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.

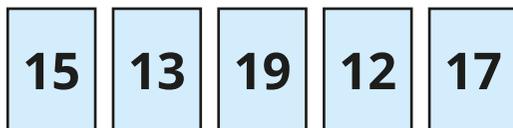- Match the pictures to the numbers on the number track.
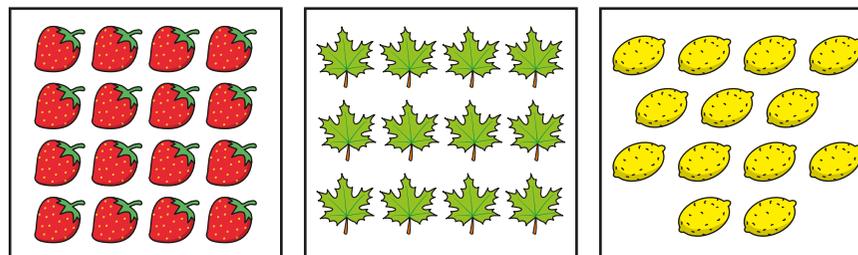
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

Count within 20

Reasoning and problem solving

Here are some number cards.

| 15 | 13 | 19 | 12 | 17 |

I am going to count forwards from 14 to 20

Jo

Which of the numbers will Jo say?

I am going to count backwards from 16 to 10

Ron

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.
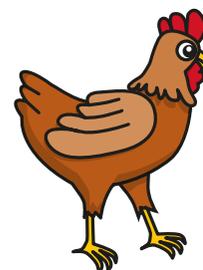
2 hens and 3 sheep

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
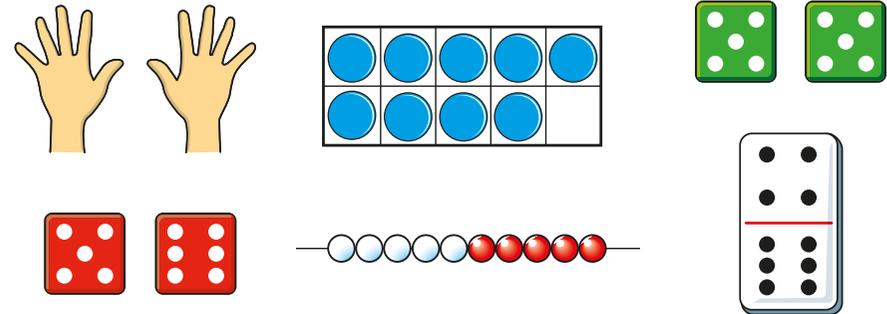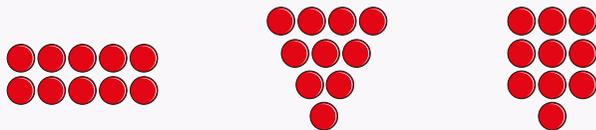
Understand 10

White Rose Maths

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.
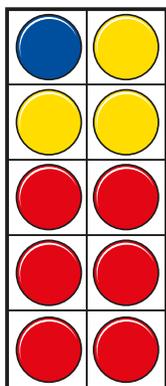
Make 10 using three different-coloured counters on a ten frame.
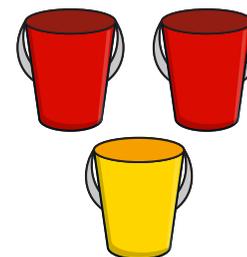
How many ways can you find?

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.

I will count to see how many beads there are. 1, 2, 3, 4 …
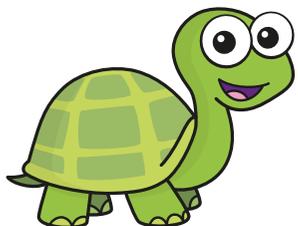
Does Tiny need to count the beads?

How do you know?

No
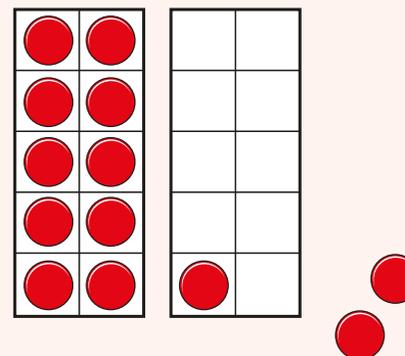
Show children 11 on ten frames. Hide the ten frames and say that you are adding 1 more.

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
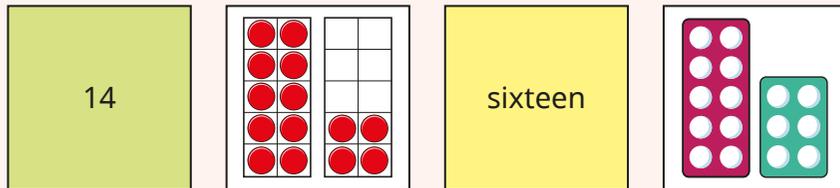
Understand 14, 15 and 16

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?

