Spring Block 1

Place value (within 20)

Small steps

Step 1	Count within 20
Step 2	Understand 10
Step 3	Understand 11, 12 and 13
Step 4	Understand 14, 15 and 16
Step 5	Understand 17, 18 and 19
Step 6	Understand 20
Step 7	1 more and 1 less
Step 8	The number line to 20

Small steps

Step 9	Use a number line to 20
Step 10	Estimate on a number line to 20
Step 11	Compare numbers to 20
Step 12	Order numbers to 20

Count within 20

Notes and guidance

In the Autumn term, children learnt the numbers to 10. In this small step, they extend that learning to count to 20

Provide regular opportunities for children to verbally count to 20, for example counting how many children are present or how many beanbags there are in a bucket. Children can find counting through the teen numbers difficult, as the number names do not have the same regular 1 to 9 pattern that they hear once they count beyond 20. Use concrete resources to support children to see the "10-and-a-bit" structure of teen numbers.

Number tracks can support children in counting on and back to 20. "I count, you count" activities allow children to practise continuing the count from different starting points.

Things to look out for

- Children may find the numbers 11, 12, 13 and 15 confusing, as they cannot hear the 1, 2, 3 and 5 within them.
- Children may find writing teen numbers tricky, in particular reversing the digits. For example, when saying 16, they hear the 6 first, so may write 61

Key questions

- What number comes after _____?
- What number comes before _____?
- Which numbers sound different? Why?
- Which numbers after 10 do not include "teen"?
- How can you count 20 cubes/counters/pencils/glue sticks?
- What songs do you know that count to 20?

Possible sentence stems

- The number that comes after _____ is _____
- The number that comes before _____ is _____
- There are _____ cubes.

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

Count within 20

Key learning

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

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

For this game, you need a 1–3 dice and a pebble.

Draw a large number track from 0 to 20 on the playground and place a pebble on number 10

Player 1 aims to get to 20

They roll the dice and move the pebble that number of places towards 20, counting out loud, for example 11, 12, 13

Player 2 aims to get to zero.

They roll the dice and move the pebble that number of places towards zero, counting out loud, for example 12, 11, 10

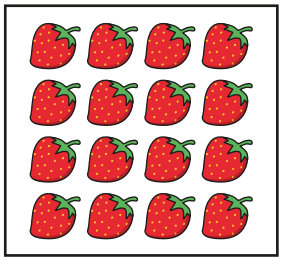
The winner is the first player to reach their target number.

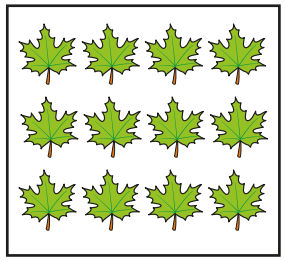
Put children into three groups.

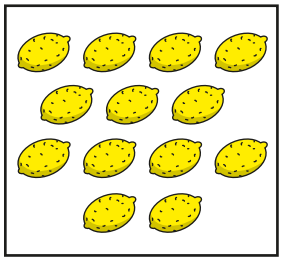
Point to a group and ask them to begin counting from 1. When you point to another group, they should continue the count. Keep switching between groups.

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

- Match the pictures to the numbers on the number track.







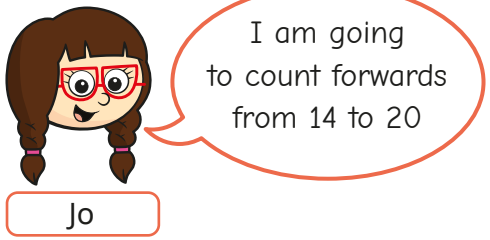
11	12	13	14	15	16	17	18	19	20

Count within 20

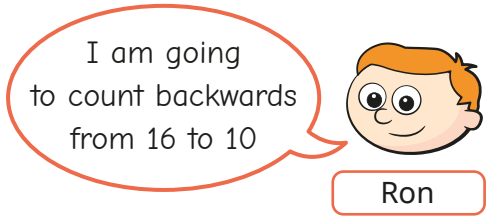
Reasoning and problem solving

Here are some number cards.

15	13	19	12	17



Which of the numbers will Jo say?

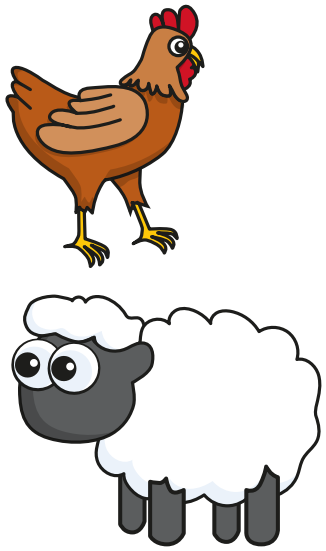


Which of the numbers will Ron say?

15, 19, 17

15, 13, 12

Mr Lee keeps hens and sheep.



He counts 14 legs altogether.

How many hens and sheep could Mr Lee have?

Compare answers with a partner.

2 hens and 3 sheep

3 hens and 2 sheep

5 hens and 1 sheep

Understand 10

Notes and guidance

In this small step, children develop their understanding of 10. A deep understanding of 10 will set children up well for future learning.

Use ten frames, bead strings and towers of cubes to draw attention to the fact that 10 ones and 1 ten are equivalent. Ten frames, bead strings and regular patterns, such as those on a dice, can support children to instantly recognise (subitise) 10 without needing to count.

Spend time looking at 10 in different ways, particularly ways where the 10 can be fixed or broken apart, for example a bundle of 10 straws. Children could then move on to seeing 10 as one base 10 piece that cannot be broken apart, although the individual ones are still obvious.

Things to look out for

- Children may struggle to understand that 1 ten is made up of 10 ones. Ensure that they explore this in a variety of ways.
- Where 10 is represented using a single piece of equipment, for example a single base 10 piece, children may struggle to recognise the 10 ones as they cannot physically break the representation apart.

Key questions

- How many ways can you make 10?
- How do you know that you have made 10?
- Is 10 greater than 9 or less than 9?
- How many ones make 10?
- If you have one full ten frame, what number have you got?
- What is this piece of base 10 worth? How do you know?

Possible sentence stems

- The ten frame is full, so I know that I have made _____
- There are _____ ones in 10
- There are _____ ones in _____ ten.

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
- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s

Understand 10

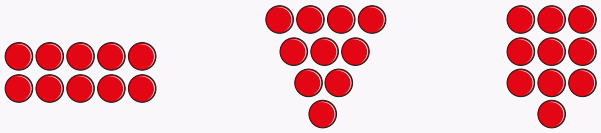
Key learning

Give one child 10 single cubes and another child a tower of 10 cubes. Ask which is more. Use the cubes to demonstrate that 10 ones and 1 ten are equivalent.

Repeat with 10 loose counters and 10 counters on a ten frame.

Show children 10 counters arranged in different ways.

How do they see the 10 each time?



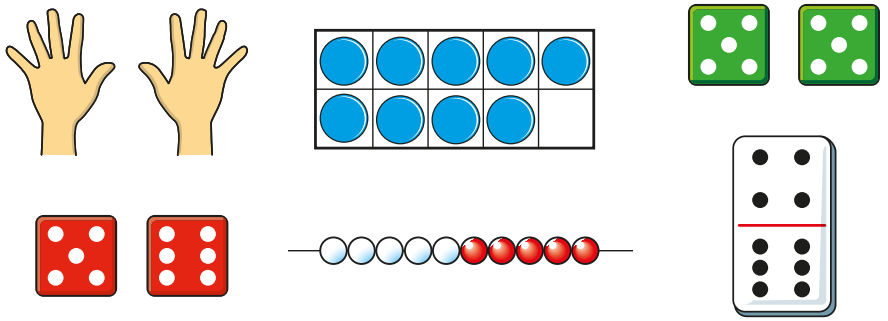
Ask children to count out 10 counters and arrange them in different ways.

What else do they notice about the composition of 10?

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

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

- Which pictures show 10?



Provide a variety of sets of different-sized objects, ensuring that some sets have 10 items and some do not.

Ask children to fill ten frames to help them to sort the sets into "10" and "not 10".

Challenge them to explain how to change the sets that are not 10 into 10

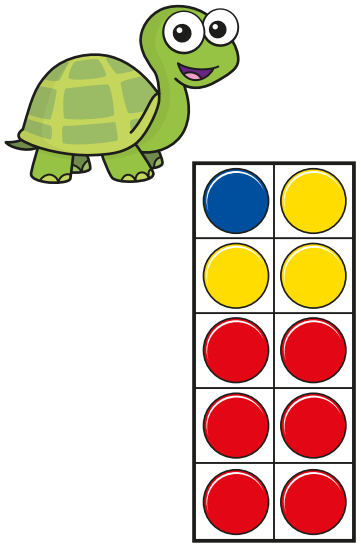
Give each child a tower of cubes from 1 to 9. Ask them to get into pairs so that each pair of children can combine their cubes to make 10

A similar activity can be done using number pieces.

Understand 10

Reasoning and problem solving

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



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

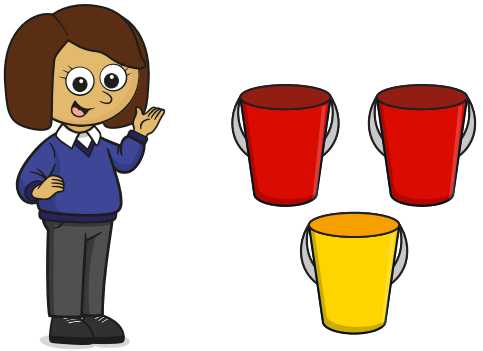
How many ways can you find?

multiple possible answers, e.g.

8, 1, 1

7, 2, 1

Kim has two red buckets and one yellow bucket.



She has 10 shells.

Kim puts her shells into the buckets.

The red buckets have the same number of shells inside.

How many shells could there be in each of Kim's buckets?

What do you notice about the number of shells in the yellow bucket?

0 + 0 + 10

1 + 1 + 8

2 + 2 + 6

3 + 3 + 4

4 + 4 + 2

5 + 5 + 0

Understand 11, 12 and 13

Notes and guidance

In this small step, children develop their understanding of 11, 12 and 13 as 1 ten and some ones, or "10-and-a-bit".

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

Encourage them to make 11, 12 and 13 using a range of resources that make the "10-and-a-bit" structure clear. Ten frames, number pieces, towers of cubes, Rekenreks and bead strings all support children to see the full ten and part of the next ten to support their place value understanding. This understanding is crucial to future work on addition and subtraction.

Time should be taken to ensure that children understand the difference between the digits in the numbers, making links between the tens and ones in the representation and the numeral.

Things to look out for

- Children may find the numbers 11, 12 and 13 confusing, as they cannot hear the 1, 2 or 3 within the number word.
- Children may write, for example, 103 instead of 13, because they can see 10 and 3 in their representation.

Key questions

- How can you show me 11 in three different ways?
- How much more than 10 is 12?
- How can you write the numbers 11, 12 and 13?
- Can you see 11/12/13 anywhere in the classroom?
- Does anyone have a brother or sister who is 11, 12 or 13?
- How many ones are there in 13?
- What is the same and what is different about 11, 12 and 13?

Possible sentence stems

- 11 has _____ ten and _____ one.
- 12 has _____ ten and _____ ones.
- 13 has _____ ten and _____ ones.

National Curriculum links

- Count to and across 100, forwards and backwards, beginning with zero or 1, or from any given number
- Read and write numbers from 1 to 20 in numerals and words

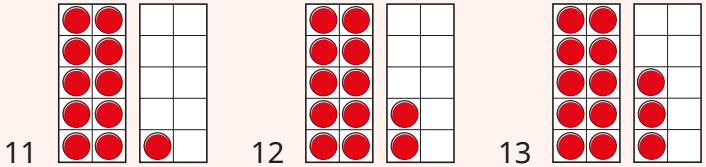
Understand 11, 12 and 13

Key learning

Show children 10 counters on a ten frame.

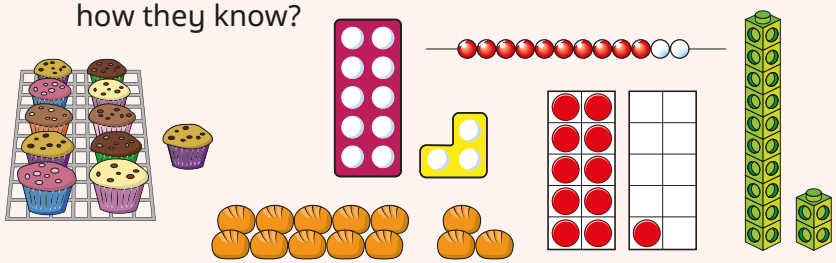
Ask how many there will be if you add one more counter. Discuss whether you can fit 11 counters on a ten frame. Build 11, emphasising 1 full ten and 1 more, linking this to how we write the numeral 11

Repeat for 12 and 13

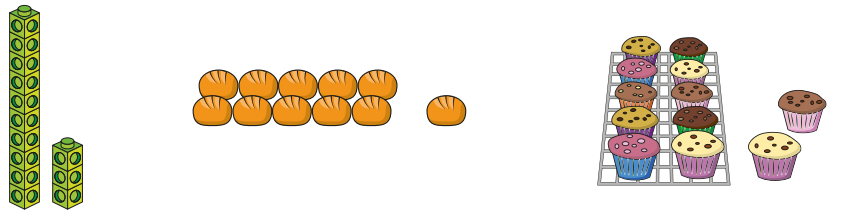


Quickly show a picture of 11, 12 or 13, making sure that the "10-and-a-bit" structure is clear. Then hide the picture.

