
Step 12	Subtraction – find a part
Step 13	Fact families – the eight facts
Step 14	Subtraction – take away/cross out (How many left?)
Step 15	Subtraction – take away (How many left?)
Step 16	Subtraction on a number line

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Small steps

Step 17	Add or subtract 1 or 2

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Introduce parts and wholes

Notes and guidance

In this small step, children begin to think about parts and wholes.

While this reinforces and reminds children of what they have learned in Reception, they are unlikely to have been formally introduced to the language of "parts" and "whole".

Ensure time is spent identifying the parts and the whole during activities. Allow children to explore and notice different compositions; for example, 5 can be composed of 2 and 3 or 1 and 4 or 1 and 1 and 3. Encourage children to recognise that numbers can be composed of two or more parts.

At this stage, children should be given the opportunity to explore this concept through play and physical activities. The part-whole model is introduced in the next step.

Things to look out for

- Children may make mistakes counting. Encourage children to subitise (to recognise instantly how many objects there are without counting).
- Children may mix up what the parts are and what the whole is. Physical activities can help with this, such as children standing in two hoops to make the parts, then physically coming together to make the whole.

Key questions

- Where is the whole?
- Where are the parts?
- Is the whole greater than the part? Is the whole always greater?
- Can zero be a part?
- Can the parts be swapped around?

Possible sentence stems

- _____ is a part.

  _____ is a part.

  The whole is _____
- The whole is _____ than the part.
- There is/are _____ in each part.

National Curriculum links

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

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Introduce parts and wholes

Key learning

Give children five bean bags.

Ask them to throw the bean bags into a hoop, noticing how many land inside the hoop and how many land outside.



Encourage them to record their results.

Is there ever zero inside or outside the hoop?

Provide each group of six children with two large hoops labelled "yes" and "no".

In each group, children take turns to ask questions, for example: "Do you like carrots?", "Have you got a sister?" Each child then stands in the correct hoop.

At the end of each turn, ask children to say the sentences out loud: "2 is a part. 4 is a part. The whole is 6"

Challenge children to find a question that sorts their group into 6 and 0

Give each child eight double-sided counters. Tell them to shake them and drop them onto the table.



Ask children:

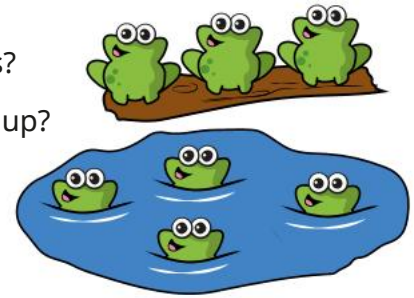
- How many counters are there? What is the whole?
- How many red/yellow counters are there? What are the parts?

- Here are some frogs.
  - Can you see two groups of frogs?
  - How many frogs are in each group?
  - Complete the sentences.

    _____ is a part.

    _____ is a part.

    The whole is _____



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Introduce parts and wholes

Reasoning and problem solving

Here are five objects.



Put the objects into two groups.

Draw the groups.

Say out loud for your groups:

- _____ is a part.
- _____ is a part.
- The whole is _____

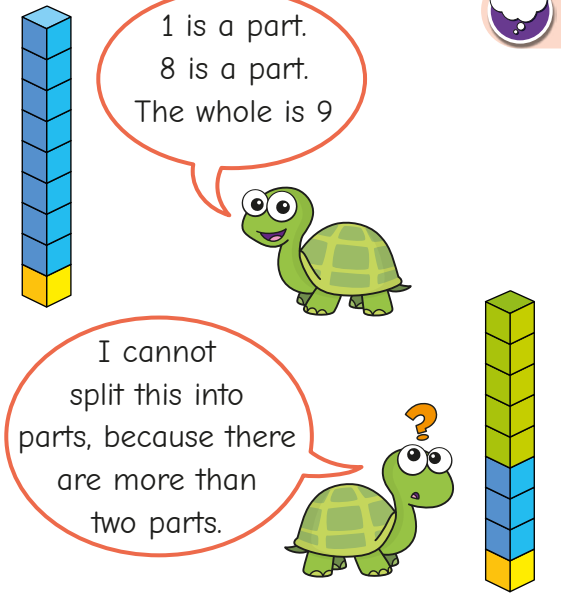
Is the whole always the same?

Compare answers with a partner.

multiple possible answers, e.g.

red and green (3 and 2)

food and not food (4 and 1)



Can you help Tiny?

Complete the sentences.

_____ is a part.

_____ is a part.

_____ is a part.

The whole is _____

1 is a part.

3 is a part.

5 is a part.

The whole is **9**

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Part-whole model

Notes and guidance

Now that children have explored parts and wholes, in this small step they are introduced to the part-whole model. This is sometimes referred to as a "cherry model".

The main teaching point is for children to see that a whole group of objects can be composed of two or more parts and that they can represent this using a part-whole model. The group can be split in a variety of different ways. Draw children's attention to the fact that the parts cannot be bigger than the whole group.

Provide children with laminated part-whole models, so that they can experiment with physical objects – either drawing or placing pictures on the part-whole model. Encourage them to describe what they do by saying full sentences aloud. Children should be comfortable describing the parts and wholes in a variety of ways, sometimes starting with the whole and at other times with a part.

Things to look out for

- Children may assume that the whole is always at the top of the diagram, so expose them to the part-whole model in different orientations.

Key questions

- What can you see?
- Have you still got 5?
- What do you notice about the whole and the parts?
- What happens when you put the parts back together?
- How many different ways can you split the whole into two parts?

Possible sentence stems

- _____ is a part.

  _____ is a part.

  The whole is _____
- _____ is the whole.

  _____ is a part.

  _____ is a part.

National Curriculum links

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

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Part-whole model

Key learning



Give children seven cubes, counters or other objects from the classroom and a laminated part-whole model.

Ask children to show that:

- 7 is the whole
- 1 is a part and 6 is a part
- 2 is a part and 5 is a part
- 3 is a part and 4 is a part

Repeat the activity with different numbers and with the part-whole model in different orientations.

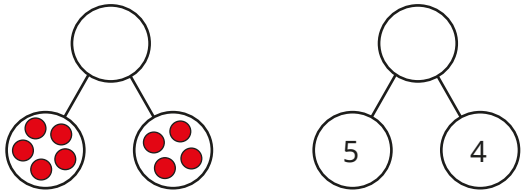
The aim is to check that children understand what is the whole and what are the parts.



In the playground, draw a giant part-whole model with chalk.

Ask children to "act out" parts and wholes. For example, six children could stand in the whole and shout, "The whole is 6". The children then choose which part to move to and chant, "_____ is a part. _____ is a part. The whole is 6".

- Complete the part-whole models.

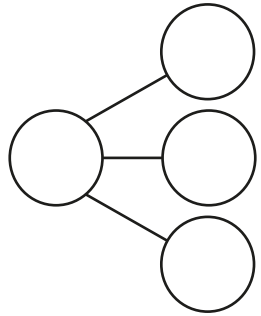


- Draw a part-whole model to match the sentences.

2 is a part.
6 is a part.
The whole is 8

- Here are seven pieces of fruit.





Put the fruit into a part-whole model.

Complete the sentences.

_____ is the whole.

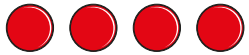
_____ is a part, _____ is a part and _____ is a part.

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Part-whole model

Reasoning and problem solving

4 is the whole.



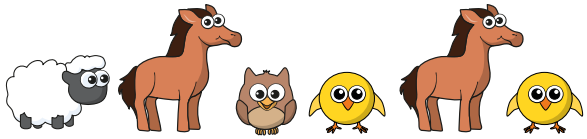
How many **different** part-whole models can you draw to show this?

4 and 0, 0 and 4

1 and 3, 3 and 1

2 and 2

Here are six animals.



How many different ways can you group the animals?

Draw a part-whole model for each way.

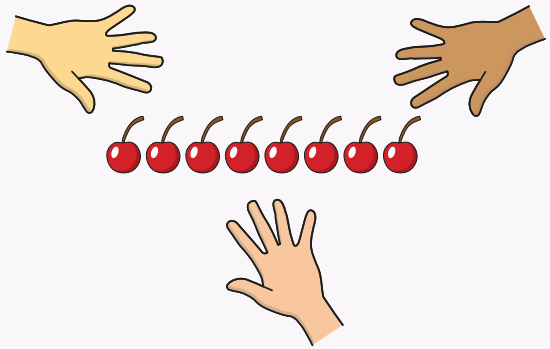
Can you make more than two groups?

multiple possible answers, e.g.

brown and not brown

4 legs and 2 legs

Show children that three friends have eight cherries.



Ask them to use cubes to show the cherries.

Ask how many ways the three friends can share the cherries.

Encourage them to think of the best way to record their results, and to think about the question if there were more cherries.

multiple possible answers, e.g.

1, 1, 6

3, 2, 3

in a part-whole model

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Write number sentences

Notes and guidance

In this small step, children learn that the addition symbol (+) can be used to represent combining two or more parts and the equals symbol (=) can be used to show the equivalence between the whole and the sum of the parts.

At this stage, children consider 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. Once understanding is established, children explore number sentences written in a different order, such as 4 = 1 + 3

"First, then, now" stories are a great way to link real-life situations to the number sentences and part-whole models.

Things to look out for

- When using interlocking cubes, ensure that children join the cubes together to make the whole rather than create an additional row of cubes, which could cause confusion about what the total is.
- Encourage children to use the phrase "is equal to" rather than "equals". This helps them to write equations more flexibly, as saying the word "equals" suggests an answer rather than an equivalence.

Key questions

- How many were there at the start?
  Then how many more were added?
- What is the total?
- What does "=" mean?
- Which number tells you how many you had to start with?
- Which number shows what has been added?
- Which number shows the total?

Possible sentence stems

- _____ plus _____ is equal to _____
- _____ is equal to _____ plus _____

National Curriculum links

- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer)
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

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Write number sentences

Key learning

Share the story *Mr Gumpy's Outing* by John Burningham. Ask children to build a boat and to create their own "first, then, now" stories as different groups of children climb aboard.

Encourage children to count how many altogether as more children join them.

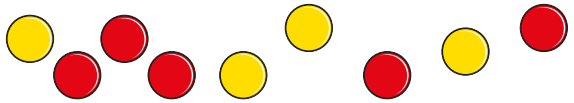
Ask children to write the number sentence to match what they are acting out.

Encourage children to create their own "first, then, now" stories using different toys and objects.
For example:

First there were 3 sheep.
Then 2 more sheep came along.
Now there are 5 sheep altogether.



- Here are some counters.

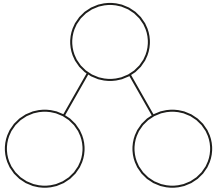


Group the counters by colour.

- Complete the sentence and say it out loud.

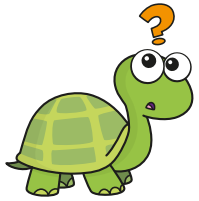
_____ red counters plus _____ yellow counters is equal to _____ counters.

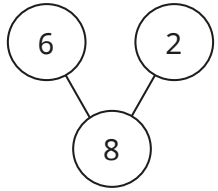
- Complete the part-whole model and the number sentence.



_____ + _____ = _____

- Correct Tiny's mistake.





6 = 2 + 8

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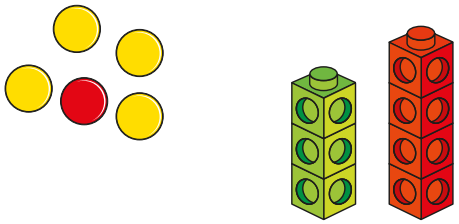
Write number sentences

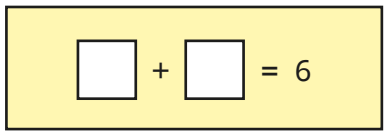
Reasoning and problem solving

Which picture helps with the number sentence?

Why?







Think of number sentences for the other pictures.

bead string

5 + 1 = 6 or

1 + 5 = 6

counters

4 + 1 = 5 or

1 + 4 = 5

cubes

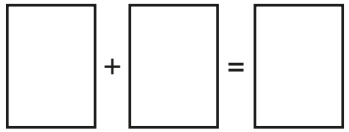
3 + 4 = 7 or

4 + 3 = 7

Here are some digit cards.