14		sixteen	

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.
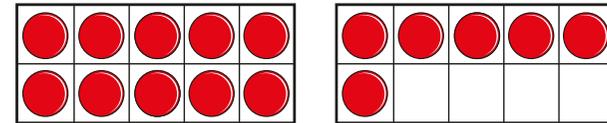
Use ten frames to show fifteen and fourteen.

- Complete the table.

Numerals	Word	Picture
14		
	sixteen	

- Complete the part-whole models.

15 — 10 — ◯

6 — 10 — ◯

10 — ◯ — 4
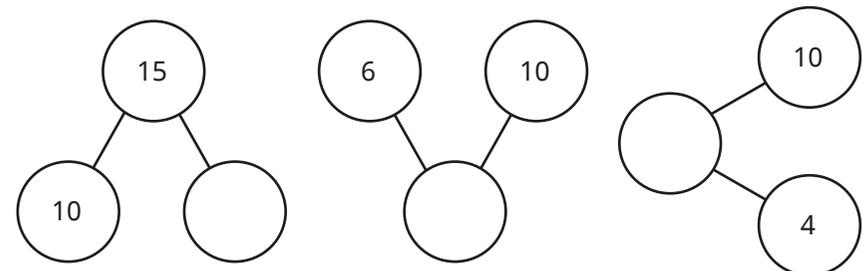
Understand 14, 15 and 16

Reasoning and problem solving

Ron uses counters to make two numbers.
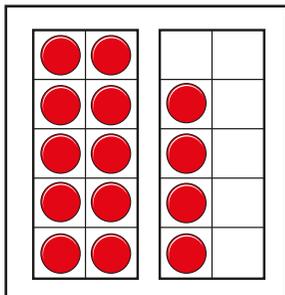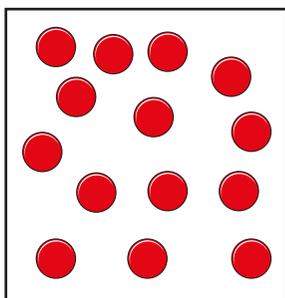
What is the same? What is different?

Which group of counters is easier to count?

Why?

same: Both groups have 14 counters.

different: The way they are arranged

the second group

Tiny makes a part-whole model.

I have made 51

Tiny has 1 full ten and 5 more cubes. The number is 15
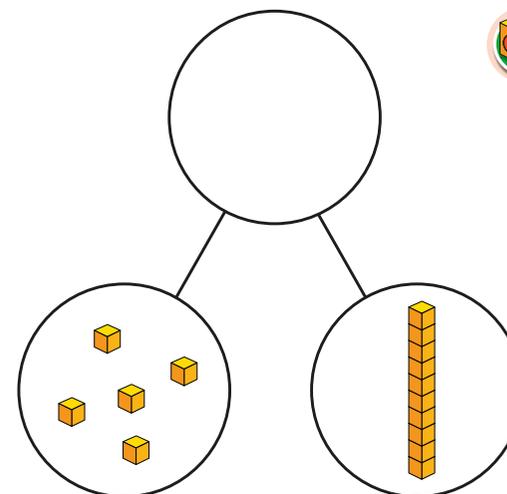
What mistake has Tiny made?

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
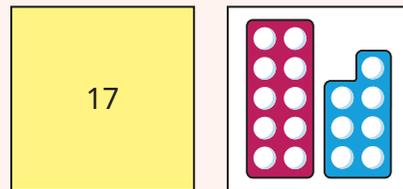
Show children 17 on ten frames.

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.
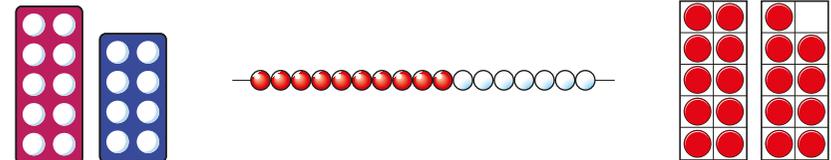
Ask children to write three numbers between 10 and 20

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.
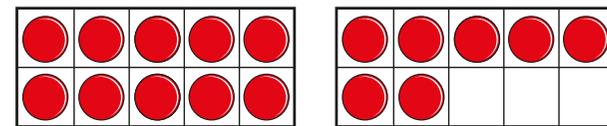
17 has _____ ten and _____ ones.