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

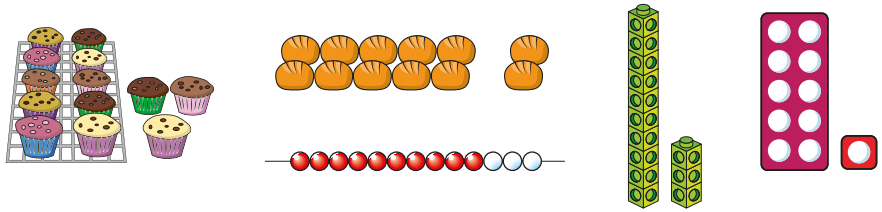


- Match the pictures to the numbers.



11	12	13

- Which pictures show 13?



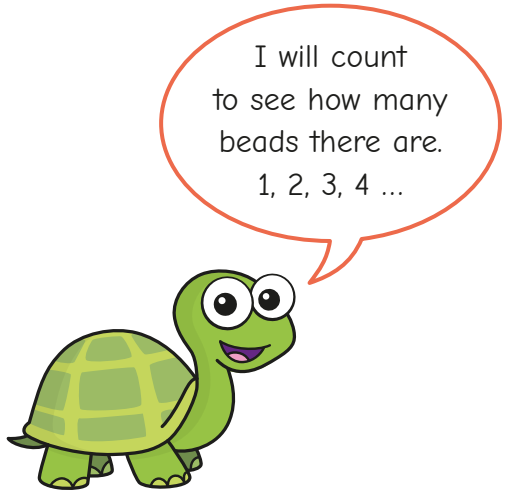
- Match the numerals to the number words.

12	13	11
eleven	thirteen	twelve

Understand 11, 12 and 13

Reasoning and problem solving

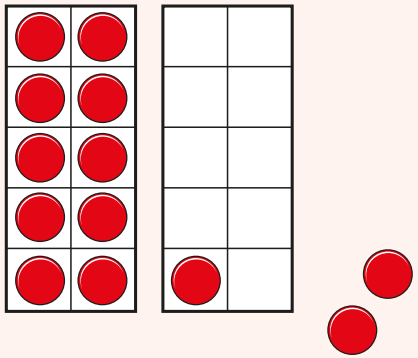
Here are some beads on a bead string.



Does Tiny need to count the beads?

How do you know?

No



Show children 11 on ten frames. Hide the ten frames and say that you are adding 1 more.

Ask how many there will be now.

Can children draw the new number?

Do their drawings match the hidden frames?

Repeat, adding or subtracting 1 or 2 counters each time to move between 10 and 13

Ask children what they notice.

Discuss answers as a class.

Understand 14, 15 and 16

Notes and guidance

In this small step, children extend the learning of the previous step by looking at 14, 15 and 16

Children practise matching numbers to representations using cards showing 14, 15 and 16 in words and numerals alongside representations of each number. As with the previous step, encourage children to make 14, 15 and 16 using a range of resources that make the "10-and-a-bit" structure clear. Ten frames, number pieces, towers of cubes, Rekenreks and bead strings all support children to see the full ten and part of the next ten to support their place value understanding. This understanding is crucial to future work on addition and subtraction.

Children should be challenged to explore the differences and similarities between these numbers and 11, 12 and 13. They also use part-whole models, giving them an informal introduction to partitioning.

Things to look out for

- Children may reverse the digits, for example writing 41 instead of 14, because they say the 4 before "teen".
- Children may write, for example, 106 instead of 16, because they can see the 10 and the 6

Key questions

- How can you show me 14/15/16 in three different ways?
- How much more than 10 is 14/15/16?
- How can you write the numbers 14, 15 and 16?
- Can you see 14/15/16 anywhere in the classroom?
- Does anyone have a brother or sister who is 14, 15 or 16?
- How many ones are there in 16?
- What is the same and what is different about 14, 15 and 16?

Possible sentence stems

- 14 has _____ ten and _____ ones.
- 15 has _____ ten and _____ ones.
- 16 has _____ ten and _____ ones.

National Curriculum links

- Count to and across 100, forwards and backwards, beginning with zero or 1, or from any given number
- Read and write numbers from 1 to 20 in numerals and words

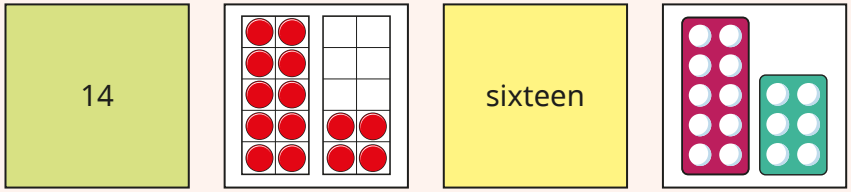
Understand 14, 15 and 16

Key learning

Use a set of cards with each card showing a numeral, word or representation for 14, 15 or 16

Give each child a card. Ask them to find a partner with the same number.

Can they find a different partner with the same number?



Use a set of cards with each card showing a numeral, word or representation for 14, 15 or 16

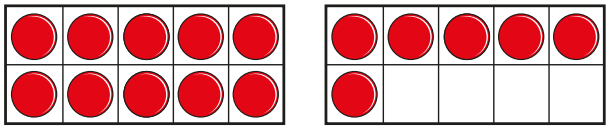
Use two 14, two 15 and two 16 cards. Shuffle the cards and take one away. Ask what number the missing card will represent.

Repeat using a mix of numerals, representations and words.

The cards can also be used to play a matching pairs game.

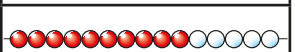
Place all the cards face down. Children take turns to turn over two cards. If they find a pair with the same number, they keep them. If not, they turn them back over for the next player's turn.

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

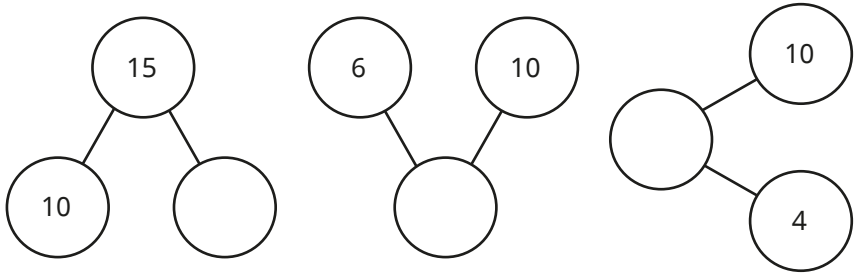


Use ten frames to show fifteen and fourteen.

- Complete the table.

Numerals	Word	Picture
14		
		
	sixteen	

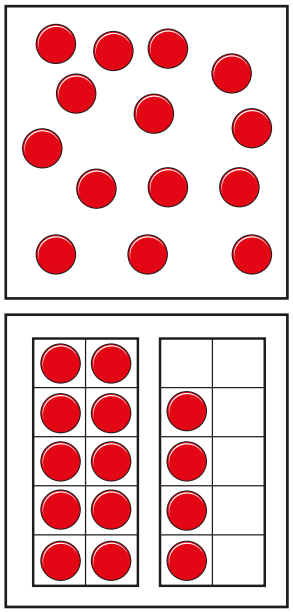
- Complete the part-whole models.



Understand 14, 15 and 16

Reasoning and problem solving

Ron uses counters to make two numbers.



What is the same? What is different?

Which group of counters is easier to count?

Why?

same: Both groups have 14 counters.

different: The way they are arranged

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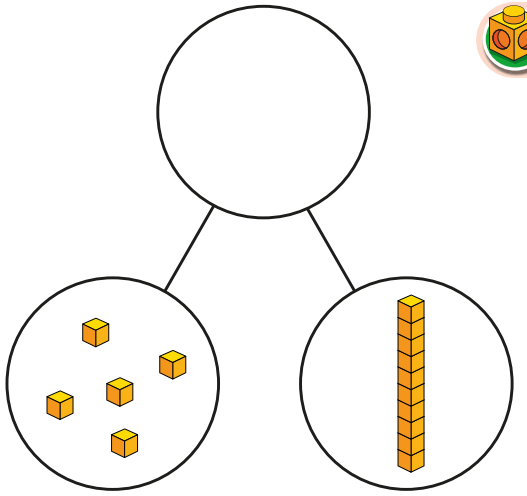
the second group

Tiny makes a part-whole model.



What mistake has Tiny made?

Tiny has 1 full ten and 5 more cubes. The number is 15

Understand 17, 18 and 19

Notes and guidance

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

Children explore 17, 18 and 19 shown on ten frames, expressing them as 1 ten and a number of ones. Encourage children to notice the "10-and-a bit" structure to help them subitise as they have done previously.

Children practise matching numbers to representations using cards showing 17, 18 and 19 in words and numerals alongside representations of each number. Ten frames, number pieces, towers of cubes, Rekenreks and bead strings continue to support children to see the full ten and part of the next ten to support their place value understanding. This understanding is crucial to future work on addition and subtraction.

Now that children are looking at the later teen numbers, encourage them to see the number of empty spaces in the second ten frame in order to quickly identify 17, 18 and 19

Things to look out for

- Children may reverse the digits, for example writing 71 instead of 17, because they say the 7 before "teen".
- Children may write, for example, 108 instead of 18, because they can see 10 and 8

Key questions

- How can you show me 17/18/19 in three different ways?
- How much more than 10 is 17/18/19?
- How can you write the numbers 17, 18 and 19?
- Can you see 17/18/19 anywhere in the classroom?
- How many ones are there in 19?
- What is the same and what is different about 17, 18 and 19?
- When you make 18 on a ten frame, how many spaces are empty?

Possible sentence stems

- 17 has _____ ten and _____ ones.
- 18 has _____ ten and _____ ones.
- 19 has _____ ten and _____ ones.
- There are _____ empty spaces on the ten frame.

National Curriculum links

- Count to and across 100, forwards and backwards, beginning with zero or 1, or from any given number
- Read and write numbers from 1 to 20 in numerals and words

Understand 17, 18 and 19

Key learning

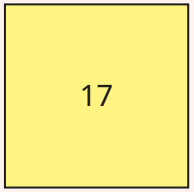
Show children 17 on ten frames.

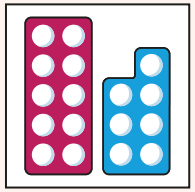
What do they notice about 17?

Ask children to use counters and ten frames to make 18 and 19 and to talk to a partner about what they notice.

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

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





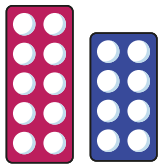
Ask children to write three numbers between 10 and 20

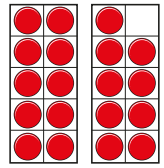
Show them a number (varying the representations).

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

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

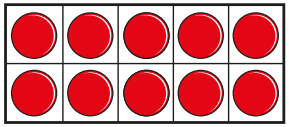
- Match the pictures to the numbers.

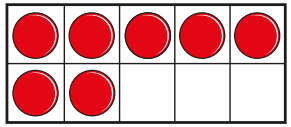




nineteen | eighteen | seventeen

- Use the ten frames to complete the sentence.





17 has _____ ten and _____ ones.

Use ten frames to show 18 and 19

- Complete the number tracks.

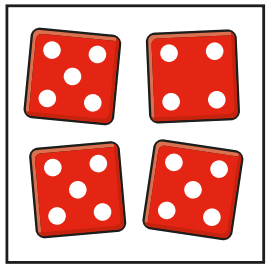
10	11	12	13		15	16			19	20

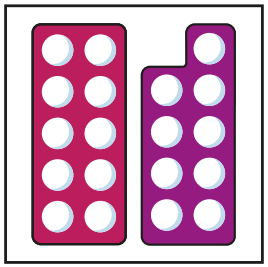
20		18		16	15	14		12	11	10

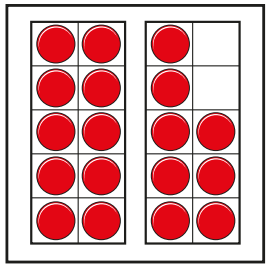
Understand 17, 18 and 19

Reasoning and problem solving

Which one does not belong?







nineteen

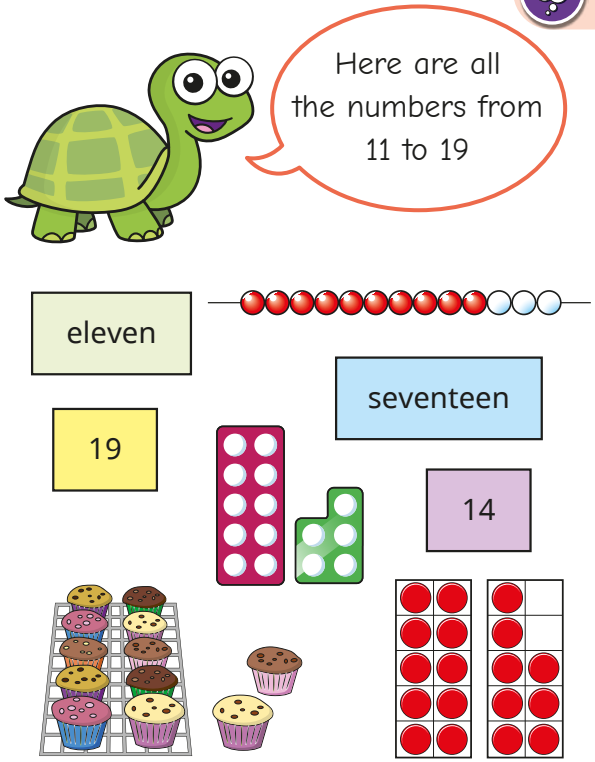
Is there more than one answer?

multiple possible answers, e.g.