0	1	2	3	4
5	6	7	8	9

Use the cards to write a number sentence.



Can you do it a different way?

What do you notice?

multiple possible answers, e.g.

5 + 1 = 6

3 + 4 = 7

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Fact families – addition facts

Notes and guidance

In this small step, children build on their learning about writing number sentences by looking at addition fact families.

Children recognise that the order of an addition sentence can be varied, and they begin to discover that addition is commutative. For example, 3 + 2 = 5 2 + 3 = 5 5 = 3 + 2 5 = 2 + 3

Continue to use concrete resources and pictures to support children's understanding – ten frames and counters and cubes are particularly useful. Using different colours can help children to form addition sentences and see that the order they say the numbers in is irrelevant. They can physically move counters on a ten frame to show this.

Things to look out for

- Children may think that they can write the three numbers in any order, for example 3 = 5 + 2. Spend time identifying the parts and the whole in a number sentence.
- Children may find number sentences such as 2 + 2 = 4 confusing. Do not avoid these examples, rather highlight them and discuss that when the two parts are the same, there are only two possible number sentences.

Key questions

- Which numbers are the parts?
- Which number is the whole?
- What is the same/different about the four addition sentences?
- What happens when the parts are the same?
- Can the parts change place? Can the whole change place? Why/why not?

Possible sentence stems

- _____ plus _____ is equal to _____
- _____ is equal to _____ plus _____
- _____ + _____ = _____
- _____ = _____ + _____

National Curriculum links

- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer)
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

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Fact families – addition facts

Key learning



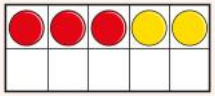
Use "first, then, now" to tell simple maths stories to practise addition in real-life contexts.



First there were 3 children on the bus.
Then 2 more children got on the bus.
Now there are 5 children on the bus.

3 + 2 = 5

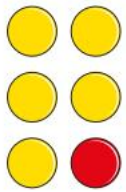
Ask children to act out the "first, then, now" story with counters and a ten frame.

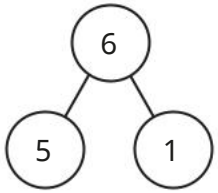


Ask children what happens if they start with two children on the bus, then three children get on the bus. What has changed and what has stayed the same?

- Complete the fact family.

  Use the counters and the part-whole model to help you.





1 + _____ = 6

_____ + 1 = 6

_____ = _____ + 1

6 = _____ + _____

- Complete the fact family.



_____ + _____ = 7

_____ + _____ = 7

7 = _____ + _____

7 = _____ + _____

- Here are some digit cards.

4	7	3

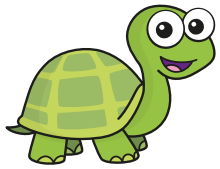
Use the digits to write four addition sentences.

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Fact families – addition facts

Reasoning and problem solving

Tiny has three digit cards.



3	5	2

Tiny uses the digits to write number sentences.

3 + 5 = 2	3 = 5 + 2

What mistake has Tiny made?

Correct Tiny's number sentences.

Complete the fact family.

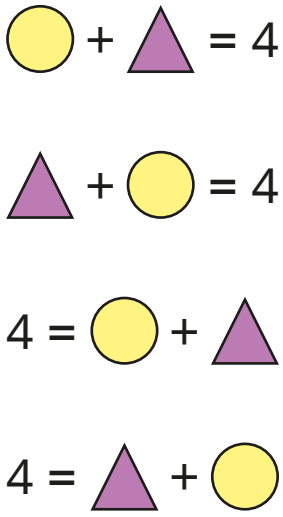
3 + 2 = 5

2 + 3 = 5

5 = 3 + 2

5 = 2 + 3

Here is an addition fact family.



What number is the circle?

What number is the triangle?

Is there more than one answer?

possible answers:

circle: 0, triangle: 4

circle: 1, triangle: 3

circle: 2, triangle: 2

circle: 3, triangle: 1

circle: 4, triangle: 0

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Number bonds within 10

Notes and guidance

In this small step, 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. Double-sided counters and ten frames are useful concrete resources, together with dot patterns. Children will see numbers made from dot patterns differently, for example some may see 6 as being made up of 5 and 1, while others may see it as being made up of two 3s. Exploring patterns is a good way to encourage discussion and expose children to different ways of thinking.

Throughout this step, continue to look at number sentences written with the symbols in different places and talk about the commutative nature of the calculations, for example 3 + 1 = 4 is the same as 1 + 3 = 4

Key questions

- What is the whole? What are the parts?
- Does the whole always stay the same?
- How can you partition the whole?
- Do the parts stay the same or change?
- If 8 is the whole, what could the parts be?

Possible sentence stems

- _____ plus _____ is equal to _____
- _____ is equal to _____ plus _____
- _____ + _____ = _____
- _____ = _____ + _____

Things to look out for

- Encourage children to find answers to additions by either subitising or counting on from a start number. For example, if the addition is 3 + 2, children should start at 3, then count on 2 more to get 5

National Curriculum links

- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer)
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

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Number bonds within 10

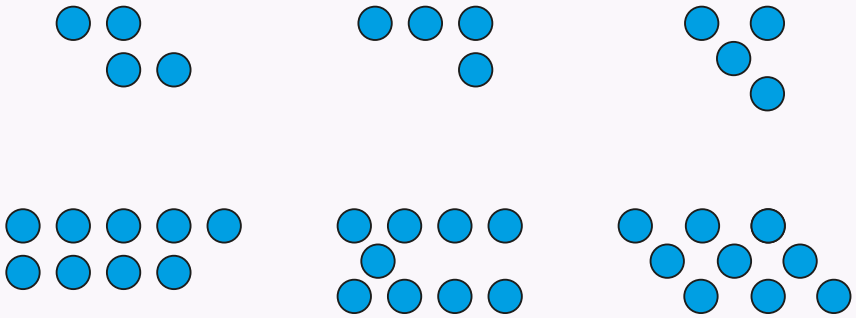
Key learning

Show children different arrangements of dots and ask them what numbers they can see. For example, they may see this arrangement as 2 and 3 or 1 and 4

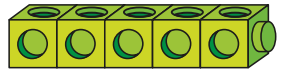


2 + 3 1 + 4

Record what children say as an addition sentence.

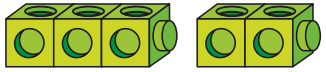


- Here are five cubes.



Break them apart in different ways to find all the number bonds to 5

One has been done for you.



3 + 2 = 5

- Use seven double-sided counters.



Make 7 in different ways.

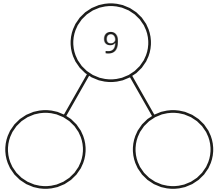
How many ways can you do it?

Write number sentences to match your counters.

- 9 is the whole

What could the parts be?

Draw a part-whole model for each of your answers.



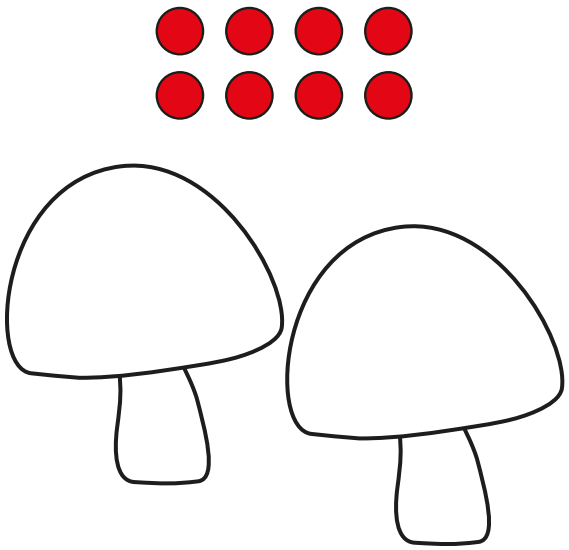
Write an addition sentence for each part-whole model.

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Number bonds within 10

Reasoning and problem solving

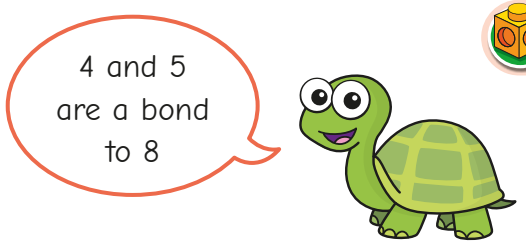
All the spots fall off two toadstools.



Put the spots back on the toadstools.

How many different ways can you find?

8 and 0
7 and 1
6 and 2
5 and 3
4 and 4
3 and 5
2 and 6
1 and 7
0 and 8



Use cubes to show that Tiny is wrong.

Talk about it with a partner.

Children use cubes to show that 4 and 5 are a bond to 9, not 8

Which number bond is the odd one out?

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

How do you know?

3 + 5

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Systematic number bonds within 10

Notes and guidance

Now that children have explored number bonds within 10, in this small step they start to work systematically to identify all the number bonds. Some children may have started to do this naturally, whereas others will need to be exposed to this way of thinking. It is important that children learn to work systematically to ensure that they organise their thinking and consider all the possibilities in a problem.

Double-sided counters are extremely useful in this step, as children can clearly see the pattern formed when they work systematically to find number bonds. If they start, for example, with 5 counters all showing the same colour, they can turn 1 over to show that 1 + 4 = 5, turn another over for 2 + 3 = 5 and so on to find all the number bonds in a systematic way.

Things to look out for

- Children may not see the connection between bonds such as 2 + 3 = 5 and 3 + 2 = 5. Link back to earlier learning on addition fact families to support them.
- Children may not recognise bonds that involve zero. For example, 5 red counters show that 5 + 0 = 5

Key questions

- How many _____ are there?
- How many _____ are there altogether?
- What happens if you turn over one counter?
- What happens if you turn over another counter?
- Can you write any of the bonds another way?
- How do you know that you have found them all?

Possible sentence stems

- There are _____ red counters and _____ yellow counters.

  There are _____ counters altogether.

  This means that _____ and _____ are a bond to _____

  _____ + _____ = _____

National Curriculum links

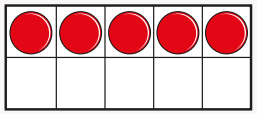
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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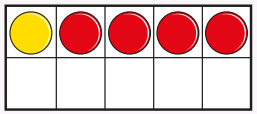
Systematic number bonds within 10

Key learning

Give children a ten frame with 5 double-sided counters on.



Ask children what bond they can see. Then ask them to turn the first counter over.



Ask children what bond they can see now.

Get children to continue this pattern to find all the bonds to 5

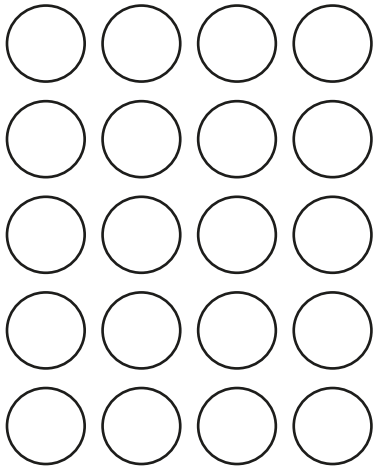
How do they know they have found them all?

Arrange children to work in pairs to repeat the activity, finding bonds for other numbers within 10

They do not need to record these yet, but could be encouraged to do so.

- Use two different-coloured crayons.

  Colour the counters to find all the bonds to 4



_____ + _____ = 4

_____ + _____ = 4

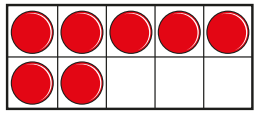
_____ + _____ = 4

_____ + _____ = 4

_____ + _____ = 4

  Which number sentences show the same bond?

- Which bond to 7 does the ten frame show?