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
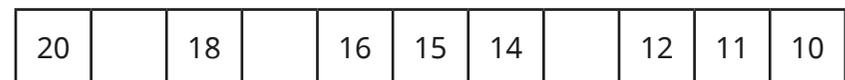
Understand 17, 18 and 19

Reasoning and problem solving

Which one does not belong?
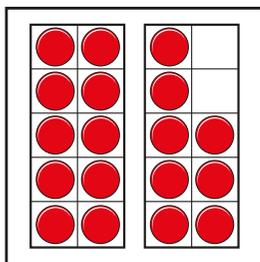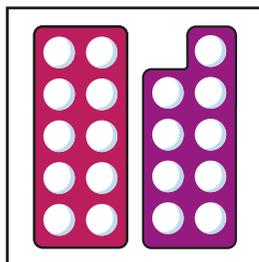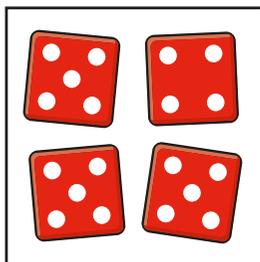
Is there more than one answer?

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.

Here are all the numbers from 11 to 19

eleven

seventeen

19

14

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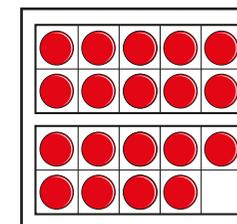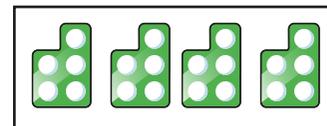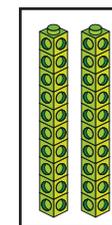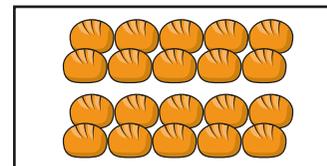
Read *One is a Snail, Ten is a Crab* by April Pulley Sayre and Jeff Sayre.

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?
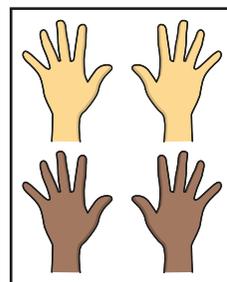
Children can play this game in pairs or small groups.

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
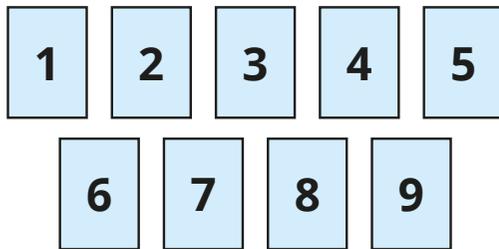
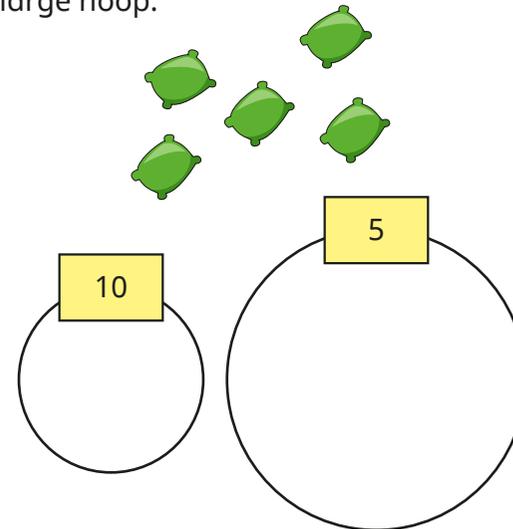> I can use the cards to make all the numbers from eleven to twenty.

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.

10

5

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

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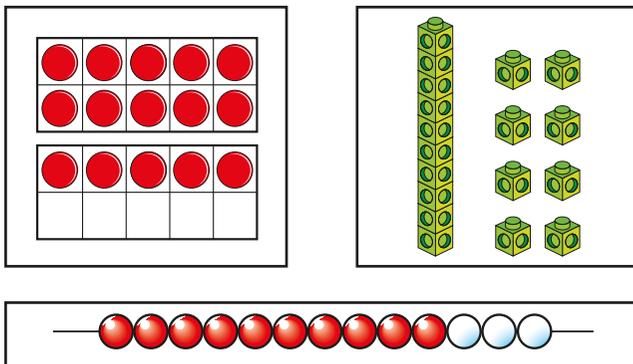
1 more and 1 less

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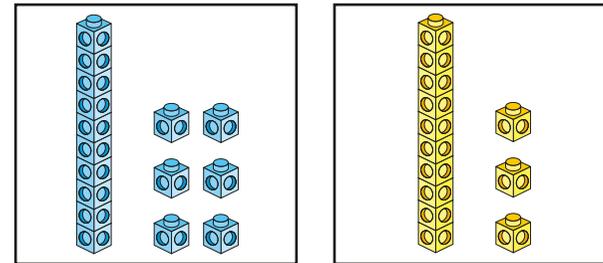
Look at the 11 to 20 counting pattern on the last page of *1 to 20 Animals Aplenty.*

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.