The ten frames show 18 and all the rest show 19

The dice is the only number with four parts.

Nineteen is the only word.



Is Tiny correct?

How do you know?

No

16 is missing.

Understand 20

Notes and guidance

In this small step, children apply what they have learnt about 10, to develop an understanding of 20. A deep understanding of 20 will set children up well for future learning.

Use ten frames, bead strings and towers of cubes to draw attention to the fact that 2 tens are equivalent to 20. Spend time looking at 20 in different ways, particularly ways where each ten can be fixed or broken apart, for example bundles of straws. Children could then move on to seeing 20 as two base 10 pieces that cannot be broken apart, although the individual ones are still obvious.

Things to look out for

- Children may struggle to understand that 20 is made up of 2 tens or 20 ones. Ensure that they explore this in a variety of ways.
- Where 20 is represented using two single pieces of equipment, for example 2 base 10 pieces, children may struggle to recognise the 10 ones in each ten as they cannot physically break the representation apart.
- Children may not understand that when counting, 20 comes after 19, and time should spend focusing on this.

Key questions

- How many ways can you make 20?
- How do you know that you have made 20?
- Is 20 greater than 19 or less than 19?
- How many ones make 20?
- How many tens make 20?
- If you have two full ten frames, what number have you got?
- How many pieces of base 10 do you need to make 20?

Possible sentence stems

- Two ten frames are full, so I know that I have made _____
- There are _____ ones in 20
- There are _____ tens in 20

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
- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s

Understand 20

Key learning

Hide small objects outside and provide two ten frames for each group of children.

The groups race to find 20 objects and fill their ten frames. Prompt children to tell you how many objects they have found and how many more they need to make 20

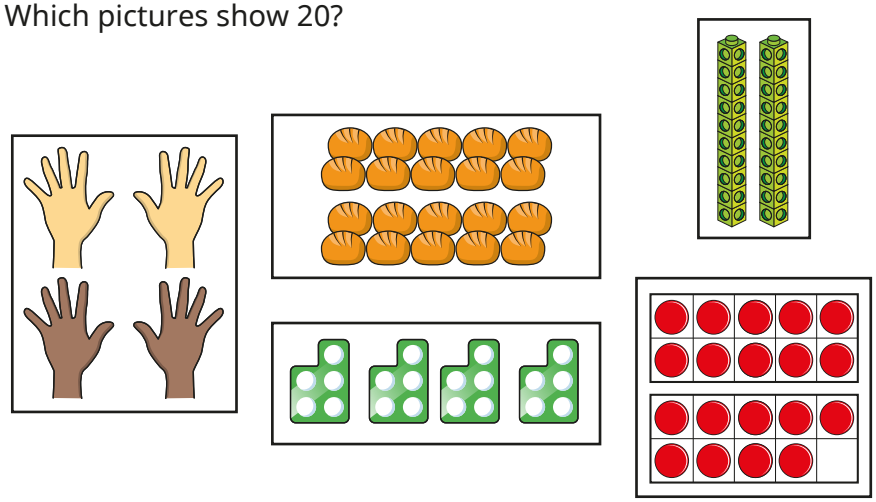
Show representations of numbers and ask children to decide if the number shown is 20 or not 20, explaining how they know.

Read *One is a Snail, Ten is a Crab* by April Pulley Sayre and Jeff Sayre.

Remind children that 20 is 2 crabs.

Ask children to find different ways of making 20 using the animals in the book.

- Which pictures show 20?



Children can play this game in pairs or small groups.

They need a number track from 0 to 20, a 1–3 dice and some counters.

They start from zero and take turns to roll the dice and count on the corresponding number of jumps. For example, if Tom is on 6 and rolls a 3, he counts 7, 8, 9 as he moves his counter along the track.

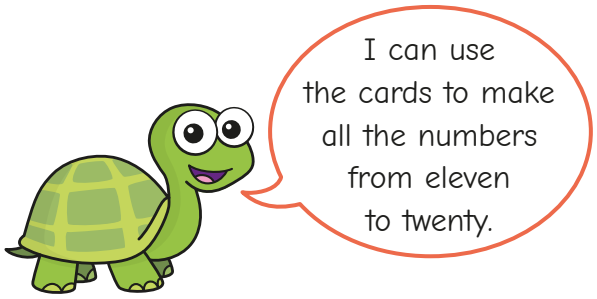
The first child to reach exactly 20 wins.

Understand 20

Reasoning and problem solving

Tiny has these digit cards.

1	2	3	4	5
6	7	8	9	



Do you agree with Tiny?

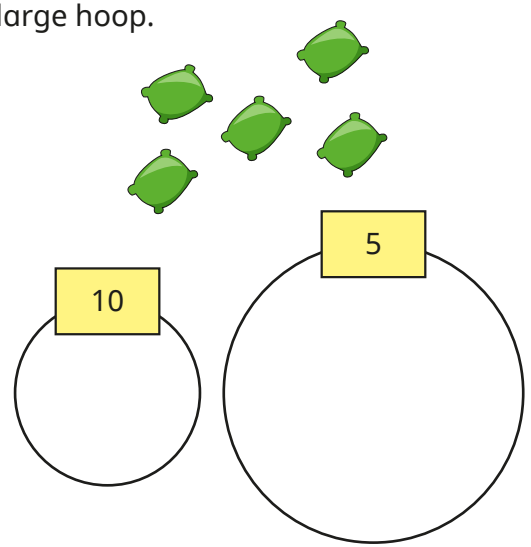
Why?

No

Ann is throwing beanbags into two hoops.

She scores 10 for a beanbag in the small hoop.

She scores 5 for a beanbag in the large hoop.



How can Ann score 20?

How many ways can you find?

10 and 10

5, 5, 5 and 5

10, 5 and 5

1 more and 1 less

Notes and guidance

In this small step, children apply their counting skills to find 1 more and 1 less than any number within 20

Children have already looked at this concept for numbers within 10, so while the focus here is on numbers from 11 to 20, other numbers within 20 can also be covered. Ensure that examples involving zero are used, for example 1 less than 1 is zero and 1 more than zero is 1. Children have already encountered the language of "more" and "less", but this may need reinforcing. Using real-life examples, such as "1 more grape", will help children with their understanding of the vocabulary.

Representations such as ten frames are useful for showing 1 more and 1 less. Towers of cubes are particularly useful for clearly showing the 1 more pattern of consecutive numbers. Using a number track alongside concrete resources can help children develop a secure understanding of the concept. Children practise finding 1 more and 1 less using both representations and numerals.

Things to look out for

- Children who are not are fully secure with counting and one-to-one correspondence may struggle with 1 more and 1 less.

Key questions

- How can you show the number _____?
- How can you find 1 more?
  How does this change the number?
  Which digit changes?
- How can you find 1 less?
  How does this change the number?
- What is the same and what is different about finding 1 more and finding 1 less?
- When you are finding 1 more or 1 less, which digit changes? Is it always the same digit?

Possible sentence stems

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

National Curriculum links

- Given a number, identify 1 more and 1 less

1 more and 1 less

Key learning

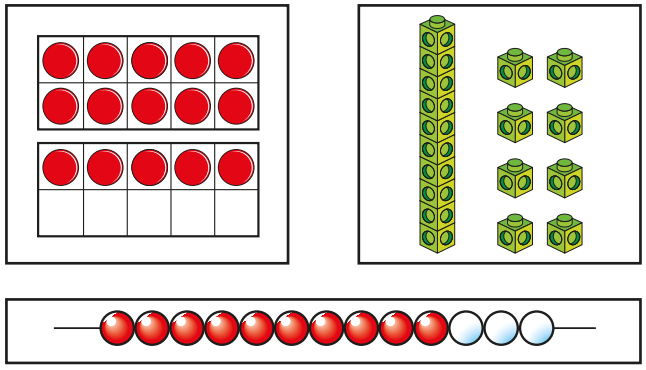
Reread *1 to 20 Animals Aplenty* by Katie Viggers.

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

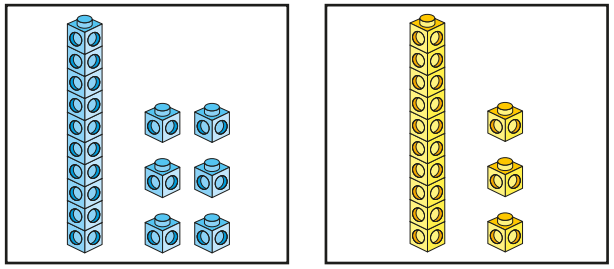
Look at the 11 to 20 counting pattern on the last page of *1 to 20 Animals Aplenty*.

Ask children to build or draw their own 11 to 20 step patterns. This could be done using resources outside or chalked onto the playground.

- Make 1 more and 1 less than each number.

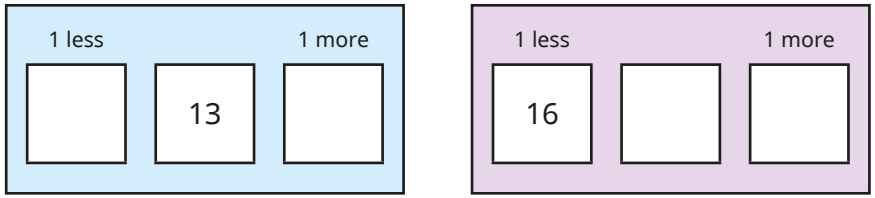


- Use cubes to make 1 more and 1 less than the numbers.



- Write numbers to fill in the boxes.

  Use base 10 to help you.



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

11	12	13	14	15	16	17	18	19	20

- _____ is 1 more than 13
- 13 is 1 more than _____
- _____ is 1 less than 19
- 19 is 1 less than _____

1 more and 1 less

Reasoning and problem solving

Dan is 1 year older than his sister.

Dan's sister is 1 year older than Dan's brother.

Dan's brother is 13

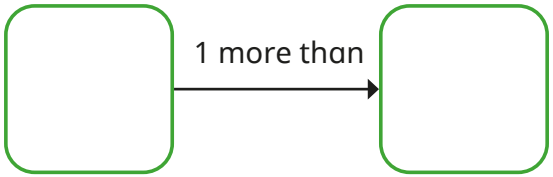
How old is Dan's sister?

How old is Dan?

14 years old

15 years old

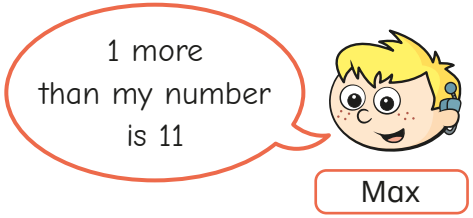
Use the numbers from 11 to 20 to fill in the boxes.



How many ways can you find?

multiple possible answers, e.g.
18, 17
12, 11

Max thinks of a number.



What is Max's number?

How do you know?

Kim thinks of a number.

What is Kim's number?

How do you know?

10

16

The number line to 20

Notes and guidance

Children learnt about the number line to 10 in the Autumn term. In this small step, they extend the number line to 20

All the number lines in this step count in 1s. Children can use number lines to practise and consolidate the skills learnt so far in this block. They recap counting from 0 to 20 forwards when labelling a number line and practise counting backwards when reading from right to left. A number line is a great opportunity to count from zero, as children do not do this when counting physical things. They use a variety of number lines all counting in 1s, but with different start and end point values.

Things to look out for

- When labelling a number line, children may write the numbers in between divisions, as they do on number tracks, rather than on divisions.
- Children may assume that all number lines start at zero.
- Children may think that numbers on a number line can either increase or decrease from left to right, as on number tracks.

Key questions

- 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 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 number on the number line is _____
- The last number on the number line 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

The number line to 20

Key learning

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

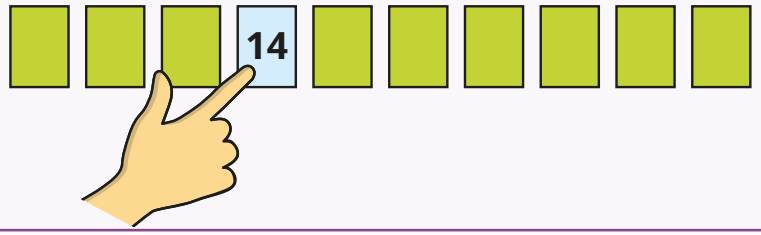
Ask children to find any given number on the number line. Is the number nearer to zero or nearer to 20? How do they know?

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

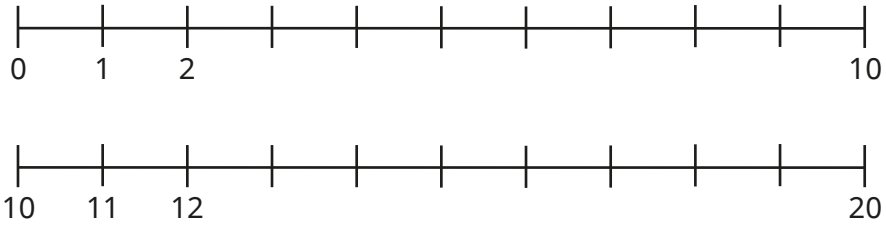
Put a set of number cards from 11 to 20 face down in order.

Challenge children to point to any card and tell them that you will use your X-ray vision to tell them the number on the card!

Can children work out the secret of your success?