  Work systematically to find all the bonds to 7

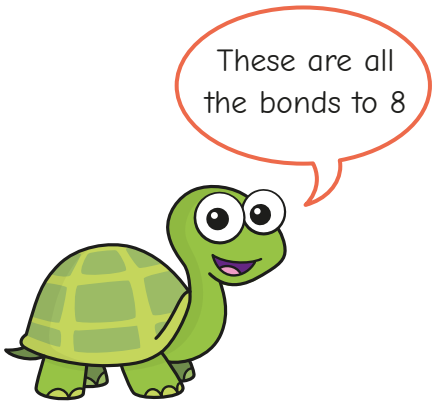
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Systematic number bonds within 10

Reasoning and problem solving

Tiny writes some number bonds.

3 + 5	0 + 8
1 + 7	4 + 4



Is Tiny correct?

Work systematically to check.

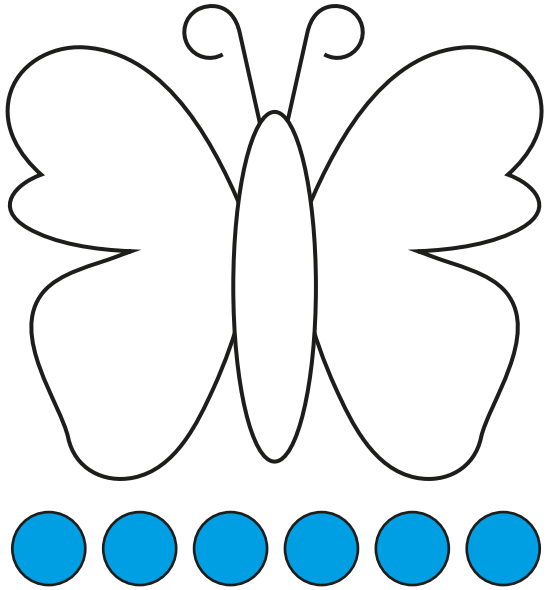
Compare answers with a partner.

No

2 + 6 is missing

Children could also write the bonds the other way round.

The butterfly has lost its spots!



How many ways can you put them back on?

Work systematically to find all the different ways.

Draw your answers.

0 and 6

1 and 5

2 and 4

3 and 3

4 and 2

5 and 1

6 and 0

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Number bonds to 10

Notes and guidance

In this small step, children move on from number bonds within 10 to number bonds **to** 10

Initially, allow children to explore finding the number bonds. They could use two different colour cubes to build towers of 10 and represent their tower in a number sentence. For example, if their tower is made up of 2 blue cubes and 8 red cubes, they have 10 cubes altogether, so 2 + 8 = 10

As children become more comfortable in finding these bonds to 10, encourage them to use their earlier learning to work systematically to find all the number bonds. Ten frames and double-sided counters can support them with their thinking.

This is essential learning that forms the basis of our number system, so time should be spent ensuring that children are comfortable with finding and recognising these bonds.

Things to look out for

- Children may not write "= 10" with their number bond, writing, for example "2 + 8". Recording "= 10" at each point will reinforce that the pair of numbers are a bond to 10
- Children may not recognise where a bond includes zero, for example 10 + 0 = 10

Key questions

- How many _____ are there?
- How many more do you need to make 10?
- What number bond can you see?
- What is the same about 2 + 8 and 8 + 2? What is different?
- Can you write any of the bonds another way?
- How do you know that you have found them all?

Possible sentence stems

- There are _____ red counters and _____ yellow counters.

  There are _____ counters altogether.

  _____ + _____ = 10

National Curriculum links

- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

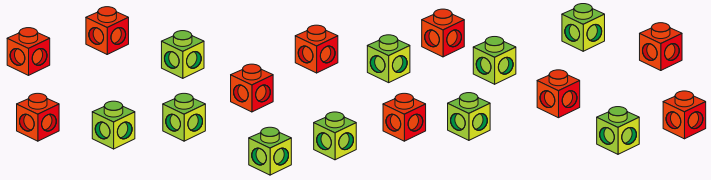
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Number bonds to 10

Key learning

Give children sets of cubes of two different colours.

They should have 10 of each colour.



Ask children to build a tower of 10 cubes and then ask:

- How many _____ cubes have you used?
- How many _____ cubes have you used?
- What bond to 10 can you see?

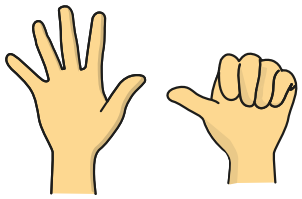
Ask children to repeat this to find more bonds to 10

Have they found the same bonds as their partner?

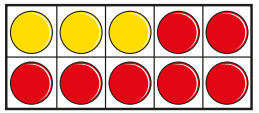
- Max shows a number on his fingers.

  How many more are needed to make 10?

  What is the bond to 10?



- Here is a ten frame.



  How many yellow counters are there?

  How many red counters are there?

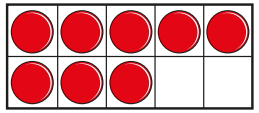
  How many counters are there in total?

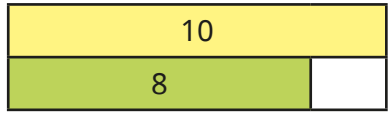
  Complete the number sentence.

  _____ + _____ = 10

- Sam puts some counters on a ten frame and draws a bar model.







  How many more counters does Sam need to fill the ten frame?

  Complete the bar model.

  Write a number sentence to show the bond to 10

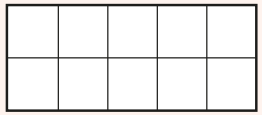
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Number bonds to 10

Reasoning and problem solving



Start with an empty ten frame.



Ask children how many counters they need to make 10

Now show 1 on a ten frame.

Ask how many counters are needed now to make 10

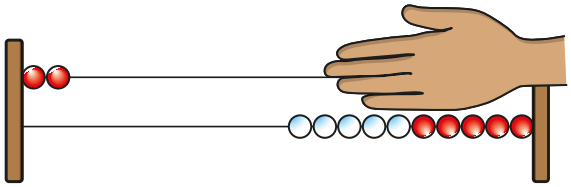
Challenge children to work systematically to find all the number bonds to 10

Encourage fluent recall rather than counting.

Ask children to write a number sentence for each number bond, and if any of the number sentences show the same bond.

Children should notice that, for example, 4 + 6 and 6 + 4 show the same number bond.

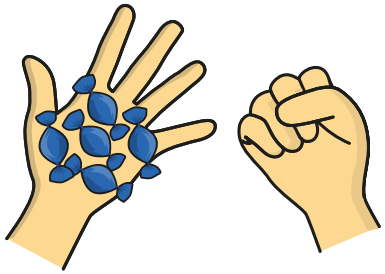
How many beads are covered?



How do you know?

8

Ben has 10 sweets.



How many sweets are in Ben's closed hand?

How do you know?

5

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Addition – add together

Notes and guidance

In this small step, children begin to formalise the idea of addition as bringing two or more parts together to create a whole. This is a more formal way of looking at the learning they have covered earlier in this block. At this stage, the focus should be on bringing two parts together, rather than adding more, which will be covered explicitly in the next step.

When representing their additions, encourage children to use correct mathematical language to explain, for example "3 cubes plus 5 cubes is equal to 8 cubes." The use of "is equal to" rather than "makes" will support children in later learning.

Ten frames, counters and Rekenreks are useful manipulatives to support this learning, and part-whole models can be used to represent additions.

Things to look out for

- Children may read "=" as "makes", which can reduce understanding and cause issues in later learning.
- If children represent both the parts and the wholes within a part-whole model, for example showing 2 cubes in one part, 3 in another and 5 in the whole, they may think that there are 10 cubes altogether.

Key questions

- How many _____ are there?
- How many are there in total?
- What are the parts? What is the whole?
- What is the addition sentence?
- What is _____ plus _____?

Possible sentence stems

- One part is _____ and the other part is _____

  The whole is _____
- _____ plus _____ is equal to _____
- _____ + _____ = _____

National Curriculum links

- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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Addition – add together

Key learning

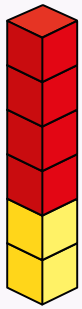
Make a tower using two different-coloured cubes.

Ask children to complete the sentences.

There are _____ red cubes.

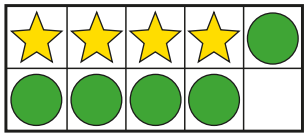
There are _____ yellow cubes

There are _____ cubes altogether.



Get children to repeat this for other towers of cubes.

- Complete the sentences to match the ten frame.

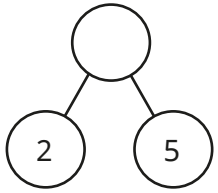


  - There are _____ stars.
  - There are _____ circles.
  - There are _____ shapes altogether.

- Here are some flowers.



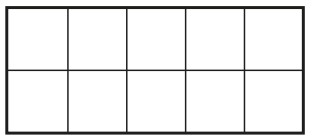
Complete the part-whole model and number sentence to match the flowers.

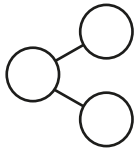


_____ + _____ = _____

- Complete the table to match the birds.







_____ + _____ = _____

_____ = _____ + _____

_____ is a part. _____ is a part. The whole is _____

Make up a story to match the part-whole model.

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Addition – add together

Reasoning and problem solving

Mo has five red cars and some blue cars.

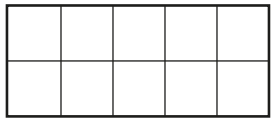


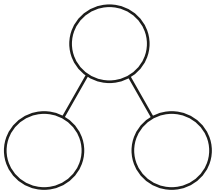
I have fewer than 10 cars in total.

How many blue cars could Mo have?

How many answers can you find?

Show all your answers.



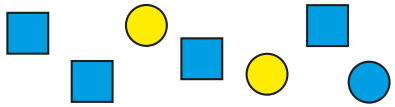


_____ + _____ = _____

Compare answers with a partner.

1, 2, 3 or 4

Ron, Tiny and Kim are finding parts and wholes from these shapes.

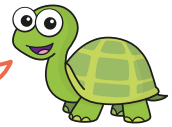




5 is a part, 2 is a part and the whole is 7

Ron

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



Tiny



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

Kim

Who is correct?

Write a number sentence for each correct answer.

Ron and Kim

Ron: 5 + 2 = 7

Kim: 4 + 3 = 7

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Addition – add more

Notes and guidance

In this small step, children build on their understanding of addition as they explore the structure of "adding more". The focus is on increasing one quantity by a given amount, while continuing to work within 10

As in the earlier steps, classroom items and concrete resources can be used to support children's learning and "first, then, now" stories can help to build their understanding. For example, "First Rosie has 3 pencils. Then she is given 2 more pencils. How many pencils does she have now?" While exploring with physical pencils will help children with initial understanding, moving towards representations such as ten frames and counters and Rekenreks will support when working in the abstract.

A number line can also support children in finding how many there are. When working on a number line, they should start from the "first" number, and draw jumps to find the total.

Things to look out for

- Children may count along the number line rather than using numeral recognition to identify the starting point.
- Children may include the starting number when counting more. For example, if there are 3 pencils and they get 2 more, they may count "3, 4".

Key questions

- How many _____ are there?
- How many more are added?
- How many are there now?
- What is the total?
- What is the addition sentence?
- What is _____ plus _____?

Possible sentence stems

- First there were _____

  Then _____ more were added.

  Now there are _____

  _____ + _____ = _____

National Curriculum links

- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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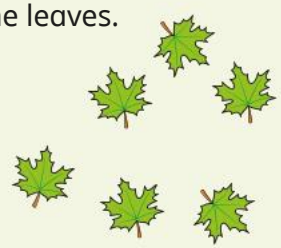
Addition – add more

Key learning



Take the class outside and find some leaves.

Ask children how many there are.



Now find some more leaves.

Ask children how many more you have found.

Ask children how many there are in total.

Get children to tell a story about what has happened.

First there were _____ leaves.

Then _____ more leaves were added.

Now there are _____ leaves.



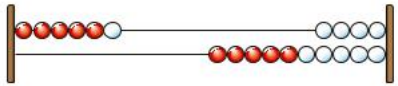
Show children the pictures.

Ask them to tell a "first, then, now" story that matches the pictures.



Ask them to write a number sentence to match the pictures.

- Push 6 beads on a Rekenrek.



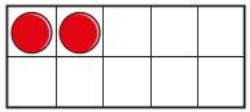
Now push 2 more beads.

How many beads have you pushed now?

Complete the number sentence.

6 + _____ = _____

- Put 2 counters on a ten frame.



Now add 8 more counters.

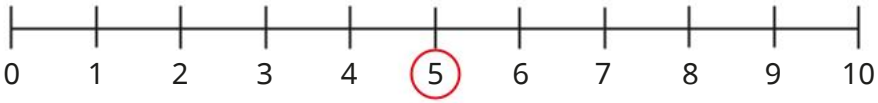
How many counters are there all together?

- Jo has 5 pencils.

Her mum gives her 2 more pencils.

How many pencils does Jo have now?

Use the number line to help you.



5 + _____ = _____

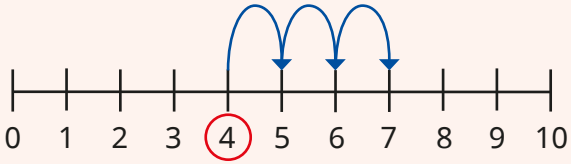
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Addition – add more

Reasoning and problem solving



Tell children that the number line shows that Max had some sweets, then his dad gave him some more.



Ask children how many sweets Max had to start with, and how many more sweets was he given. Can they tell you how many sweets Max has now?

Ask children to write a number sentence to show this and to work with a partner to write a "first, then, now" story.

4

3

7

4 + 3 = 7

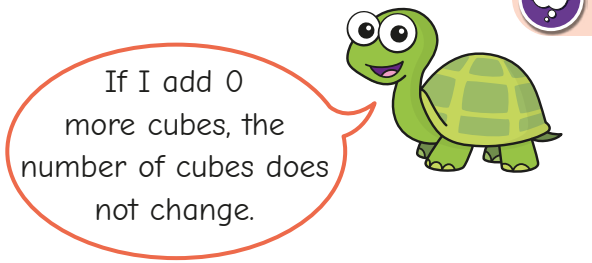
Ann spills paint on her story.

There are 5 birds in a tree.
[paint] more birds land.
Now there are 7 birds.

What number is covered up?

How do you know?

2



Is Tiny correct?

How do you know?

Yes

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Addition problems

Notes and guidance

This small step brings together the learning from the previous steps, as children start to answer addition problems that are not isolated to a specific structure. As this is the first time that they are likely to have explored multiple structures within different contexts, this can initially be overwhelming for children. The use of manipulatives and realistic situations can support children to understand what is happening.

While concrete resources and visual representations are useful, children should move towards working in the abstract. This is an excellent opportunity to reinforce learning on number bonds, from earlier in the block. Children should start to use these bonds to find answers to additions rather than always relying on counting.

Things to look out for

- Children may struggle to understand the context of the question, so their difficulty is with comprehension rather than addition.
- Children may always rely on counting, rather than using number bonds.

Key questions

- How many _____ are there?
- How many more are added?
- How many are there now?
- How many are there in total?
- What is the addition sentence?
- What is _____ plus _____?
- How can you use bonds to help you?

Possible sentence stems

- The bond to _____ for _____ is _____
- _____ plus _____ is equal to _____
- _____ + _____ = _____

National Curriculum links

- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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Addition problems

Key learning

- Complete the bonds to 8
  - 5 + _____ = 8
  - 2 + _____ = 8
  - _____ + 1 = 8
  - 8 = 4 + _____
  - 8 + _____ = 8
  - 8 = _____ + 3

- Dan has 5 stickers.

  Fay has 3 stickers.

  How many stickers do they have in total?

  How do you know?

- First there are 6 children on a bus.

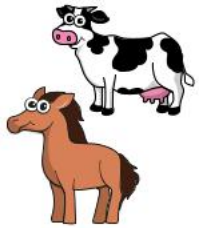
  

  Then 2 more children get on the bus.

  How many children are on the bus now?

  How do you know?

- There are 7 cows and 3 horses.

  How many cows and horses are there altogether?

  What is the number bond?

  _____ + _____ = _____

- 4 boys and 3 girls are playing at the park.
  - How many children are there in total?

    _____ + _____ = _____

    What is the number bond?

  2 more girls come to play.
  - How many children are there now?

    _____ + _____ = _____

    What number bond did you use?

- Jo has 5 green sweets and 2 red sweets.
  - How many sweets does she have altogether?

    _____ + _____ = _____

    What number bond did you use?

  Jo gets 3 more red sweets.
  - How many sweets does she have altogether now?

    _____ + _____ = _____

    What number bond did you use?

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Addition problems

Reasoning and problem solving

Kim and Mo have some bricks.



Kim

I have
3 blue bricks
and 5 red bricks.

I have
4 blue bricks
and 3 red bricks.



Mo

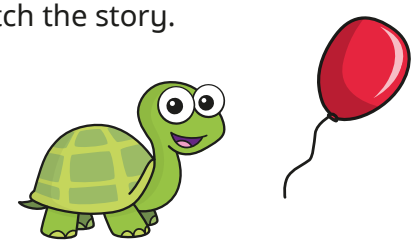
Who has more bricks?

How do you know?

Kim

Ron tells Tiny a number story about balloons.

Tiny writes a number sentence to match the story.



$8 + 1 = 9$

What is Ron's story?

multiple possible answers

Tom has 3 marbles.

Sam has 2 more marbles than Tom.

How many marbles do they have in total?

8

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Find a part

Notes and guidance

Now that children have looked at addition in detail, in this small step they begin to think about subtraction by finding a part. The focus of this small step is on the knowledge and use of number bonds to identify missing parts, rather than formal subtraction and the subtraction symbol.

A practical way to introduce this to children is through games. If you tell them that you have 5 counters altogether, and show them 2 in one hand, they can use their knowledge of bonds and their earlier learning to work out how many are in the other hand. Children then begin to work more abstractly and use their earlier learning to identify what is missing.

Questions will be presented in the form 3 + _____ = 5, rather than 5 – 3 = _____. They will be introduced to the subtraction symbol formally in the next step.

Things to look out for

- Children may add the numbers in the question together rather than realising that they need to find a part. For example, in 3 + _____ = 5, they may think that the missing number is 8, because 3 + 5 = 8

Key questions

- What is the whole?
- What is one of the parts?
- What is the other part?
- How do you know?
- How can you use number bonds to help you?
- What is the addition sentence?

Possible sentence stems

- If the whole is _____ and _____ is a part, then the other part is _____
- _____ plus _____ is _____
- The bond to _____ for _____ is _____
- _____ is a part, _____ is a part and _____ is the whole.

National Curriculum links

- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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Find a part

Key learning

Put some counters in each hand, with a total within 10

Show children the counters in one hand and close your other hand.

Tell children how many counters you have in total.

Ask how many are in your other hand.

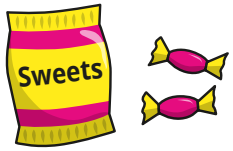
Focus on children using their number bonds, rather than counting.

Give pairs of children 10 counters and ask them to do the activity with different numbers of counters.

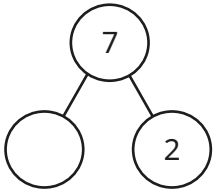
- Max has these sweets.

  He has 7 sweets in total.

  How many sweets are in the bag?



  Complete the part-whole model and the number sentence.

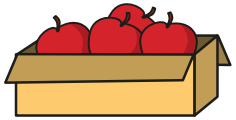


_____ + 2 = 7

- There are 6 apples in a box.

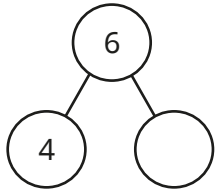
  4 of the apples are red.

  The rest are green.



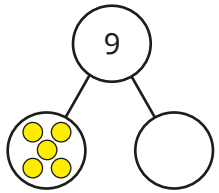
  How many green apples are there?

  Complete the part-whole model and the number sentence.



4 + _____ = 6

- Complete the part-whole model and the sentences.

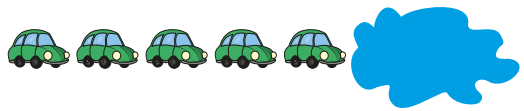


_____ + _____ = _____

_____ = _____ + _____

5 is a part, _____ is a part and 9 is the whole.

- There are 7 cars in total.



  5 of them are green.

  How many of the cars are **not** green?

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Find a part

Reasoning and problem solving

Ron and Jo have some stickers.





I have fewer than 4 stickers, Jo has the rest.

Ron

We have 10 stickers in total.



Jo

How many stickers could they each have?

How do you know?

Ron 3 and Jo 7

Ron 2 and Jo 8

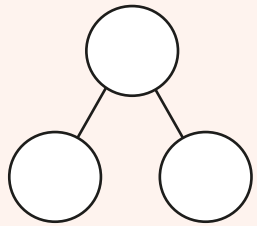
Ron 1 and Jo 9

Ron 0 and Jo 10



Give children digit cards from 0 to 9 and a blank part-whole model.

0	1	2	3	4
5	6	7	8	9



Ask them to place the 4 in one of the parts.

Then ask children to complete the part-whole model in as many different ways as possible, using the remaining digit cards once only and remembering that one part must always be 4

Ask children to explain why they cannot use zero.

Ask if there are any other digits they cannot use.

multiple possible answers, e.g.

4, 1 and 5

4 would be needed twice

8

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Subtraction – find a part

Notes and guidance

In this small step, children are formally introduced to the subtraction symbol for the first time.

As in the previous step, the structure of all the questions is partitioning. The only difference is the way in which children represent their findings. They are still required to use their knowledge of number bonds to find parts, but represent them using the subtraction symbol.

To begin, children focus on the meaning of the subtraction symbol rather than having to identify missing values. They are given a completed part-whole model and write the related subtractions using the numbers in the part-whole model to start to build their understanding.

As children become more secure in this, and understand what the subtraction symbol represents, they then use it to answer missing number problems similar to the ones they saw in the previous step.

Things to look out for

- Children may think that, because addition is commutative, then subtraction must also be, leading them to write incorrect statements, for example 5 – 2 = 3 so 2 – 5 = 3

Key questions

- What is the whole?
- What is one of the parts?
- What is the other part?
- How do you know?
- How can you use bonds to help you?
- What is the addition sentence?
- What is the subtraction sentence?

Possible sentence stems

- If the whole is _____ and _____ is a part, then the other part is _____
- _____ minus _____ is _____

  _____ – _____ = _____

National Curriculum links

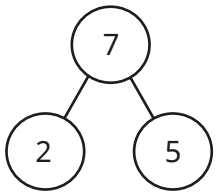
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
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Subtraction – find a part

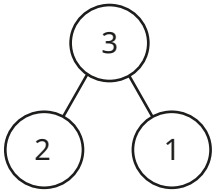
Key learning

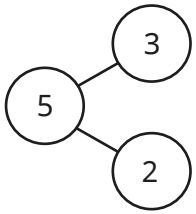
- Complete the number sentences to match the part-whole model.



  - 7 – 2 = _____
  - 7 – 5 = _____

- Write two subtraction sentences for each part-whole model.

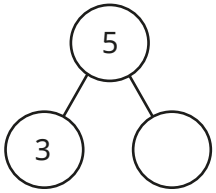




- Ann has 3 red pens and some blue pens.

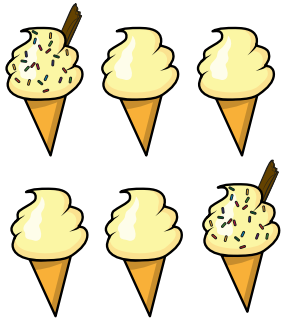
  She has 5 pens in total.

  How many blue pens does she have?



_____ – _____ = _____

- Complete the sentences to find how many ice creams do **not** have flakes.



  - 6 – 2 = _____
  - There are _____ ice creams that do not have flakes.

- Max has 9 party hats altogether.

  4 of them are red.

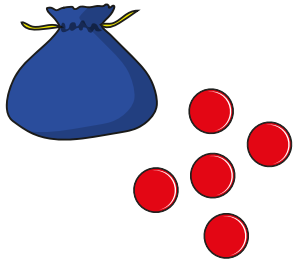
  The rest are blue.

  How many party hats are blue?

- There are 8 counters in total.

  How many counters are in the bag?

  Show this in a part-whole model and as a number sentence.