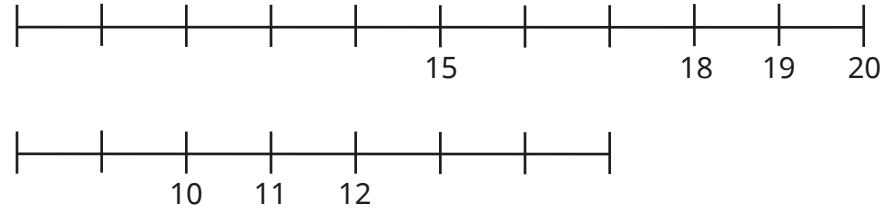


- Complete the number lines.



What is the same about the number lines? What is different?

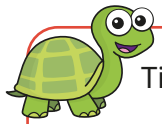
- Complete the number lines.



- Use a number line from 0 to 20
  - Circle the number 13
  - Circle the number 20

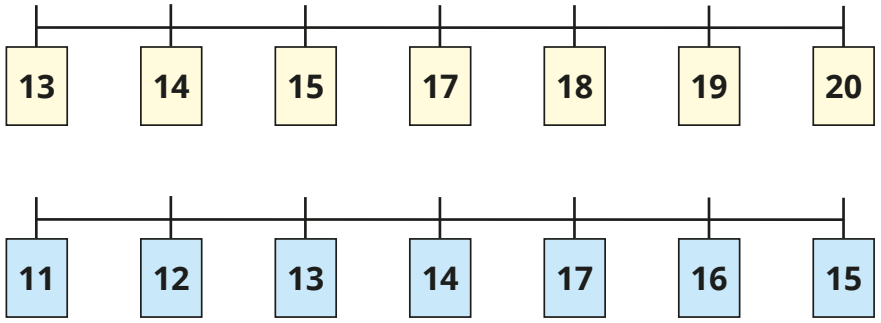
The number line to 20

Reasoning and problem solving



Tiny has put number cards on two number lines.

Spot the mistake in each number line.

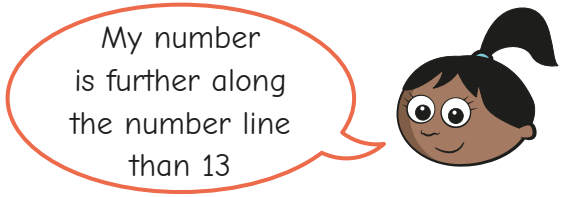


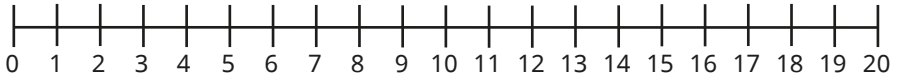
Draw a number line with a mistake for a partner to spot.

16 is missing.

15 and 17 are the wrong way round.

Sam is thinking of a number.





What could Sam's number be?

Compare answers with a partner.

any number greater than 13 and less than or equal to 20

Use a number line to 20

Notes and guidance

In this small step, children build on their understanding of the number line to 20

All the number lines in this step count in 1s. Children continue to use the number line to practise and consolidate the skills learnt so far in this block.

Children see that 1 more is the next number along the number line, while 1 less is the previous number. They identify all the numbers lying between two given numbers and work out and label numbers on partially labelled number lines.

Things to look out for

- When labelling a number line, children may write the numbers in between divisions, as they do on number tracks, rather than on divisions.
- When completing a partially labelled number line, children may assume that the number line starts at 1, not zero, or they may try to guess the numbers, rather than count to check.

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?
- What does each jump on the number line represent?

Possible sentence stems

- The first number on the number line is _____
- The 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

Use a number line to 20

Key learning

Use chalk to draw a large 0–20 number line on the playground.

Ask a child to start at 9 and jump to 17, one division at a time. Which numbers do they land on?

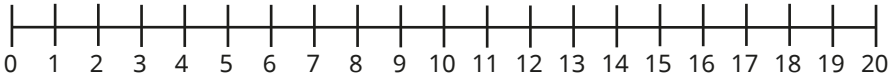
Can children find 1 more and 1 less than 15?

Can they find all the numbers that are greater than 11? Less than 14?

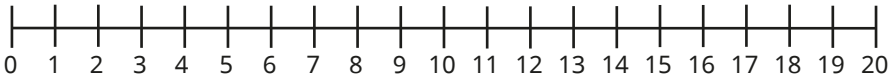
Can they find all the numbers in between 12 and 18?

- Ann counts from 8 to 15

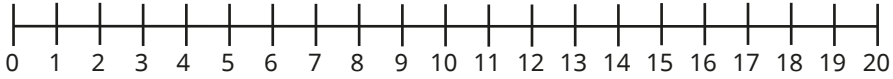
  Circle all the numbers that she will say.



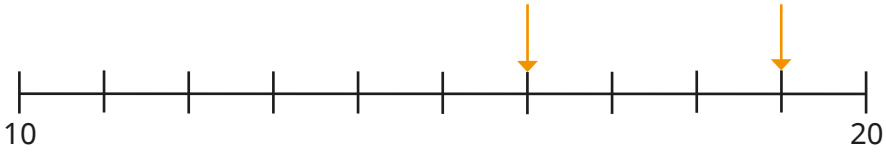
- Circle all the numbers that are greater than 7



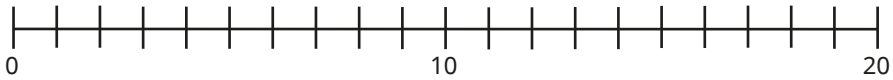
- Circle all the numbers that are less than 13



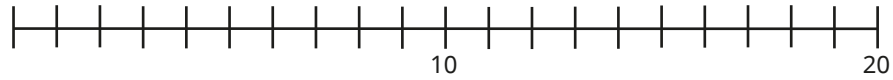
- What numbers are the arrows pointing to?



- Label 15, 12 and 9 on the number line.



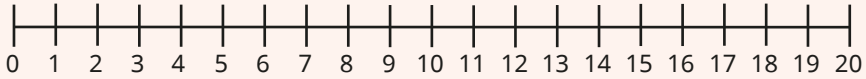
Label 7, 17 and 19 on the number line.



Use a number line to 20

Reasoning and problem solving

Ask children to pick a number on the number line.



Can they tell you how many jumps there are from zero to their number? How many jumps are there from their number to 20? Is their number closer to zero or closer to 20?

Repeat with different numbers.

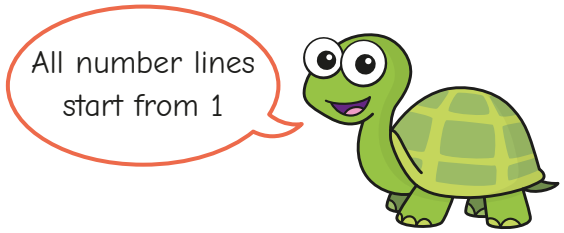
Ask children what they notice about the two sets of jumps each time.

multiple possible answers, e.g. 15

15 jumps from zero to 15

5 jumps from 15 to 20

The two sets of jumps always total 20

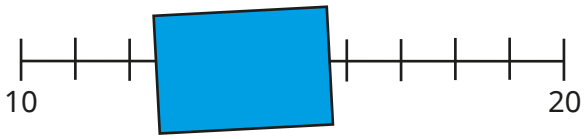


Do you agree with Tiny?

Why?

No

Which numbers are hidden by the card?



13, 14, 15

Estimate on a number line to 20

Notes and guidance

In this small step, children are asked to estimate for the first time. This is a new word for children to learn. Previously, they may have been asked to "guess" and make predictions.

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

Some children may initially struggle to estimate. Conversations with other children are vital to develop understanding. Some children may find not having an exact answer difficult and need time to grasp the idea of estimating.

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

Things to look out for

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

Key questions

- What does "estimate" mean?
- Can you find halfway?
- What number is halfway on the number line?
  Is 7 more or less than the number?
- Will halfway on the number line always be 5?
  What if the number line starts at zero and ends at 20?
  What number is halfway now?
- Can you explain your thinking?
- Where is 15 on the number line? How do you know?

Possible sentence stems

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

Estimate on a number line to 20

Key learning

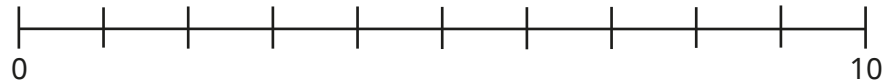
Use chalk to draw a number line on the playground. Label one end zero and the other end 10

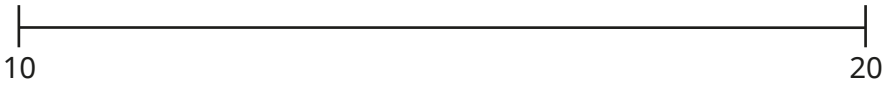
Give a child a number card and ask them to position themselves on the number line. Repeat for other numbers. Encourage children to explain their reasoning. For example, 5 is halfway along the line and 6 is a little bit past halfway.

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

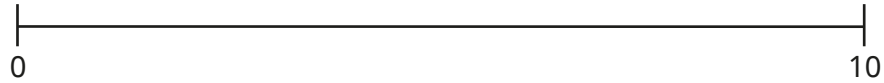
- Use the number line from 0 to 10 to help you estimate.

  Where do 13 and 19 belong on the number line from 10 to 20?

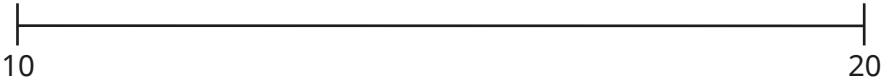




- Estimate where 4 belongs on the number line.

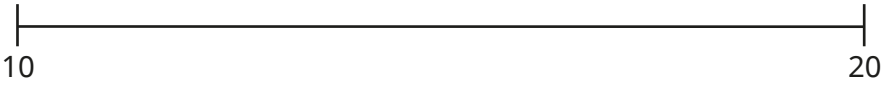


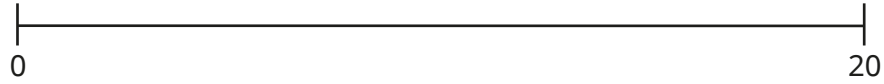
Estimate where 14 belongs on the number line.



What is the same? What is different?

- Estimate where 15 belongs on each number line.





What is the same? What is different?

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

  Which numbers will you mark on your lines first?

Estimate on a number line to 20

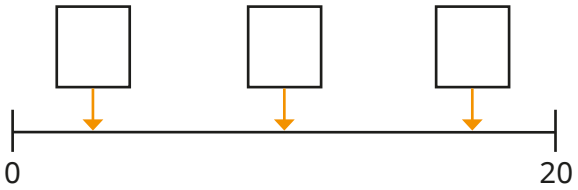
Reasoning and problem solving

What could the missing number be?

How do you know?

18

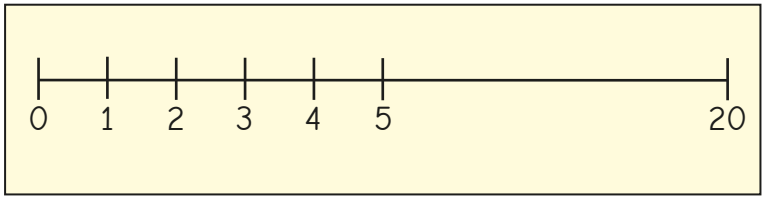
What could the missing numbers be?

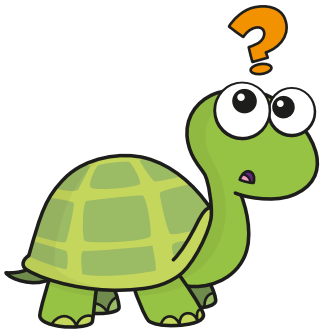


How do you know?

3, 10, 17

Tiny is trying to draw a number line from 0 to 20





What is wrong with Tiny's number line?

How would you draw the number line?

Tiny will not have enough room for all the numbers to 20

Compare numbers to 20

Notes and guidance

In this small step, children build on their understanding of comparing numbers from the Autumn term to compare pairs of numbers up to and including 20

Children can use their knowledge of counting to support them. For example, because they say 16 after 15, they know that 16 is greater than 15. They can also use their knowledge of representing numbers using objects to help them identify which number in a pair is greater or less than the other. Ten frames and number lines are useful representations to support children when comparing numbers.

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

Things to look out for

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

Key questions

- When you count from zero, which of the numbers do you say first?
- Which number is further along the number line?
- Which number is greater? How do you know?
- Which is the smaller number? How do you know?
- What does each symbol mean?
- Can you tell me a number that is less/greater than _____?

Possible sentence stems

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

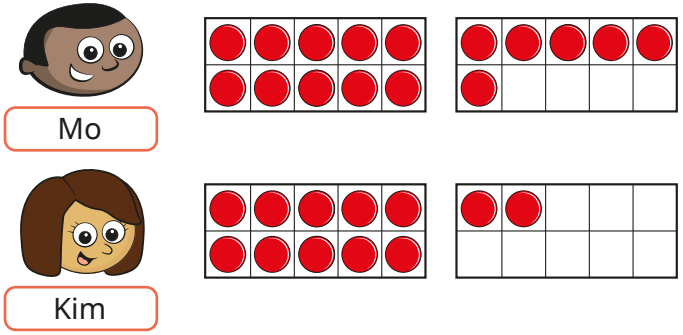
National Curriculum links

- 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

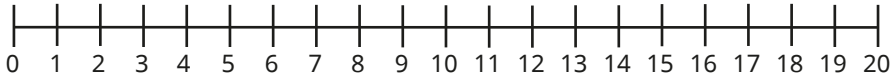
Compare numbers to 20

Key learning

- Mo and Kim have each made a number.



  - What number has Mo made?
  - What number has Kim made?
  - Who has made the greater number?