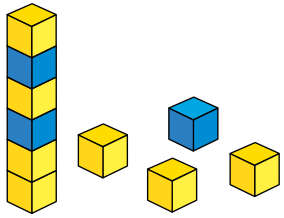


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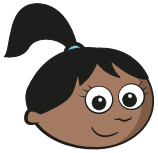
Subtraction – find a part

Reasoning and problem solving

Here are 10 cubes.



Sam and Mo use a subtraction to find something out about the cubes.



$10 - 6 = 4$

What has Sam found?



$10 - 3 = 7$

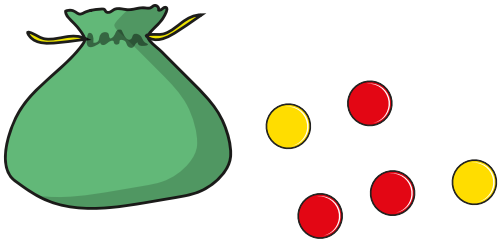
What has Mo found?

What else can you find?

number of cubes not in a tower

number of yellow cubes

Ben has got some counters.



There are no more than 10 counters in total.

How many counters could be in the bag?

There are no more than 7 red counters in total.

What counters could be in the bag?

Compare answers with a partner.

0, 1, 2, 3, 4 or 5

multiple possible answers, e.g.

2 red and 1 yellow

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Fact families – the eight facts

Notes and guidance

Now that children have been exposed to both addition and subtraction, in this small step they build on their knowledge of addition fact families to find all eight facts within a fact family. An example of such a fact family is:

3 + 5 = 8	8 = 3 + 5
5 + 3 = 8	8 = 5 + 3
8 – 5 = 3	3 = 8 – 5
8 – 3 = 5	5 = 8 – 3

Initially, the focus is on identifying the facts from a completed part-whole model or number sentence. Once children are secure in this, they can start to use questions in similar structures to those they have seen previously, to complete a calculation and find its related fact family.

Things to look out for

- Children may miss out some number sentences from their fact families. Encourage them to count to ensure that they have eight sentences.
- Children may think that, because addition is commutative, then subtraction must also be, leading them to write incorrect statements, for example 5 – 2 = 3 so 2 – 5 = 3

Key questions

- What is the whole? What are the parts?
- What addition sentences can you write?
- What subtraction sentences can you write?
- Can you write any of them another way?
- How do you know that you have got them all?
- What is the same and what is different about the number sentences?

Possible sentence stems

- _____ is a part, _____ is a part and _____ is the whole.
- _____ + _____ = _____
- _____ – _____ = _____
- I know I have found all the facts, because ...

National Curriculum links

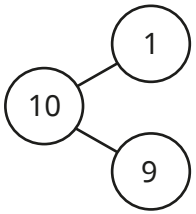
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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Fact families – the eight facts

Key learning

- Here is a part-whole model.



Complete the fact family for the part-whole model.

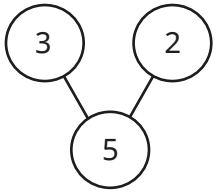
_____ + _____ = 10 10 = _____ + _____

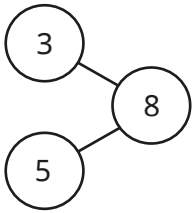
_____ + _____ = 10 10 = _____ + _____

10 – _____ = _____ _____ = 10 – _____

10 – _____ = _____ _____ = 10 – _____

- Write the fact families for the part-whole models.





- Write the fact family to match the picture.



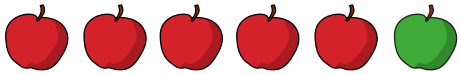
_____ + _____ = _____ _____ = _____ + _____

_____ + _____ = _____ _____ = _____ + _____

_____ – _____ = _____ _____ = _____ – _____

_____ – _____ = _____ _____ = _____ – _____

- There are 6 apples.



5 of them are red and 1 is green.

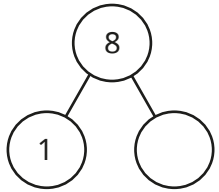
Write the fact family to show this.

- There are 8 cars in a car park.

1 of the cars is blue.

The rest of the cars are red.

Complete the part-whole model.



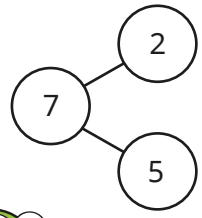
Write the fact family for your part-whole model.

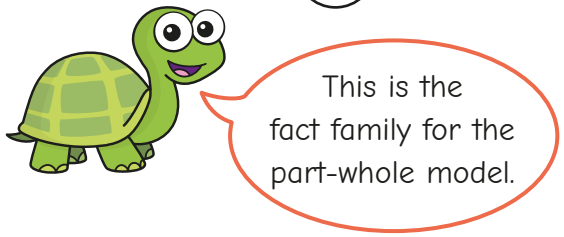
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Fact families – the eight facts

Reasoning and problem solving

Here is a part-whole model.



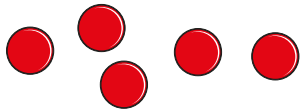


5 + 2 = 7	7 = 5 + 2
2 + 5 = 7	7 = 2 + 5
7 − 2 = 5	7 = 5 − 2
7 − 5 = 2	7 = 2 − 5

Has Tiny made any mistakes?

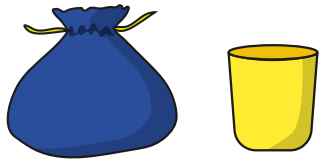
The last two in the right-hand column are wrong.

Max has five counters.



He puts the counters away.

Each counter is either in the bag or in the cup.



How many counters could be in the bag and in the cup?

Write eight number sentences to show this.

How many different answers can you find?

Talk about it with a partner.

multiple possible answers, e.g.

4 in the bag and 1 in the cup

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Subtraction – take away/cross out (How many left?)

Notes and guidance

In this small step, children are introduced to the structure of subtraction that is "taking away". This is the first time within this block that they will have seen such questions. In the same way as they were introduced to partitioning, this is done within this step without the use of the subtraction symbol. Use of the subtraction symbol follows formally in the next small step.

Taking away is often the structure of subtraction that children are more familiar and comfortable with, as they can physically take things away to support their understanding. They can then move on to crossing out on diagrams and pictures. In each question, children are required to find out how many are left.

In later steps, children will use number sentences for this type of problem. Although physically taking away can aid initial understanding, moving towards crossing out can help children to relate the numbers in the number sentences to the question and understand what each number represents.

Things to look out for

- If things are physically removed, children may not be sure why this has happened or where they have gone, and this may hinder understanding in later steps.

Key questions

- How many _____ are there?

  How many were taken away?

  How many are left?
- How many _____ were there at first?

  Then what happened?

  How many _____ are there now?
- How can you show this in a part-whole model?

Possible sentence stems

- First there were _____

  Then _____ were taken away.

  Now there are _____

National Curriculum links

- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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Subtraction – take away/cross out (How many left?)

Key learning



Take the class outside and find some leaves.



Ask children how many there are.

Now remove some of the leaves.

Ask children how many you took away.

Ask children how many are left.

Get children to tell a story about what has happened.

First there were _____ leaves.

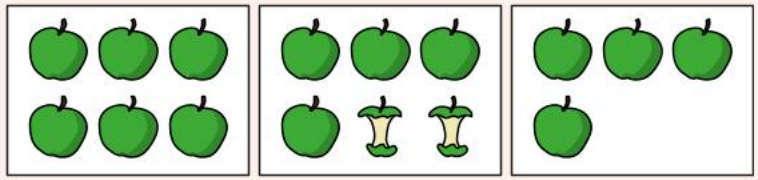
Then _____ leaves were taken away.

Now there are _____ leaves.



Show children the pictures.

Ask them to tell a "first, then, now" story that matches the pictures.



- There are 7 birds in a tree.

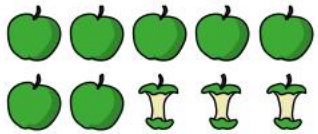
  3 birds fly away.

  Complete the sentences.

  - First there were _____ birds in the tree.
  - Then _____ of the birds flew away.
  - Now there are _____ birds in the tree.



- Complete the sentences to write a story.



  - First there were _____ apples.
  - Then _____ of the apples were eaten.
  - Now there are _____ apples.

  Draw a part-whole model for the story.

- Write a story to match the pictures.



  Draw a part-whole model for your story.

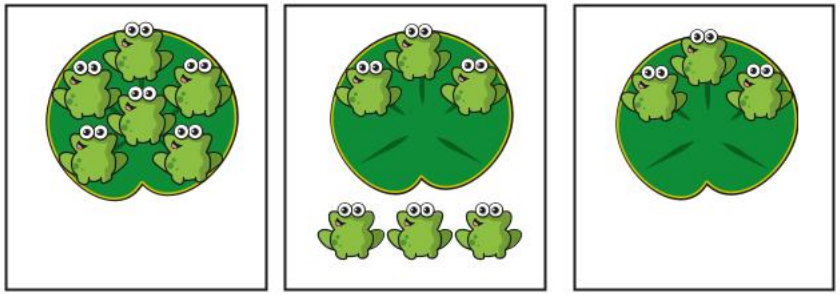
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Subtraction – take away/cross out (How many left?)

Reasoning and problem solving

The pictures show a story.

First | Then | Now



Complete the sentences.

First there were _____ frogs on the lily pad.

Then _____ frogs jumped off.

Now there are _____ frogs on the lily pad.

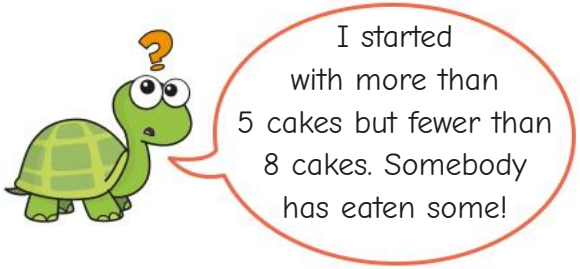
In the "then" picture, do the 3s show the same thing?

Why?

6, 3, 3

No

Tiny has got some cakes.



Here are the cakes that are left.



How many cakes could Tiny have had to start with?

How many cakes could have been eaten?

Draw a part-whole model.

Find all the different answers.

Talk about it with a partner.

6 cakes, then 4 eaten

7 cakes, then 5 eaten

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Subtraction – take away (How many left?)

Notes and guidance

In this small step, children formalise their learning from the previous step. They again focus on subtraction questions that require them to take away, but this time record their findings in a number sentence.

The use of "first, then, now" stories can aid understanding and help children to relate the question to the number sentence. For example, for the story "First there were 5 birds in a tree. Then 2 of the birds flew away. Now there are 3 birds in the tree", the related subtraction sentence is 5 – 2 = 3. Encourage children to recognise that the 5 represents the number of birds at the start, the 2 represents the number of birds that flew away and the 3 represents the number of birds that are left.

Initially, children simply form the subtraction sentences for a given scenario. Then they move on to questions where they need to work out how many are left. Use of concrete resources and pictorial representations is useful throughout.

Things to look out for

- Children may write the numbers the wrong way round, which will not correctly exemplify the question. For example, they may write 5 – 3 = 2 as the subtraction sentence for the example given above.

Key questions

- How many _____ were there at first?

  Then what happened?

  How many _____ are there now?
- How many are left?
- How can you show this in a part-whole model?
- What is the subtraction sentence?

Possible sentence stems

- First there were _____

  Then _____ were taken away.

  Now there are _____
- _____ – _____ = _____

National Curriculum links

- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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Subtraction – take away (How many left?)

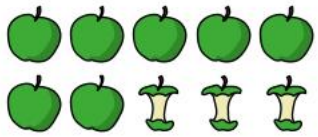
Key learning

- Complete the sentences to match the pictures.



  - First there were _____ birds in the tree.
  - Then _____ of the birds flew away.
  - Now there are _____ birds in the tree.
  - 7 – _____ = _____

- Complete the sentences to make a story.



  - First there were _____ apples.
  - Then _____ of the apples were eaten.
  - Now there are _____ apples.
  - 10 – _____ = _____

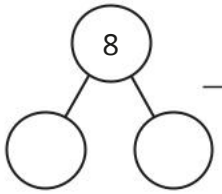
- First there were 8 cakes.

  Then 5 of the cakes were eaten.

  How many cakes are left?

  Complete the part-whole model and the subtraction sentence.





_____ – _____ = _____

- Complete the number sentence.



  7 – 6 = _____

  Write a story to match the picture.

- There are 9 children on a bus.

  1 child gets off the bus.

  How many children are on the bus now?

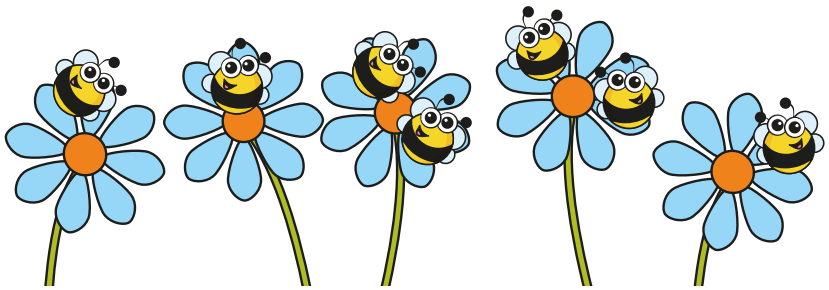
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Subtraction – take away (How many left?)

Reasoning and problem solving

There are 7 bees on some flowers.

Some bees fly away.



How many ways can you complete the subtraction?

_____ = 7 – _____

Tell a story for each one.

Why can you not use 8 or 9?

Talk about it with a partner.

multiple possible answers, e.g.

5 = 7 – 2

Fay and Dan have 9 grapes in total.

Fay eats 2 grapes and Dan eats 3 grapes.

How many grapes do they have left?

How do you know?

4

Complete the number sentence in different ways.

□ – □ = 0

What do you notice?

multiple possible answers, e.g.

5 – 5 = 0

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Subtraction on a number line

Notes and guidance

In this small step, children look at subtraction on a number line for the first time.

Children use the method of "counting back" to find the answers to subtraction calculations. As they did when adding more, they start from the "first" number and then count back to find the answer. These questions can be linked to examples and scenarios they have used in earlier steps in this block. This allows children to first focus their attention on how the number line helps with the calculation, before they move on to work more abstractly to complete subtractions by counting back.

As in the previous step, encourage children to think about each number within a calculation, what it represents and how it is shown on the number line. For example, in 5 – 3 = 2, 5 is the number they start at, 3 is the number of jumps back they do and 2 is the number they land on.

Things to look out for

- Children may count the number they start on when counting back. For example, when calculating 5 – 3, they may count "5, 4, 3", leading to an incorrect answer.
- Where calculations have repeated numbers, children may not understand the different meanings of the numbers.

Key questions

- What number do you need to start from?
- How many jumps back do you need to make?
- What number do you land on? What does that tell you?
- Why do you not say the number that you are starting on when you count?
- What is the subtraction sentence?
- Can you tell a story that matches the number line?

Possible sentence stems

- I need to start from _____

  I need to make _____ jumps backwards.

  I land on _____

  This means that _____ – _____ = _____

National Curriculum links

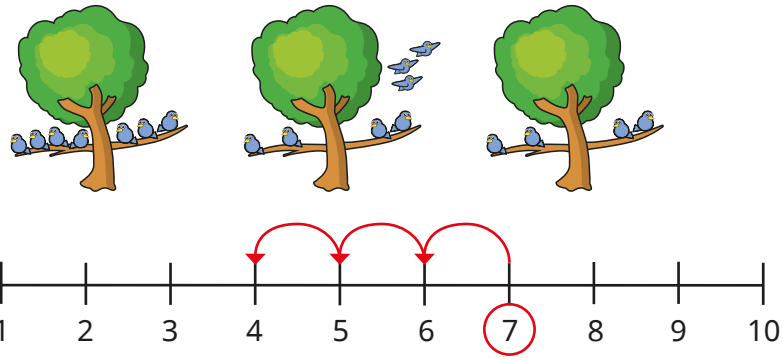
- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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Subtraction on a number line

Key learning

- Mo uses a number line to work out how many birds are left.



  - Why is 7 circled?
  - Why are there 3 jumps?
  - What number do the jumps end on? What does this mean?

- Jo has 8 sweets.

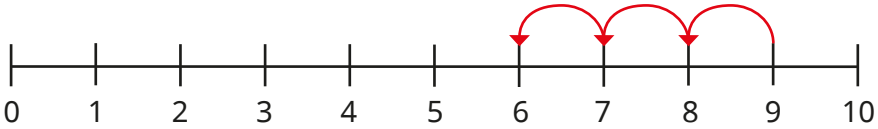
  She gives 5 sweets to Ron.

  How many sweets does Jo have left?

  Use the number line to work it out.



- Complete the number lines and the subtractions.



9 – 3 = _____



6 – 4 = _____

- Use the number line to complete the subtractions.



  - 7 – 3 = _____
  - 6 – 6 = _____
  - 10 – 6 = _____
  - 5 – 0 = _____
  - 9 – 4 = _____
  - 4 – 4 = _____

  Which subtractions have the same answer?

- Tom counts backwards from 9

  How many jumps does it take to get to 2?

  Show this in a number sentence.

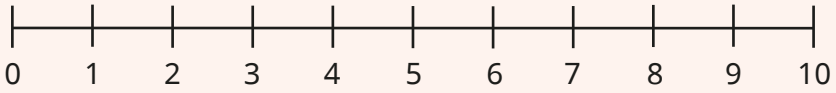
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Subtraction on a number line

Reasoning and problem solving



Give children a number line from 0 to 10 and tell them that they are starting from 10



In pairs, children take it in turns to roll a dice.



Whatever number they roll, they make this many jumps backwards.

If they roll a number greater than the number they are on, they need to wait until their next turn to try again.

The first child to get to zero wins.

Encourage children to discuss what numbers they would like to roll and why.

Tell children to write a number sentence for each step in their game.

Answers will vary, depending on numbers rolled.

Tiny counts back to work out 7 – 2

7 – 2 = 6



Use a number line to show that Tiny is wrong.

What is the correct answer?

Talk about Tiny's mistake.

5

Complete the subtraction.

_____ – _____ = 2



Is there more than one answer?

multiple possible answers, e.g. 5 – 3 = 2

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Add or subtract 1 or 2

Notes and guidance

In this small step, children focus on adding 1 or 2 in a variety of different contexts. They combine all the methods and approaches they have seen so far in this block.

The main difference between this learning and the previous learning is that children need to decide for the first time whether the question is an addition or a subtraction. So far, they have only seen each skill in isolation.

Encourage children to make connections between adding/subtracting 1 and adding/subtracting 2. It is important that they recognise that adding 2 is the same as adding 1 twice, and similarly subtracting 2 is the same as subtracting 1 twice. This will help children to be secure in their understanding of the composition of 2

Things to look out for

- Children may not understand what the question is asking.
- Children may be overwhelmed by the context of the question and find this difficult, rather than the maths itself.
- When adding/subtracting, children may start counting on the first number, for example incorrectly finding that 5 – 2 = 4, because they count "5, 4".

Key questions

- How many are there at first?
- Do you need to add or subtract? How do you know?
- How many do you need to add or subtract?
- What is 1 more/less than _____?
- What is 2 more/less than _____?
- What is the same about adding/subtracting 1 and adding/subtracting 2? What is different?

Possible sentence stems

- 1 more/less than _____ is _____
- 2 more/less than _____ is _____
- To add 2, I can add 1 _____ times.
- To subtract 2, I can subtract 1 _____ times.

National Curriculum links

- Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

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Add or subtract 1 or 2

Key learning

- Tom has these cakes.



  - Ann has 1 more cake than Tom.
    How many cakes does Ann have?
  - Sam has 1 cake fewer than Tom.
    How many cakes does Sam have?

- Max has these stickers.



  - His mum gives him 1 more sticker.
    How many stickers does Max have now?
  - His mum gives him 1 more sticker.
    How many stickers does Max have now?
  - How many stickers has Max's mum given him altogether?
    Write an addition sentence.

- Mo has these sweets.

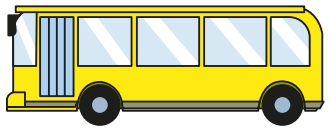


  - He eats 1 sweet.
    How many sweets does he have left?
  - He eats another sweet.
    How many sweets does he have left?
  - How many sweets has Mo eaten altogether?
    Write a subtraction sentence.

- There are 9 cars in a car park.
  One of the cars is red.
  How many cars are **not** red?
  Write a number sentence.



- There are 8 people on a bus.
  2 more people get on the bus.
  How many people are on the bus now?
  Write a number sentence.

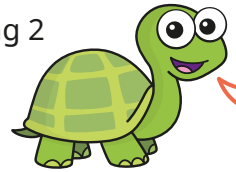


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Add or subtract 1 or 2

Reasoning and problem solving

Tiny is adding 2



To add 2,
I can just add 1 and
then add another 1

Is Tiny correct?

How do you know?

Yes

Here is a number line.



Use the number line to work out the subtractions.

7 – 2	7 – 1 – 1

What do you notice?

5, 5

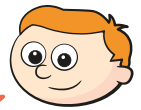
Kim, Ron and Sam have some crayons.



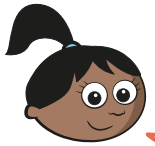
I have
5 crayons.

Kim

I have
1 more crayon
than Kim.



Ron



Kim has
1 more crayon
than me.

Sam

How many crayons does Ron have?

How many crayons does Sam have?

How many more crayons does Ron have than Sam?

6

4

2

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Autumn Block 3

Shape

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White Rose MATHS

Small steps

Step 1	Recognise and name 3-D shapes
Step 2	Sort 3-D shapes
Step 3	Recognise and name 2-D shapes
Step 4	Sort 2-D shapes
Step 5	Patterns with 2-D and 3-D shapes

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Recognise and name 3-D shapes

Notes and guidance

This small step is the first in a block of learning on shape. Children start by looking at 3-D shapes, as these are tangible shapes that they can touch and feel to help understand their identifying features.

Children are required to name simple 3-D shapes such as cubes, cuboids, cylinders, pyramids, cones and spheres. While some questions require children to write the names of the shapes, at this point the focus should be more on verbally naming and matching.

Encourage children to make links to previous learning and to start to think about the 2-D faces on a 3-D shape, as this will support them later on when they look at 2-D shapes in detail.

Things to look out for

- Children may think that a 3-D shape can only be placed or viewed in a certain way. Ensure that children are exposed to shapes in different orientations.
- Children may be familiar with the names of 2-D shapes from earlier learning or real-life experience, and may confuse these names with the names of 3-D shapes.

Key questions

- What makes a shape 3-D?
- What 3-D shapes can you see in the classroom?
- What is the name of this 3-D shape?
- Do all cubes look the same?
- Does the shape change when you turn it around?
- Can you think of any everyday objects that are cones/cubes/cylinders?

Possible sentence stems

- The mathematical name of a football is a _____
- The mathematical name of a book is a _____
- The mathematical name of a tin of beans is a _____
- This is a _____ because ...

National Curriculum links

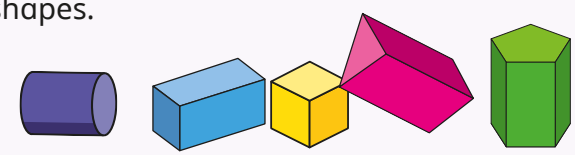
- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

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Recognise and name 3-D shapes

Key learning

Provide a selection of blocks in different sizes and shapes.



Can children name each shape?

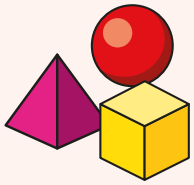
Encourage children to handle the shapes by building towers with different numbers of blocks, asking them to name each shape as they select it.

Challenge children to place their blocks to make the tower as tall as possible.

Ask children to make a variety of 3-D shapes using modelling clay.

Ask which shapes are the easiest and hardest to make, and why.

Ask children to describe how they made the flat faces.



- Match each shape to its name.



cube	cylinder	cuboid	pyramid	cone	sphere

- Complete the sentences to describe the model.