- 

  - Circle 13 and 19 on the number line.
  - Write **less** or **greater** to compare the numbers.

    13 is _____ than 19 19 is _____ than 13
  - Write < or > to compare the numbers.

    13 ◯ 19 19 ◯ 13

- Write the missing phrase.

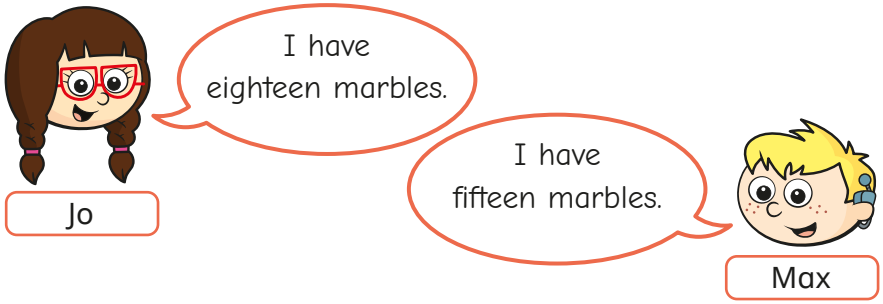
less than	greater than	equal to

  - 11 is _____ 15
  - 13 is _____ 9
  - Eleven is _____ 16
  - Twenty is _____ 0
  - 12 is _____ twelve.
  - 10 is _____ 20

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

  14 ◯ 9 19 ◯ 20 13 ◯ 12

- Jo and Max have some marbles.



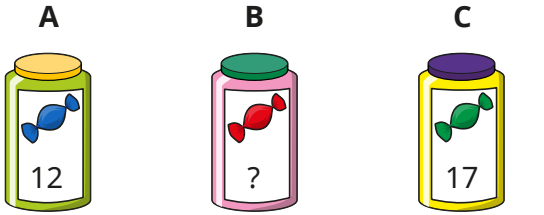
  Who has more marbles?

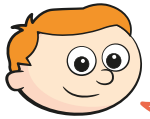
  How do you know?

Compare numbers to 20

Reasoning and problem solving

Ron and Sam have three jars of sweets.

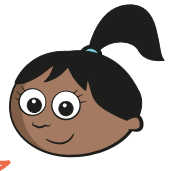




There are more sweets in jar B than in jar A.

Ron

There are fewer sweets in jar B than in jar C.



Sam

How many sweets could there be in jar B?

Compare answers with a partner.

13, 14, 15, 16

What could the missing numbers be?

☐ is greater than 15, but less than 20

☐ is less than eighteen, but greater than twelve.

Compare answers with a partner.

16, 17, 18, 19

13, 14, 15, 16, 17

Give each child a Rekenrek.

Tell children a number between 0 and 20 and ask them to make a number that is greater/less than your number.

How do they know that it is greater/less?

multiple possible answers

Order numbers to 20

Notes and guidance

Now that children are confident in counting and comparing numbers to 20, in this small step they move on to ordering sets of three numbers.

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

Children need to apply their knowledge of tens and ones to help them work abstractly. For example, when ordering 8, 17 and 14 children should recognise that 8 is the only number that does not have 1 ten, therefore 8 is the smallest of the three numbers.

Things to look out for

- Children may compare the ones in a number without considering the tens and so think that 8 is greater than 15, because 8 is greater than 5
- Children may struggle with descending order, and think that numbers can only be ordered from smallest to greatest.

Key questions

- How did you compare the groups?
- How do you know that group _____ has the most/fewest?
- How do you know that group _____ is the greatest/smallest?
- How can you show the numbers using cubes or counters?
- Do you need to start with the smallest or the greatest number?
- Which number is the greatest/smallest? How do you know?
- Do all the numbers have tens? How does this help?

Possible sentence stems

- _____ has _____ ten and _____ ones.
- _____ ones is greater/less than _____ ones, so _____ is greater/less than _____
- The greatest/smallest number is _____

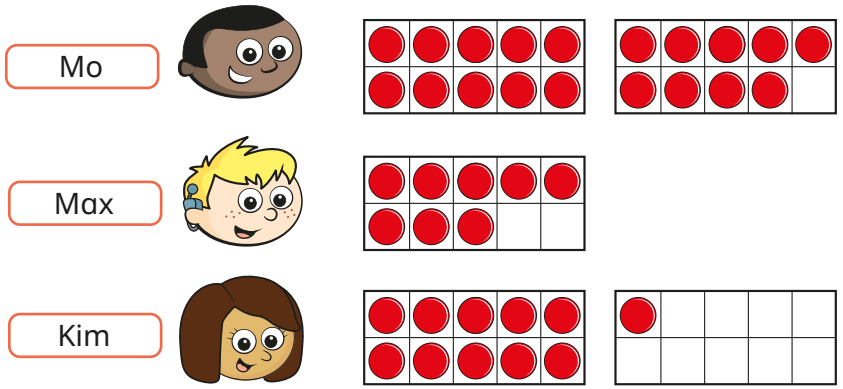
National Curriculum links

- 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

Order numbers to 20

Key learning

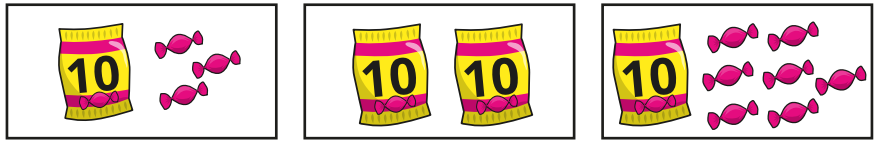
- Mo, Max and Kim use counters to make numbers.



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

    Start with the smallest number.

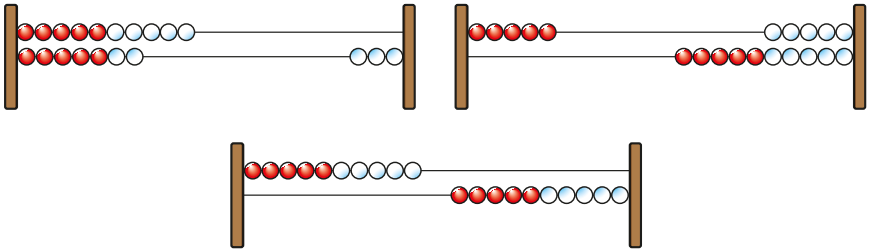
- Here are three groups of sweets.



  Put the groups in order.

  Start with the one that has the most sweets.

- Mrs Smith has made three numbers on Rekenreks.



  - What numbers has Mrs Smith made?
  - Write the numbers in order.

    Start with the greatest number.

- Complete the sentences for each set of numbers.

  _____ is the greatest number.

  _____ is the smallest number.

13, 18, 15	20, 17, 11
12, 5, 7	nineteen, zero, fifteen

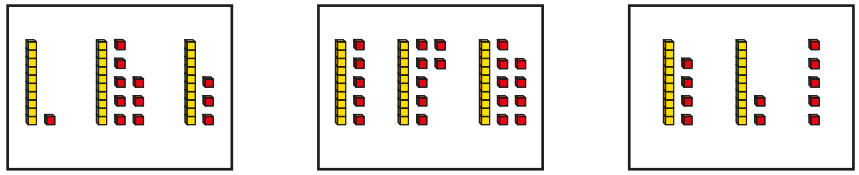
Write each set of numbers in order, from greatest to smallest.

Order numbers to 20

Reasoning and problem solving

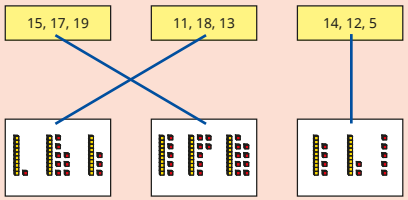
Match the labels to the pictures.

15, 17, 19	11, 18, 13	14, 12, 5



Order the numbers in each set from smallest to greatest.

Order all the numbers from greatest to smallest.



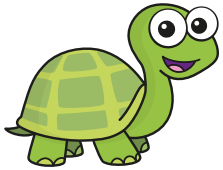
15, 17, 19

11, 13, 18

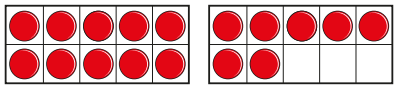
5, 12, 14

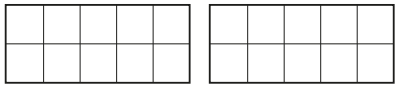
5, 11, 12, 13, 14, 15, 17, 18, 19

Tiny is making numbers in order from greatest to smallest.

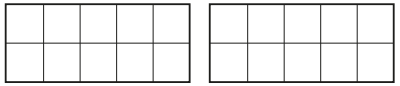


greatest





smallest



Draw counters to show the numbers Tiny could have made.

Is there more than one answer?

multiple possible answers, e.g.

17, 14, 13

17, 8, 0

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

Spring Block 2

Addition and subtraction (within 20)

Small steps

Step 1	Add by counting on within 20
Step 2	Add ones using number bonds
Step 3	Find and make number bonds to 20
Step 4	Doubles
Step 5	Near doubles
Step 6	Subtract ones using number bonds
Step 7	Subtraction – counting back
Step 8	Subtraction – finding the difference

Small steps

Step 9	Related facts
Step 10	Missing number problems

Add by counting on within 20

Notes and guidance

In this small step, children build on their learning from earlier in the year as they explore addition by counting on from a given number within 20

The use of ten frames and counters or cubes is particularly useful, together with bar models. Children should begin to understand that addition is commutative (although they do not need to formally know the word), and that it is more efficient to start from the greater number than the smaller number. For example, when working out 1 + 13, it is quicker to add 1 to 13 than to add 13 to 1. A number line is a particularly useful tool to exemplify this point, as children see the benefit of drawing just 1 jump rather than drawing 13 jumps.

It is important that children see that they are not just counting the total of two separate numbers or items; rather, they are adding to what they already have.

Things to look out for

- Children may count all the items, starting from 1, rather than counting on from one of the numbers in the addition.
- Children may always start from the first number in the addition, rather than starting from the greater number.

Key questions

- What number did you start with? Then what happened? Now what do you have?
- Is it quicker to add 4 to 9 or to add 9 to 4? Is the answer the same?
- How can you use a number line to count on from _____?
- How do the counters show the question?
- How can you use a bar model or a number line to show counting on?

Possible sentence stems

- First, I had _____

  Then I counted on _____

  Now I have _____
- To work out _____ + _____, I will count on from _____

National Curriculum links

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

Add by counting on within 20

Key learning

Show children how to play snakes and ladders.

Encourage them to count on using the numbers on the board. For example, if they start on 13 and roll a 4, they count "14, 15, 16, 17".

Put children into groups.

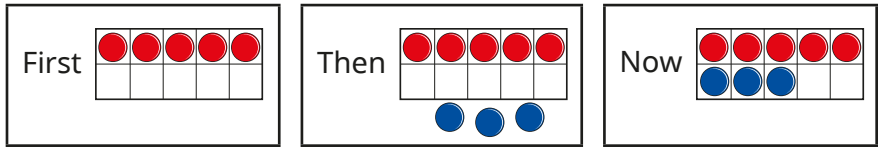
Point to yourself and begin counting. When you point to another group, they continue the count. Keep switching between groups.

Repeat with different starting numbers. This activity is great for creating rhythmical patterns and can be extended to more than one group of children.

Read *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 characters climb aboard. Encourage children to count on as more children join the boat.

- Use ten frames to complete the number story.



First there were _____ cars in the car park.

Then _____ more cars parked in the car park.

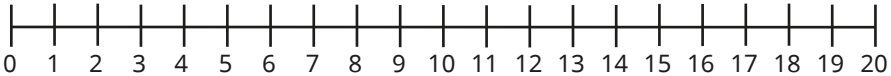
Now there are _____ cars in the car park.

- Use the bar model to help you solve the problem.

Ann has 13 marbles.
She gets 5 more marbles.
How many marbles does Ann have now?

- Dan starts at 9 and counts on 6

Show this on the number line and complete the number sentence.

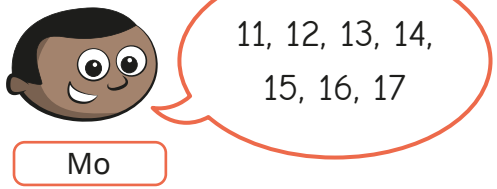


9 + 6 = _____

Add by counting on within 20

Reasoning and problem solving

Mo and Ron are counting on to work out 11 + 7

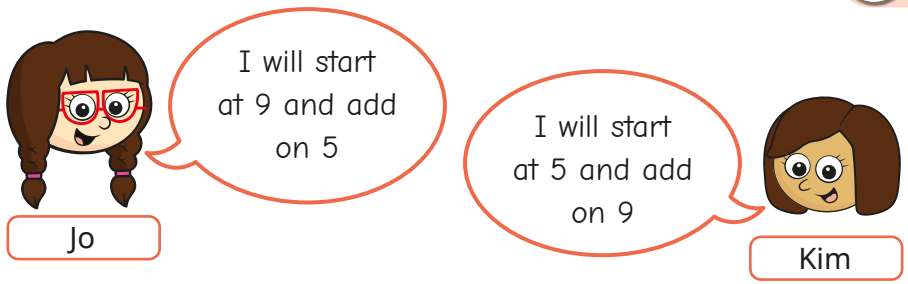


Who is correct?

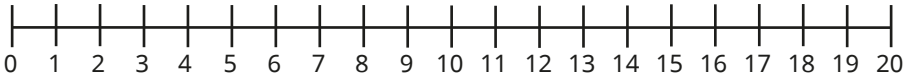
Use a number line to show your answer.