There are _____ cuboids.

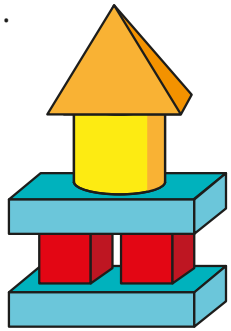
There are _____ cylinders.

There are _____ pyramids.

There are _____ cubes.

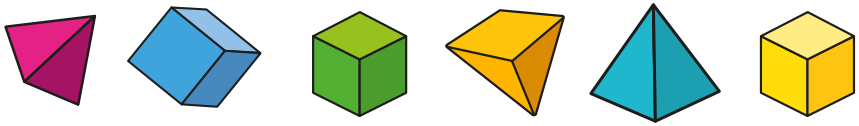
Use 3-D shapes to make your own model.

Ask a partner to describe it.



- Which shapes are cubes?

Which shapes are pyramids?



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Recognise and name 3-D shapes

Reasoning and problem solving



Put a selection of 3-D shapes in a feely bag.

Ask a child to feel a shape in the bag without taking it out. Ask them to guess what shape it is and explain their choice.

multiple possible answers



Give children a selection of 3-D shapes and ask them to build a tower.

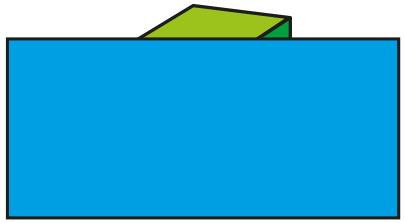
Encourage them to think about these questions:

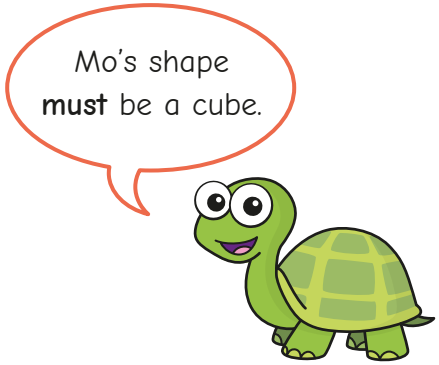
- Which shapes are the best for the bottom of the tower?
- Which shapes can only go on the top of the tower?
- Does it matter which way round a shape is placed?

Possible positions for shapes will depend on whether they have flat or curved surfaces.

Mo has a 3-D shape.

He covers the bottom of the shape.





Do you agree with Tiny?

Talk about it with a partner.

No

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Sort 3-D shapes

Notes and guidance

In this small step, children start to sort 3-D shapes. They should be given the opportunity to explore similarities and differences between shapes as they play, and to sort them according to what they notice. While they may have naturally started to sort 3-D shapes already, in this step children sort and group 3-D shapes more formally according to simple properties, including type, size and colour. As well as sorting shapes themselves, children also identify how given groups of shapes have been sorted.

Encourage children to explain in detail what they notice about groups of shapes and to consider whether they could have been sorted another way. Children should think about the key features of each 3-D shape. Encourage them to consider questions such as "Will they stack, or will they roll?" as another method for sorting.

Things to look out for

- If children are not used to seeing 3-D shapes presented in different orientations, they may try to sort by shapes that are "upside down".
- Children may think that cubes and cuboids can never be sorted into the same group, because they do not realise that a cube is a special type of cuboid.

Key questions

- Why is this 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 group?
- 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?

Possible sentence stems

- A _____ has flat faces.
- A _____ has a curved surface.
- A _____ has both flat faces and curved surfaces.

National Curriculum links

- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

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Sort 3-D shapes

Key learning



Give children some 3-D shapes and ask them to sort the shapes into two groups.

Get them to explain why they put certain shapes together and how the sets are different. Then ask children how they could sort the shapes in another way.



Read the story of *Rapunzel*.

Discuss which shapes children could use to build Rapunzel's tower.

Which shapes would they use at the bottom of the tower, and which shapes at the top?

Ask whether they could add a staircase to help Rapunzel escape.

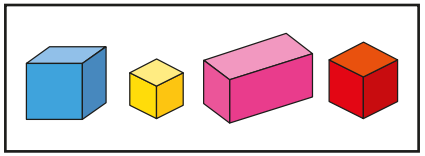


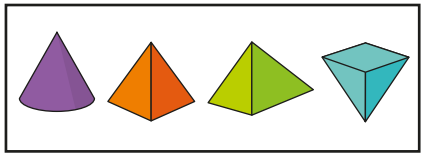
Play "Guess my rule".

Sort a variety of 3-D shapes into two groups and ask children to work out how you are sorting them.

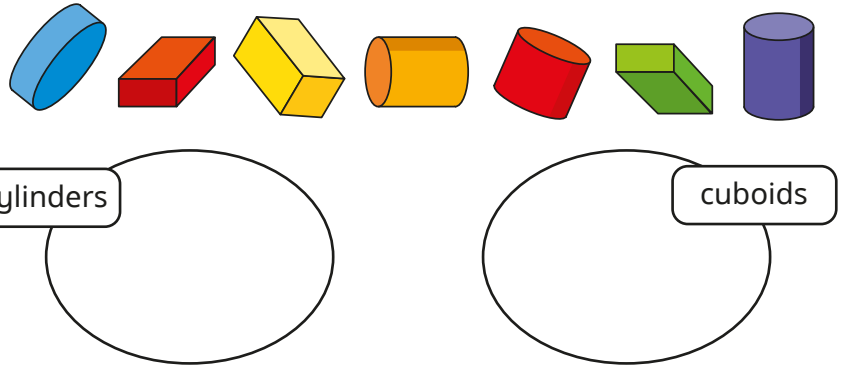
For example, you could sort shapes by those that stack and those that roll.

- Which is the odd one out in each group?



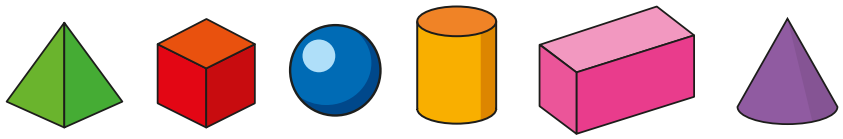


- Sort the shapes into the groups.



- Which shapes will roll?

  Which shapes will stack?



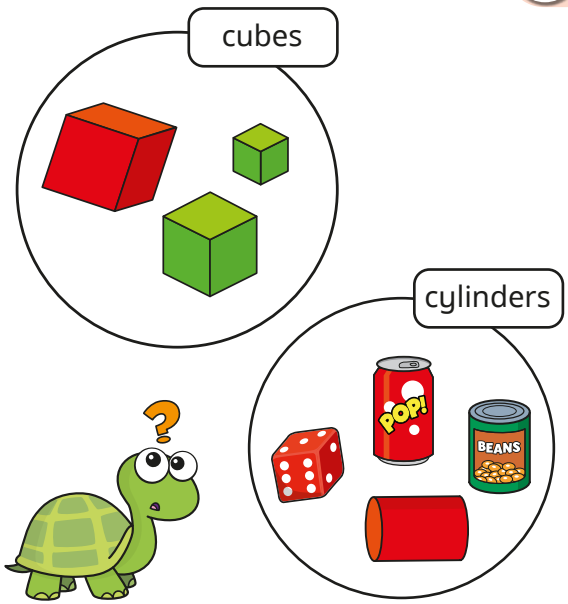
Will any of the shapes roll **and** stack?

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Sort 3-D shapes

Reasoning and problem solving

Tiny is sorting 3-D shapes.



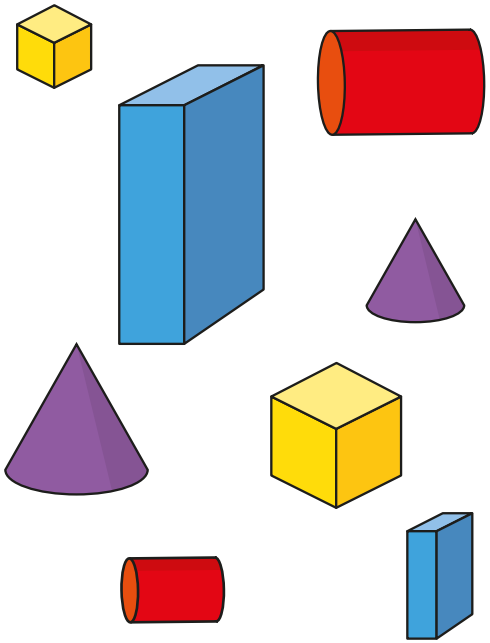
Is Tiny correct?

How do you know?

Can you sort the shapes another way?

No

Sort the shapes into two groups.



Can you sort them another way?

various possible answers, e.g.

flat faces and curved surfaces

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Recognise and name 2-D shapes

Notes and guidance

Now that children have looked in detail at 3-D shapes, they begin to look at 2-D shapes. They will have experience of 2-D shapes and may already know some of the names. Children are required to name simple 2-D shapes, such as triangles, squares, rectangles and circles. While some questions require children to write the names of the shapes, at this point the focus should be on verbally naming and matching.

As 2-D shapes cannot be physically explored in the same way as 3-D shapes, they can be difficult to introduce to children in a practical way. 3-D shapes can be used as a way of exploring 2-D shapes, where children focus on the faces of the 3-D shapes to identify which 2-D shapes they are made up of. They can also draw around 3-D shapes or use them to make prints of 2-D shapes. It is essential that children recognise that 2-D shapes are completely flat.

Things to look out for

- Children may not recognise that a square is a special type of rectangle.
- Children may think that each shape can only be placed or viewed in a certain way. Ensure that children are exposed to these shapes in different orientations.

Key questions

- What 2-D shapes do you know?
- What is the difference between a 2-D shape and a 3-D shape?
- Can you see any 2-D shapes on the faces of this 3-D shape?
- What does "2-D" mean?
- Describe the difference between a square and a cube.
- Describe the difference between a circle and a sphere.
- Where can you see 2-D shapes around the classroom?

Possible sentence stems

- On the face of a cylinder, I can see a _____
- On the face of a pyramid, I can see a _____ and a _____
- I know this shape is a _____ because ...

National Curriculum links

- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

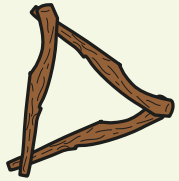
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Recognise and name 2-D shapes

Key learning

Take the class outside to collect sticks.

Ask children how many triangles they can make from their sticks. Discuss whether they always use the same number of sticks for each triangle.



Repeat with squares and rectangles.

Ask whether it is possible to make a circle using sticks.

Show children a picture made of different shapes, for example a boat, a rocket or a house.



Ask children what shapes they can see in the picture.

Ask them how many triangles/squares/rectangles/circles they can count.

Give children shapes to make their own pictures.

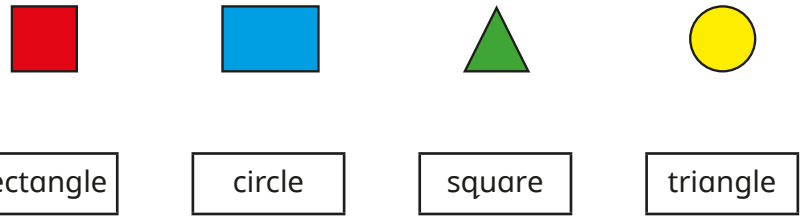
Take the class on a shape hunt, looking for circles, squares, rectangles and triangles on the surface of everyday objects.

Give children some 3-D shapes to draw around. Ask them to name the shapes they have drawn.

Ask how many different 2-D shapes they can draw using 3-D shapes in this way.

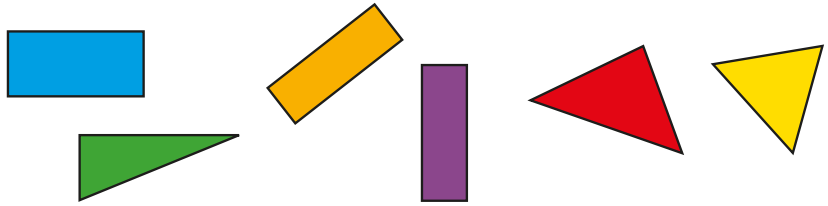
Can they draw a circle? Can they draw a square?

- Match each shape to its name.



- Which shapes are triangles?

  Which shapes are rectangles?



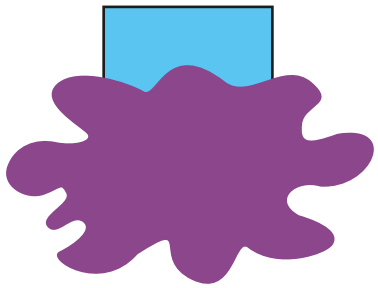
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Recognise and name 2-D shapes

Reasoning and problem solving

Sam draws a shape.

She spills paint on the shape.





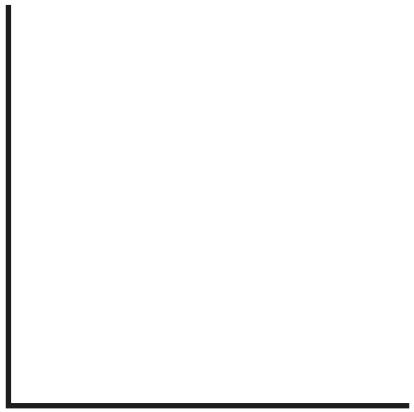
Do you agree with Tiny?

Is there more than one answer?

No

The shape could be a square or a rectangle.

Here is part of a shape.



Draw straight lines to complete the shape.

How many ways can you do it?

Compare shapes with a partner.

multiple possible answers, e.g.

square, rectangle or triangle

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Sort 2-D shapes

Notes and guidance

In this small step, children start to sort 2-D shapes. While they may have naturally started to sort 2-D shapes already, in this step they sort and group 2-D shapes more formally according to simple properties, including type, size and colour. As well as sorting shapes into groups themselves, children also identify how given groups of shapes have been sorted.

Encourage children to explain in detail what they notice about groups of shapes and to consider whether they could have been sorted another way. They should think about what is the same and what is different about shapes, while also recognising that the orientation of a shape does not affect its properties.

Take time to explore the similarities between squares and rectangles, so that children see the connection.

Things to look out for

- Children may try to sort by shapes that are "upside down" if they are not used to seeing 2-D shapes presented in different orientations.
- Children may think that squares and rectangles can never be sorted together, because they do not realise that a square is a special type of rectangle.

Key questions

- 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?

Possible sentence stems

- I have sorted the shapes by _____
- These shapes are grouped together because ...

National Curriculum links

- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

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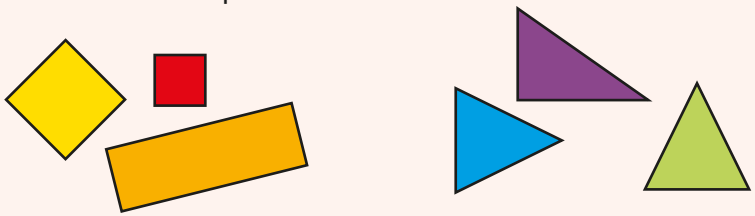
Sort 2-D shapes

Key learning

Play "Guess my rule".

Sort a variety of 2-D shapes into two groups and ask children to work out how you are sorting them.

For example, you could sort shapes by shapes with 4 sides and shapes with 3 sides.



Give children another shape and ask them which group it belongs in.

Read *Which One Doesn't Belong?* by Christopher Danielson.

Using the book as a prompt, ask children to explain which shape is different from the rest.

Can they find more than one answer?

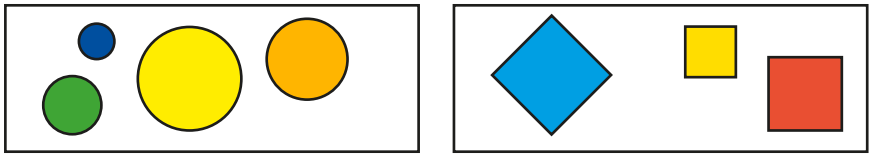
Challenge them to find a reason why each of the shapes could be different from the rest.

Take children on a shape hunt around the school.

Take photos of 2-D shapes then sort them by name.

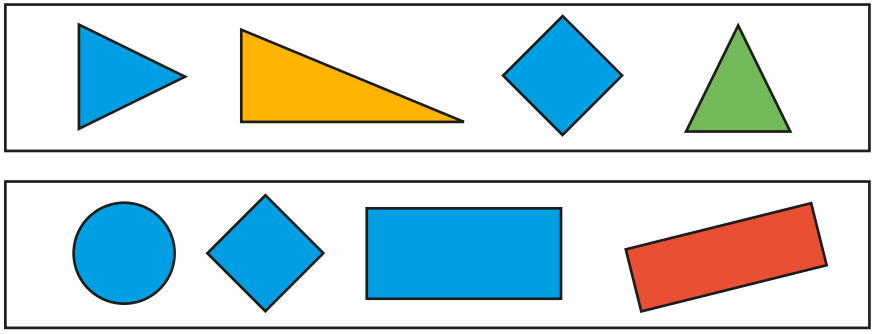
Can children sort them another way?

- How have the shapes been sorted?



Draw one more shape in each group.

- Which shape is the odd one out in each group?



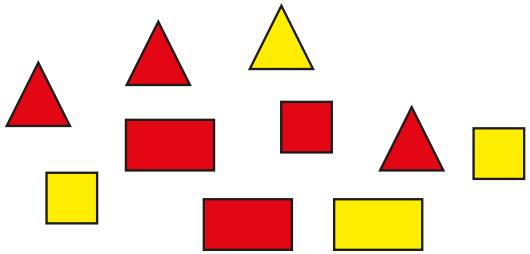
Is there more than one answer?

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Sort 2-D shapes

Reasoning and problem solving

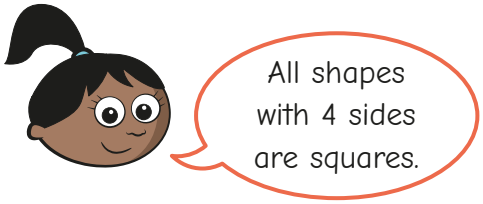
Sort the shapes into two groups.



Ask a partner to label your groups.

How many different ways can you sort the shapes?

multiple possible answers, e.g.
number of sides
colour

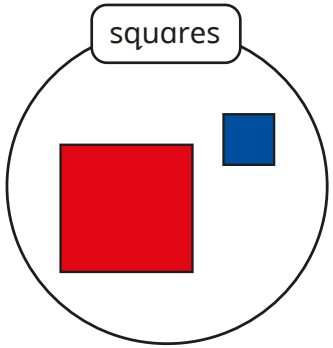


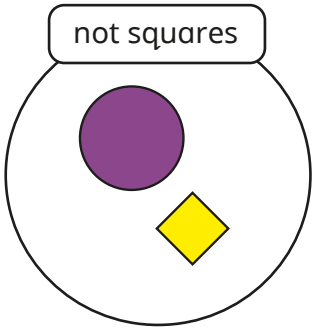
Is Sam correct?

How do you know?

No

Max is sorting 2-D shapes.





Is Max correct?

How do you know?

No

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Patterns with 2-D and 3-D shapes

Notes and guidance

In this small step, children create patterns with 2-D and 3-D shapes. They should experience both repeating patterns (ABAB) and symmetrical patterns (ABBCBBA), but do not need to know the names of these types of patterns.

Children use both 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 their previous learning on naming shapes. Use shapes in different orientations to reinforce children's recognition of 2-D and 3-D shapes.

Children should be able to recognise the rule within a pattern and use this to continue it in any direction.

Things to look out for

- Children may find it harder when a pattern involves more than two shapes, as they may not find the rule as easy to spot.
- Where a pattern repeats the same shape multiple times in a row, for example ABBBABBB, children may find it more difficult to identify the rule and therefore to continue the pattern.

Key questions

- What is the order of the shapes in the pattern?
- Can you describe the pattern?
- What will the next shape be?
- How many different shapes are in the pattern?
- Can you say the names of the shapes out loud as you describe the pattern?
- What is the same and what is different about the patterns?

Possible sentence stems

- The next shape in the pattern is a _____
- There are _____ shapes before the pattern starts again.
- The pattern is made up of _____ shapes.

National Curriculum links

- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

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Patterns with 2-D and 3-D shapes

Key learning



Use natural objects to build a repeating pattern.



Ask children to describe and continue the pattern.

Ask children to continue longer patterns.



Challenge children to create a different pattern using similar structures.

Can their partners continue their patterns?



Tell each child to draw either a triangle or a circle on their whiteboard.

Now ask the children to line up and make a pattern from their whiteboards.

How many different patterns can they make?

Repeat for other shapes and patterns.

- Kay makes a pattern.



Say the pattern out loud: rectangle, triangle, circle, rectangle, triangle, circle ...

Which shape comes after the circle?

Which shape comes before the rectangle?

- Ben makes a pattern.

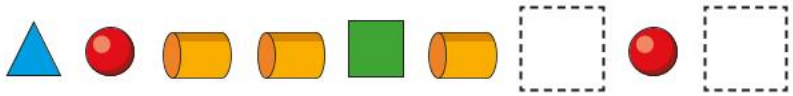
He uses 3-D shapes to print 2-D shapes.



Which 3-D shapes can Ben use to continue the pattern?

Use 3-D shapes to make your own print pattern.

- What are the missing shapes in this symmetrical pattern?



How do you know?

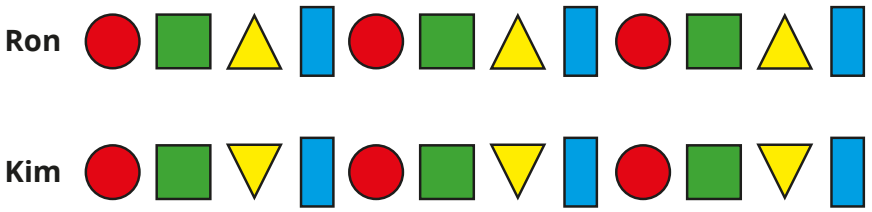
Can you make or draw your own symmetrical pattern?

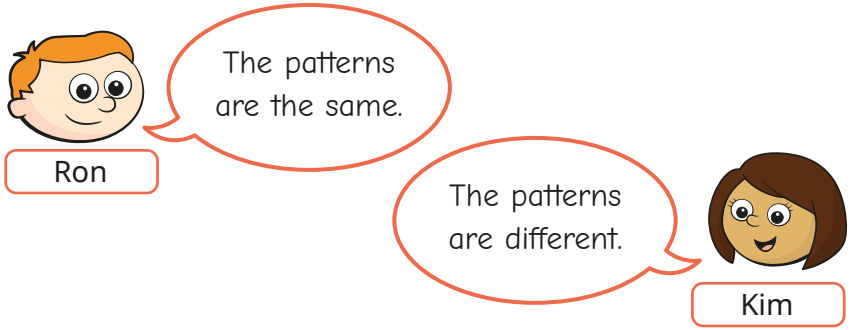
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Patterns with 2-D and 3-D shapes

Reasoning and problem solving

Ron and Kim each make a pattern.



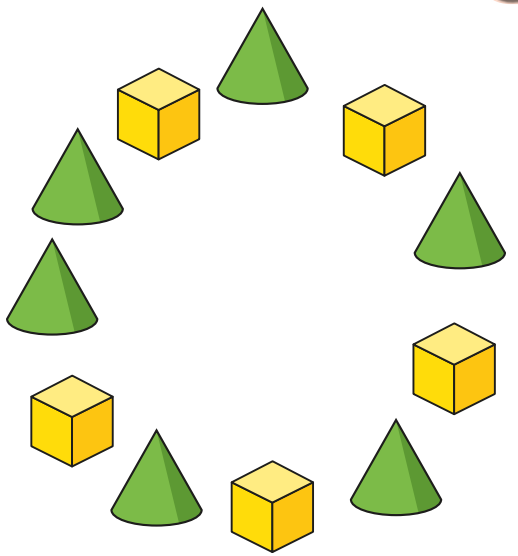


Who do you agree with?

Why?

Kim

Jo makes a pattern in a circle.



Is Jo's pattern correct?

How do you know?

Use 3-D shapes to make your own pattern in a circle.

No

Jo has put two cones together.

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