Ron

Jo and Kim are working out 5 + 9



Use a number line from 0 to 20



Show Jo and Kim's methods.

What do you notice?

Use Jo's method to work out 3 + 8

11

Add ones using number bonds

Notes and guidance

In this small step, children use number bonds and related facts when adding within 20, as an alternative to counting on. This is a more efficient method because, for example, if they know that 4 and 2 are a bond to 6, they can use this fact to see that 14 and 2 are a bond to 16, as are 4 and 12

Using counters and ten frames and base 10 enables children to see the links between related facts, noticing that, for example, 11 + 6 is 10 more than 1 + 6

Children can also explore missing number problems such as 5 + _____ = 17 using the knowledge that 5 and 2 are a number bond to 7

Things to look out for

- If children are not secure with number bonds within 10, they may make errors when trying to find the related facts within 20
- Children may not see that they can use a single number bond within 10 to find two different addition facts within 20, for example using 3 + 2 to work out both 13 + 2 and 12 + 3

Key questions

- What is the same and what is different about 4 and 14?
- If you know that 4 plus 2 is equal to 16, how can you use this to work out 14 plus 2?
- What do you notice about 14 + 2 and 12 + 4?
  How many tens are there in each addition?
  How many ones are there?
- What is the number bond for 5 to 7?
  How can you use this to help work out 15 + _____ = 17?
  What about 5 + _____ = 17?

Possible sentence stems

- _____ and _____ are a number bond to _____

  So _____ and _____ are a number bond to _____
- There are _____ ones altogether and _____ ten, so the total is _____

National Curriculum links

- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

Add ones using number bonds

Key learning

Draw two number tracks on the playground.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Ask one child to stand on 1 and another child to stand on 11

Roll a dice and ask both children to hop along their track the number rolled.

What do they notice about where they have landed?

Repeat for other starting numbers, ensuring that totals cannot go beyond 10 or 20, depending on the number track.

In pairs, provide children with three ten frames.

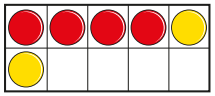
Ask one child to make a number between 0 and 4 and the other child to make the number that is 10 more, for example 3 and 13

Roll a dice and ask each child to add that number of counters to their ten frames.

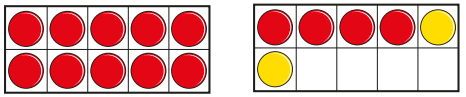
What do they notice about their answers?

Ask children to write number sentences for their additions.

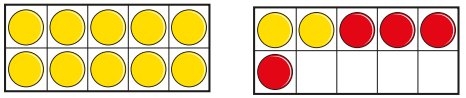
- Complete the additions.



4 + 2 = _____

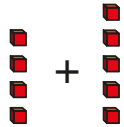


14 + 2 = _____

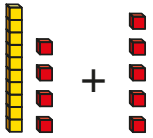


12 + 4 = _____

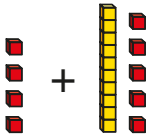
- Complete the additions.



4 + 5 = _____



14 + 5 = _____



4 + 15 = _____

Add ones using number bonds

Reasoning and problem solving

Tiny is working out the missing number.

$3 + \square = 18$

Do you agree with Tiny?

Why?

Work out the missing numbers.

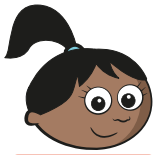
1 + _____ = 6 _____ + 3 = 9

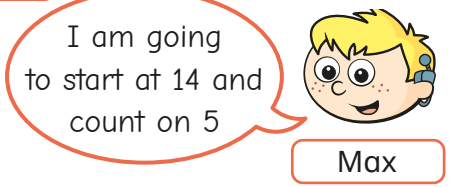
11 + _____ = 16 _____ + 3 = 19

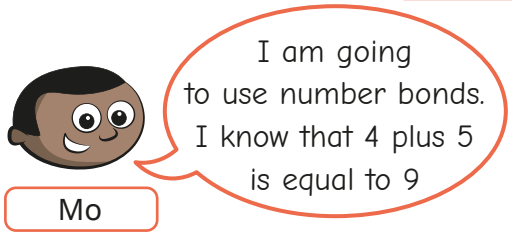
No

5, 5, 6, 16

Sam, Max and Mo are working out 5 + 14







Use each method to work out the answer.

Whose method do you prefer? Why?

19

Find and make number bonds to 20

Notes and guidance

In this small step, children explore number bonds to 20. They have already learnt about number bonds to 10 and should be confident with these. It is essential that children are fluent in their number bonds as they are used frequently throughout the curriculum.

Children use their knowledge of number bonds to 10 to find number bonds to 20. Using examples such as 7 + 3, 17 + 3 and 7 + 13 encourages children to see the link between bonds to 10 and bonds to 20, as well as reinforcing their understanding of place value. They see that working systematically helps them to find all the possible number bonds to 20

Representations such as ten frames, counters, Rekenreks and part-whole models, among others, can be used to support children's understanding.

Things to look out for

- Children may add a 10 to both numbers, for example 14 + 16 = 20
- Children may miscalculate if they are using counting on as a strategy for working out the number bond. Using equipment such as ten frames can help with this.

Key questions

- How many more do you need to make 20?
- How does knowing the number bonds to 10 help you to work out the number bonds to 20?
- What is the same and what is different about 4 + 6 = 10 and 14 + 6 = 20?
- How do you know that you have found all the number bonds?

Possible sentence stems

- There are _____ red counters and _____ yellow counters.

  There are _____ counters altogether.

  This means that _____ and _____ are a bond to _____

  _____ + _____ = _____
- I know that _____ + _____ = 10, so _____ + _____ = 20

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

Find and make number bonds to 20

Key learning

Provide pots labelled with numbers 1–20 and a selection of natural objects.

Ask children to count the correct number of items into each pot.

Can they find 2 pots that have 20 items in total?

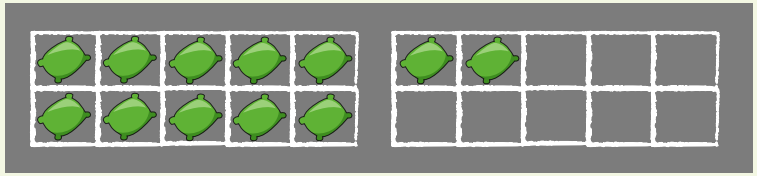
Is there more than one way to do it?

Ask children to draw what they have found.

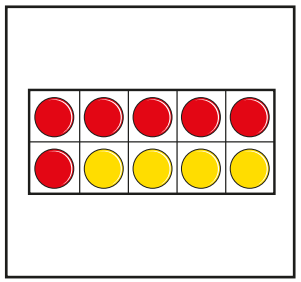
Chalk two large ten frames onto the playground. Tell the children you have hidden 20 beanbags and that they need to find them!

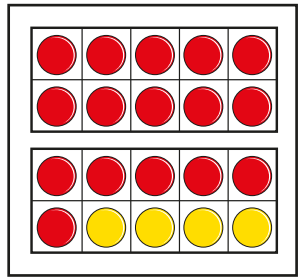
As the children find the beanbags, they put them into the ten frames.

Prompt children to use the ten frames to help them see how many they have found and how many are still hidden.



- Complete the sentences for each picture.





There are _____ red counters.

There are _____ yellow counters.

There are _____ counters altogether.

_____ + _____ = _____

- Continue the pattern to find all the number bonds to 20

20 = 20 + 0

20 = 19 + 1

20 = 18 + 2

20 = 17 + 3

How do you know that you have found them all?

Find and make number bonds to 20

Reasoning and problem solving

Use counters to show each addition.

7 + 3 = 10

17 + 3 = 20

20 = 7 + 13

What is the same?

What is different?

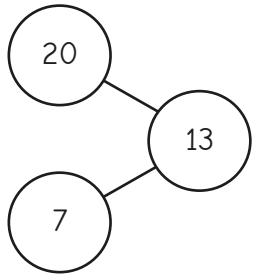
Talk about it with a partner.

multiple possible answers, e.g.

The = is in a different place.

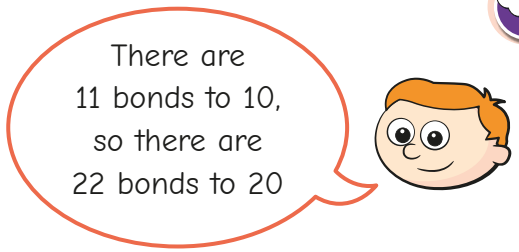
The number of ones remains the same and a ten has been added to create a number bond to 20

Kay shows a number bond to 20 in a part-whole model.



What mistake has Kay made?

Kay has put 20 as a part, but it should be the whole.



Do you agree with Ron?

Why?

No

Doubles

Notes and guidance

In this small step, children learn about doubles, with a focus on adding the two equal quantities together as opposed to multiplying by 2

Give children opportunities to build doubles using real objects and mathematical equipment. Building numbers using the pair-wise patterns on ten frames helps them to see the doubles. Mirrors and barrier games are a fun way for children to see doubles as they build and begin to explore symmetry. Encourage children to say the doubles as they build them, for example "Double 2 is 4"

Provide examples of doubles and non-doubles for children to sort and explain why they have sorted in the way they have. Dominoes are a great resource for this activity.

At this point, children only explore doubles up to double 10

Things to look out for

- Children may make mistakes when adding.
- Some children may think that double 2 is 22 or double 3 is 33, because they can see the number twice.
- Children may find doubles beyond double 5 more challenging as they cross 10

Key questions

- How can you sort these pictures into doubles and not doubles?
- How do you know that this shows a double?
- How can you make double _____?
- How can you show the double differently?
- If double 2 is 4, what do you think double 3 is?
- What is the greatest double you can roll on a normal dice?
- What is 12 the double of?

Possible sentence stems

- _____ + _____ = _____, so double _____ is _____
- Double _____ is _____
- _____ is the double of _____

National Curriculum links

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

Doubles

Key learning

Read *Double the Ducks* by Stuart J. Murphy.

In groups, ask children to think of their own doubling story and act it out. You could give each group the following starting point.

> A farm has 3 horses, 4 sheep, 7 cows and 1 goat.

Tell children to take turns rolling two dice.

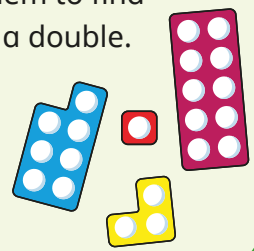
They score a point each time they roll a double.

The first to reach 3 points wins the game.

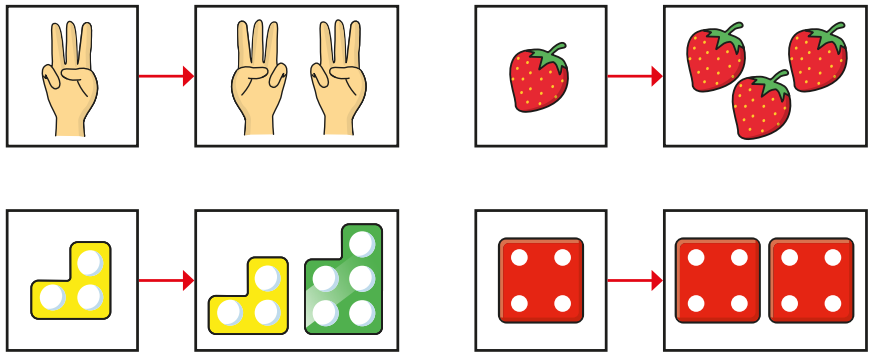
Hide number pieces outside.

Give each child a number piece. Ask them to find another one that is the same to make a double.

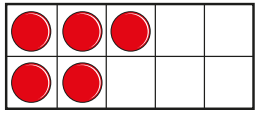
Ask them to say the double they have found, for example "Double 5 is 10"



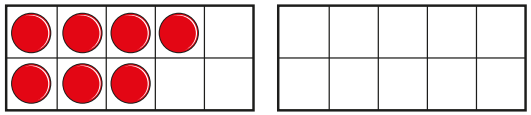
- Which pictures show doubles?



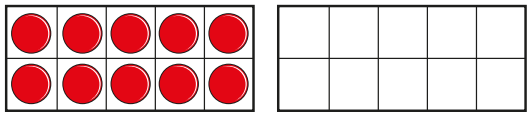
- Draw counters to work out the doubles.



Double 5 is _____



Double 7 is



Double 10 is

Doubles

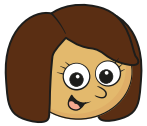
Reasoning and problem solving

Ben has some cakes.

He doubles the number of cakes.

Here are Ben's cakes now.

How many cakes did Ben start with?



Ben had 4 cakes at the start.

Kim

Ben had 16 cakes at the start.

Jo

Who do you agree with?

Why?

Kim

Double each number.

Complete the table.

Number	Double
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

What patterns can you see?

2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Near doubles

Notes and guidance

Building on the previous step, in this small step children use doubles to help work out near doubles. For example, they can use the double fact that 6 + 6 = 12 to work out 6 + 7 by adding 1 more. They should see that this is a more efficient method than counting on.

As in the previous step, building numbers in a pair-wise pattern on ten frames can help children visualise that to work out 3 + 4, they can do 3 + 3 plus 1 more.

Children can also explore finding near doubles through subtraction, for example 3 + 4 is equal to 4 + 4 minus 1. This can be useful for children who are more confident with certain doubles than others. For example, if a child is not confident with doubling 7, they may struggle with 7 + 8, but if they can double 8, they can use this fact instead.

Things to look out for

- Children may be more confident with doubles less than 10, such as double 4, and require extra support with doubles that go beyond 10
- Children may not be able to quickly recall 1 more or 1 less than any number within 20

Key questions

- What does double _____ mean?
- What is double _____?
- What is 1 more than _____?
- If _____ is 1 more than _____, how can you use this to work out _____ + _____?
- If _____ is 1 less than _____, how can you use this to work out _____ + _____?

Possible sentence stems

- _____ is 1 more than _____, so I can work out double _____ and then add 1
- Double _____ plus 1 is equal to _____
- _____ is 1 less than _____, so I can work out double _____ and then subtract 1

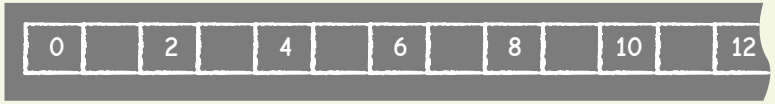
National Curriculum links

- Add and subtract 1-digit and 2-digit numbers to 20, including zero

Near doubles

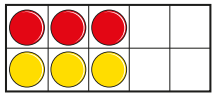
Key learning

Draw a number track from 0 to 20 in chalk on the playground. Only show the even numbers.

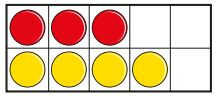


Ask children to stand on a number and then to write either 1 more or 1 less than their number in the adjacent box.

- What additions are shown?



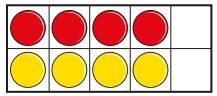
_____ + _____



_____ + _____

  - What do you notice about the number of red counters in each ten frame?
  - What do you notice about the number of yellow counters in each ten frame?
  - What do you notice about the total number of counters in each ten frame?

- What double is shown on the ten frame?



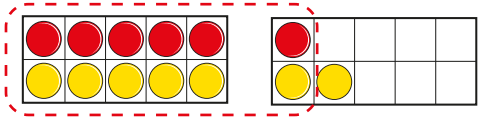
Add one more red counter to the ten frame.

What addition is shown now?

Complete the sentence.

_____ + _____ is equal to double _____ plus 1

- Use the counters and ten frames to complete the sentence.



6 + 7 = double _____ plus _____

- Use counters and ten frames to show that:
  - 2 + 3 = double 2 plus 1
  - 9 + 8 = double 8 plus 1

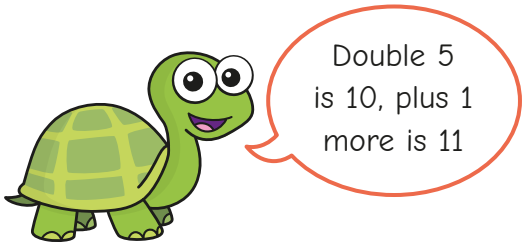
- Use doubles to work out the near doubles.

5 + 6	8 + 7	5 + 4	9 + 8

Near doubles

Reasoning and problem solving

Tiny uses doubles to work out 5 + 4



What mistake has Tiny made?

What is the correct answer?

9

Write <, > or = to complete the number sentences.

double 6 ◯ 6 + 7

double 9 ◯ 9 + 8

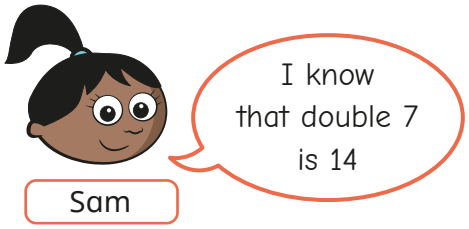
9 + 8 ◯ double 8

<

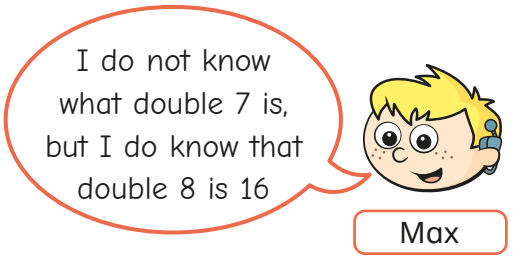
>

>

Sam and Max are working out 8 + 7



How can Sam use this fact to work out 8 + 7?



How can Max use this fact to work out 8 + 7?

Use counters to help you.

add 1

subtract 1

Subtract ones using number bonds

Notes and guidance

In this small step, children begin subtracting within 20. Earlier in the year, children subtracted within 10 by counting back and using number lines. They now subtract within 20 using their knowledge of number bonds. For example, if they know the number bond 7 – 5 = 2, then they know that 17 – 5 = 12

By completing these calculations side by side using ten frames, counters, part-whole models or base 10, children see that the second subtraction will have an answer that is 10 greater than the first subtraction.

At this stage, none of the subtractions cross 10, so children can focus on using their number bond knowledge rather than counting back, which is covered in the next step.

Things to look out for

- Children may be unsure of the number bond facts within 10
- Children may not see the link between 4 – 1 = 3 and 14 – 1 = 13
- Children may incorrectly use their number bond knowledge, for example 14 – 1 = 3

Key questions

- What are _____ and _____ a number bond to?
- What is the same and what is different about 5 and 15?
- If you know that 7 subtract 2 is equal to 5, how can you use this to work out 17 – 2?
- What do you notice about 17 – 2 and 17 – 4? How many tens are there in each subtraction? How many ones are there?
- What is the number bond for 5 to 8?
  How can you use this to help work out 18 – 5?

Possible sentence stems

- The number bond for _____ to _____ is _____
  So the number bond for _____ to _____ is _____
- There will be _____ ones and _____ ten, so the answer is _____

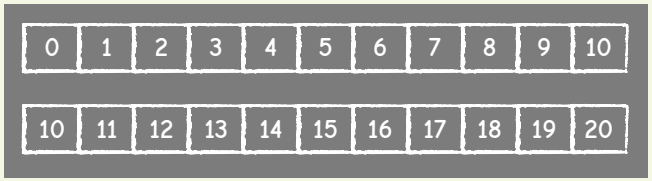
National Curriculum links

- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

Subtract ones using number bonds

Key learning

Draw two number tracks on the playground.



Ask one child to stand on 10 and another on 20

Roll a dice and ask both children to hop back along their track the number rolled. What do they notice about where they have landed?

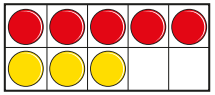
Repeat for other starting numbers, ensuring that the answer does not go below 0 or 10, respectively.

Provide pairs of children with three ten frames and some counters. Ask one child to make a number between 6 and 10 and the other to make the number that is 10 more.

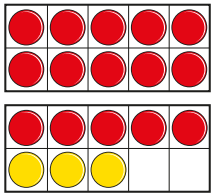
Roll a dice and ask each child to subtract the counters from their ten frames. What do they notice about their answers?

Ask them to write number sentences that match their subtractions.

- Complete the subtractions.



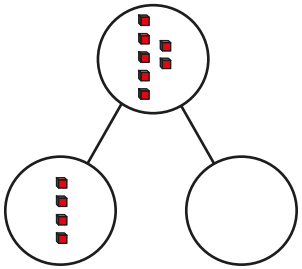
8 – 3 = _____

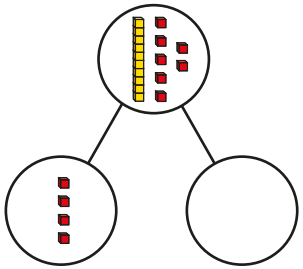


18 – 3 = _____

What do you notice?

- Complete the part-whole models.





Write a subtraction number sentence for each part-whole model.

What do you notice?

- Use number bonds to work out the subtractions.

14 – 2	18 – 5	19 – 3	15 – 4

Subtract ones using number bonds

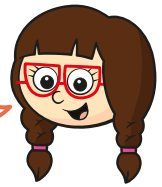
Reasoning and problem solving

Ron and Jo are working out 16 – 5

I will count back 5 places.

Ron

I know that 6 – 5 = 1, so 16 – 5 = 11

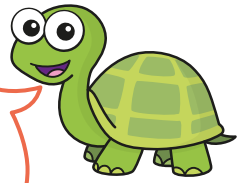


Jo

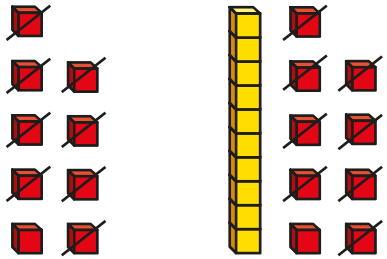
Whose method do you prefer? Why?

Children need to justify their preferred method.

Tiny is working out 19 – 8



I know that 9 – 8 = 1 and 19 is 10 greater than 9, so 19 – 8 will be 10 greater than 1



Do you agree with Tiny?

Talk about it with a partner.

Yes

Subtraction – counting back

Notes and guidance

In this small step, children build on the language of subtraction, recognising the subtraction symbol from earlier learning and using it within 20

Children use the counting back strategy for numbers within 20, including subtractions that cross 10. The use of zero is important, so children know that when nothing is taken away, the start number remains the same, or when the whole group is taken away, there will be nothing left. Crossing out and using a number line are particularly useful for counting back to work out subtractions.

This can also be linked with "first, then, now" stories.

Things to look out for

- When counting back, children may include the start number. For example, when working out 15 – 4, they may count "15, 14, 13, 12".
- Children may write calculations the wrong way around if they do not understand the importance of order when subtracting, thinking that it is the same as addition, where the order does not matter. For example, they may write 4 – 15 but still give the answer 11

Key questions

- How many objects were there at first?
  Then what happened to the objects?
  How many objects are there now?
- How does using counters help you?
- How does using a number line help you?
- Can you think of another way to show the problem?

Possible sentence stems

- First there were _____

  Then _____ were taken away.

  Now, there are _____
- _____ subtract _____ is equal to _____

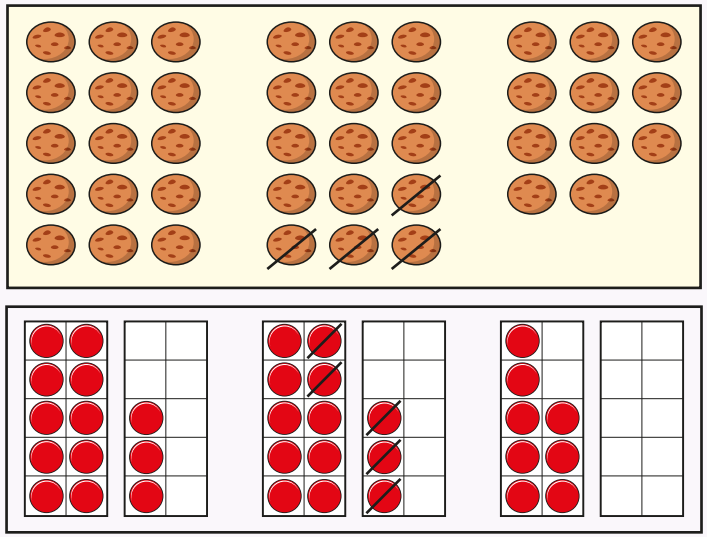
National Curriculum links

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

Subtraction – counting back

Key learning

Show children the pictures.



Ask children to tell a "first, then, now" story for each picture and to write the matching number sentence.

Ask each child to fill 2 ten frames with 20 items.

Children take turns to roll a dice and remove the corresponding number of items. The winner is the first person to reach exactly zero.

- First there were 14 sheep.

  Then they all ran away.

  How many sheep are left?

  Use ten frames and counters to work it out.

  Complete the number sentence.

  _____ – _____ = _____

- Tiny has 13 stars for being helpful!

  Tiny gives 4 stars to Fay.

  How many stars does Tiny have left?

- Max uses a number line to work out 20 – 7

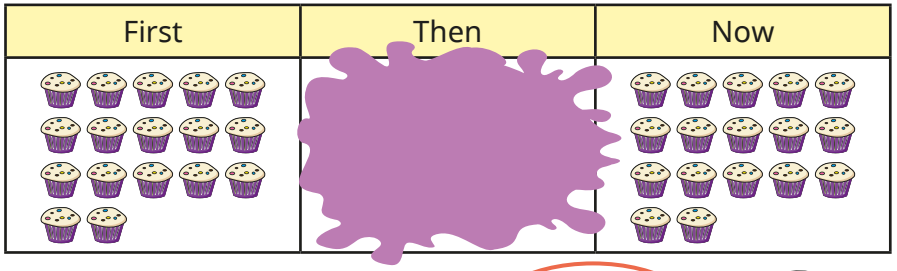
  Use a number line to work out the subtractions.

  ▶ 20 – 8 ▶ 18 – 9 ▶ 19 – 4

Subtraction – counting back

Reasoning and problem solving

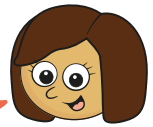
Mo, Kim and Ron are working out what subtraction is shown.



I think it is
17 – 0 = 17

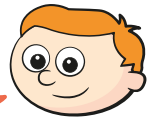
Mo

I think it is
17 – 17 = 0



Kim

I think it is
0 – 17 = 17



Ron

Who is correct?

How do you know?

Mo

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

17 – 5 ◯ 12 – 5

14 – 4 ◯ 18 – 8

11 – 7 ◯ 11 – 4

I can do these without working out any answers.

Is Jo correct?

How do you know?

>

=

<

Yes

Subtraction – finding the difference

Notes and guidance

In this small step, children formally learn about finding the difference for the first time and explore it as a form of subtraction.

Children often struggle with this concept as they are not required to physically take away or count back a specified amount as they have previously experienced. Instead, they are making comparisons between two amounts. In some cases the question will be worded as "How many more ...?" Up until now, they have only encountered the word "more" when thinking about addition.

Children can use their skills of counting back and counting on to help them find the difference. Alternatively, they can make both amounts and visually see how many more or less a number is.

Things to look out for

- Children may add instead of subtracting.
- Children may include the start number when counting back.
- Children may misinterpret the word "difference" in a mathematical context, for example describing the difference in appearance of the numbers.

Key questions

- Who has more? How do you know? How many more does _____ have?
- What does "difference" mean?
- What strategy can you use to find the difference?
- What pictures/objects can you use to show this?
- How can you complete the sentences?
- How do the counters/bar models help you to subtract?
- Which method will you use to show your thinking? Why?
- Did you count forwards or backwards? Why?

Possible sentence stems

- The difference between _____ and _____ is _____
- When finding the difference, I can ...
- _____ is the difference between _____ and _____

National Curriculum links

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

Subtraction – finding the difference

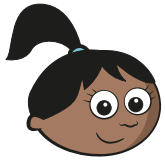
Key learning

Take the class into the playground. Ask the boys and the girls to stand in separate lines next to each other. Make sure they are lined up in pairs.

Ask what the difference is between the number of boys and the number of girls?

Repeat the activity with different criteria, for example children collecting either sticks or pebbles.

- How many more cakes does Sam have than Max?

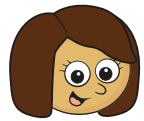


Sam

Max

Sam has _____ more cakes than Max.

- Kim has 7 sweets and Mo has 3 sweets.



Kim

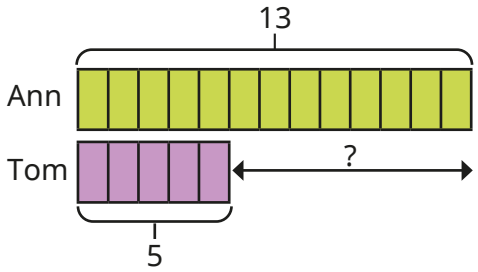
Mo

How many more sweets does Kim have than Mo?

How many fewer sweets does Mo have than Kim?

- Ann has 13 marbles.

  Tom has 5 marbles.



How many more marbles does Ann have than Tom?

Subtraction – finding the difference

Reasoning and problem solving

Two numbers have a difference of 4

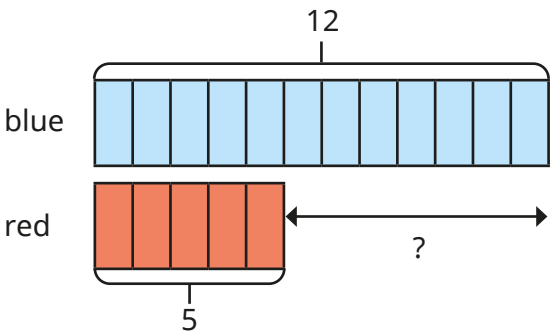
The greater number is less than 15

The smaller number is more than 6

What could the two numbers be?

14 and 10, 13 and 9, 12 and 8, 11 and 7

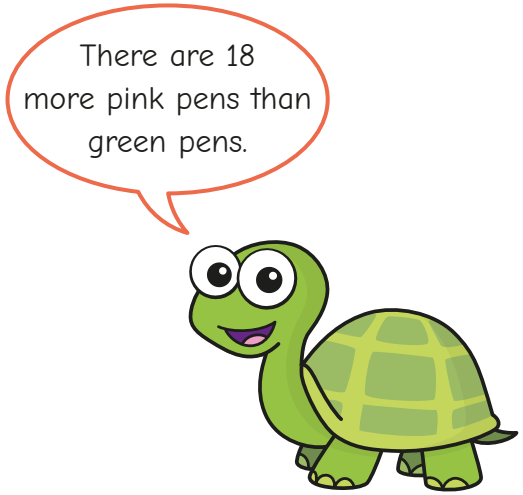
Think of a subtraction problem to match the bar model.



multiple possible answers

There are 11 pink pens and 7 green pens in a pot.

How many more pink pens are there than green pens?



What mistake has Tiny made?

Draw a picture to show the correct answer.

Tiny has added the numbers instead of subtracting them.

Related facts

Notes and guidance

Now that children have spent some time exploring addition and subtraction separately, in this small step they look at how they relate to each other, considering the addition and subtraction fact families for numbers within 20

Children use both concrete resources and pictures to find links between the addition and subtraction sentences. Highlight that addition and subtraction are inverse operations. As well as finding the four related facts, children can write the sentences with the "=" at either the end or the start.

Throughout this step, the idea of commutativity should be reinforced, and children should be able to verbalise that addition can be done in any order, whereas subtraction cannot. It is not necessary for children to use the word "commutative" at this stage.

Things to look out for

- Children may work out subtractions correctly, but write them incorrectly, for example 7 – 12 = 5
- Children may think that by writing "=" in a different place they have written a different fact, for example 3 + 5 = 8 and 3 = 5 + 8

Key questions

- What is the same and what is different?
- What addition sentences can you write?
  What subtraction sentences can you write?
  Can you write any of them another way?
- If you know that 12 + 1 = 13, what else do you know?
- Can you see any patterns?
- If you know that 15 – 3 = 12, why can you not say 3 – 15 = 12?
  Use counters to show this.

Possible sentence stems

- _____ can be done in any order.
- _____ cannot be done in any order.
- If I know that _____ + _____ = _____, then I also know that _____ – _____ = _____

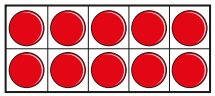
National Curriculum links

- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20, including zero

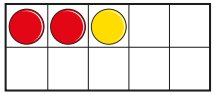
Related facts

Key learning

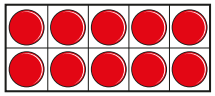
- Complete the addition and subtraction sentences for each picture.



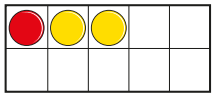
12 + 1 = _____



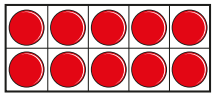
13 – 1 = _____



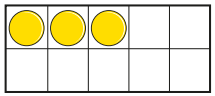
11 + _____ = 13



13 – _____ = _____



_____ + _____ = _____



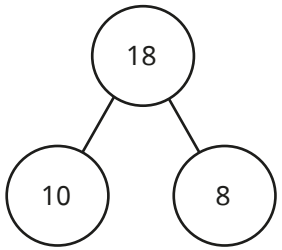
_____ – _____ = _____

What do you notice about the additions and subtractions?

- Write a subtraction fact for each addition fact.

10 + 4 = 14	19 + 1 = 20	0 + 17 = 17

- Complete the fact family for the part-whole model.



_____ + _____ = 18

_____ + _____ = 18

18 – _____ = _____

18 – _____ = _____

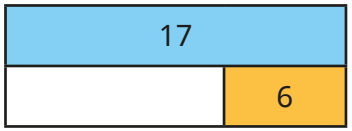
_____ = _____ + _____

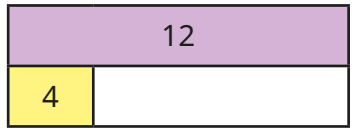
_____ = _____ + _____

_____ = _____ – _____

_____ = _____ – _____

- Complete the bar models.





Write the fact family for each bar model.

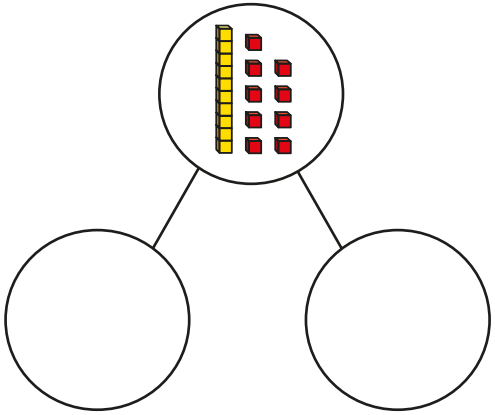
Use the numbers 8, 7 and 15 to draw your own bar model.

Write the fact family for your bar model.

Related facts

Reasoning and problem solving

Use the cards to write addition and subtraction sentences to match the part-whole model.



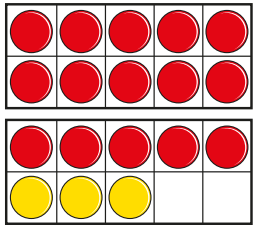
nine	add
ten	subtract
nineteen	is equal to

multiple possible answers, e.g.

nine add ten is equal to nineteen

nine is equal to nineteen subtract ten

Which number sentences match the ten frames?



15 + 3 = 18	15 – 3 = 18
3 + 18 = 15	18 – 15 = 3
18 + 3 = 15	18 – 3 = 15
18 = 3 + 15	15 – 18 = 3

How do you know?

15 + 3 = 18

18 – 15 = 3

18 – 3 = 15

18 = 3 + 15

Missing number problems

Notes and guidance

In this final small step, children explore missing number problems. They use the idea of inverse operations to see that if they start with a number and add 2 to it, then to "undo" that they need to subtract 2. Bar models and part-whole models are useful representations for this.

"First, then, now" stories can be particularly helpful for children to act out the problems and visualise what is happening. Use of counters and ten frames, as well as number lines, supports children in their understanding of a missing number problem, helping them to discuss what the numbers in a problem represent.

With the missing number problem 3 + _____ = 5, a common mistake is to add 3 and 5 and get 3 + 8 = 5. Children need to spot that this does not make sense, as 8 is greater than 5

Things to look out for

- Children may just look at the numbers and operation rather than thinking about the missing number element of the problem.
- Children may find it more challenging when number sentences are written in the form 4 = _____ – 2 rather than _____ – 2 = 4

Key questions

- If I add/subtract _____ counters to/from the ten frame, how can you undo what I have done?
- How many counters do you need to add to/subtract from _____ to get _____?
- If you know the whole and a part, how can you find the other part?
- Should the missing number be greater than or less than _____? How do you know?

Possible sentence stems

- First there were …
  Then …
  Now there are …
- If _____ is the whole and _____ is a part, then the other part must be _____

National Curriculum links

- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9

Missing number problems

Key learning

Give children 8 counters and a ten frame.

Ask them to act out the "first, then, now" stories.

First there were 3 frogs in the pond.
Then some more frogs jumped into the pond.
Now there are 8 frogs in the pond.

How many frogs jumped into the pond?

First there were 8 children sitting at the table.
Then some children went away.
Now there are 6 children sitting at the table.

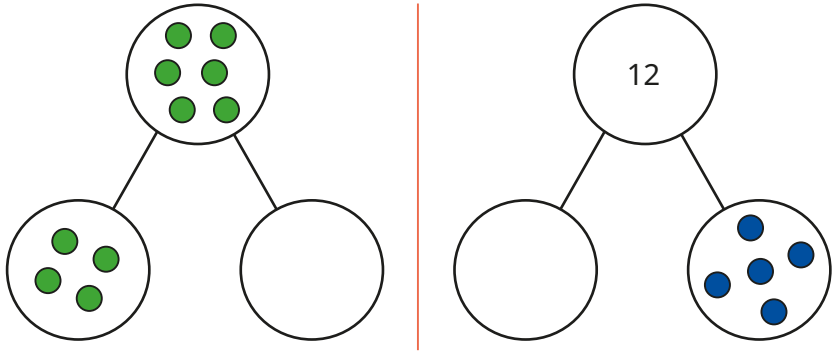
How many children went away?

- First there were 12 birds in a tree.
  Then some of the birds flew away.
  Now there are 10 birds in the tree.

  How many birds flew away?

  12 – _____ = 10

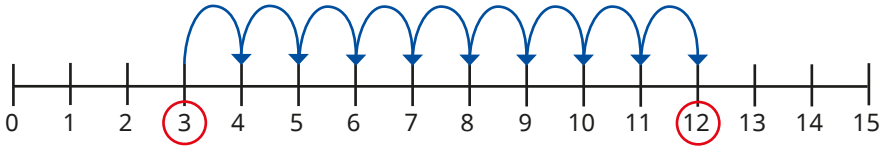
- Complete the part-whole models and number sentences.



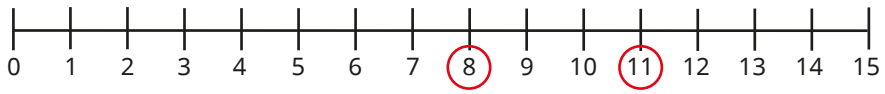
4 + _____ = 6

_____ + 5 = 12

- Use the number lines to find the missing numbers.
  - 3 + _____ = 12



  - 11 – _____ = 8



Missing number problems

Reasoning and problem solving

Jo is working out the missing number.

$5 + \square = 11$

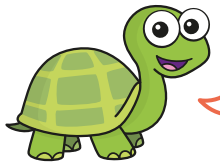
The answer is 16

What mistake has Jo made?

What is the missing number?

6

Tiny is thinking of a number.



When I add 5 to my number, I get 13

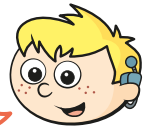
What number is Tiny thinking of?

8

Max and Sam are working out the missing number.

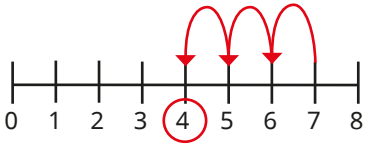
$4 = \square - 3$

I know that 4 minus 3 is equal to 1, so the missing number is 1

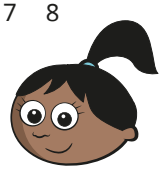


Max

Sam draws a number line to help.



The missing number is 7



Sam

Who do you agree with?

Why?

Sam