1 less		1 more
	13	
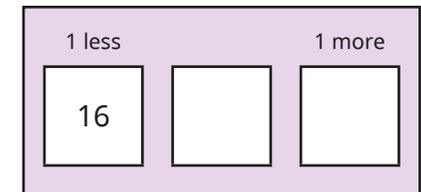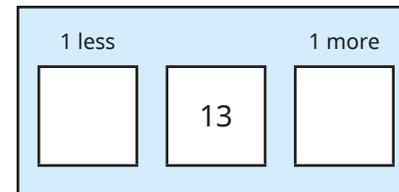
1 less		1 more
16		

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

11	12	13	14	15	16	17	18	19	20
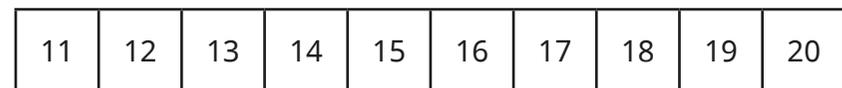
  ▶ _____ is 1 more than 13

  ▶ 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.

[ ] —1 more than→ [ ]

How many ways can you find?

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

Max thinks of a number.

1 more than my number is 11

Max

What is Max's number?

How do you know?

Kim thinks of a number.

1 less than my number is 15

Kim

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.

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 _____

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.

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?
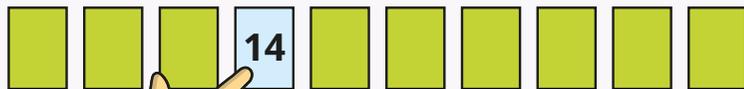
Ask them to explain how they know which number is halfway between zero and 20
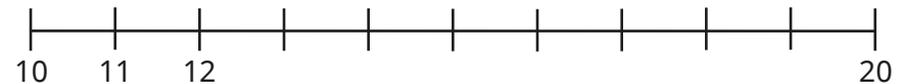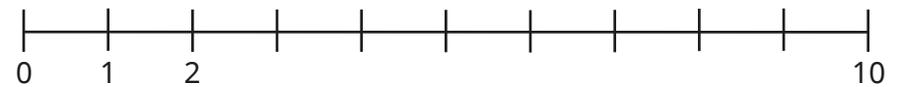
Put a set of number cards from 11 to 20 face down in order.

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?

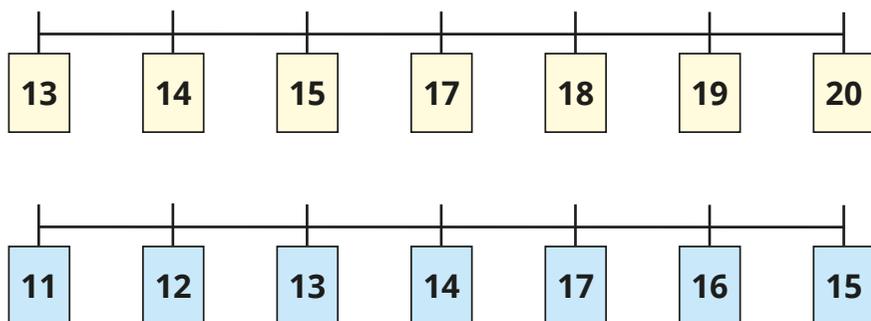- Complete the number lines.
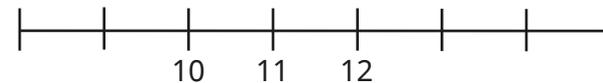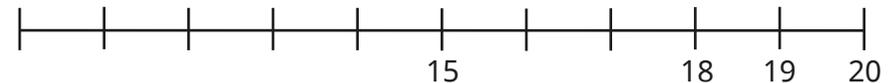
- Use a number line from 0 to 20
  - ▶ Circle the number 13
  - ▶ Circle the number 20

The number line to 20

Reasoning and problem solving
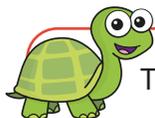
Tiny has put number cards on two number lines.

Spot the mistake in each number line.

| 13 | 14 | 15 | 17 | 18 | 19 | 20 |

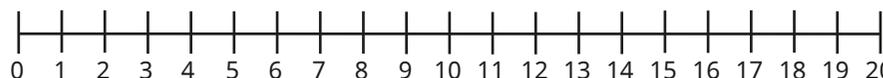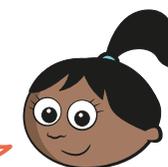| 11 | 12 | 13 | 14 | 17 | 16 | 15 |

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.

My number is further along the number line than 13

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

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?
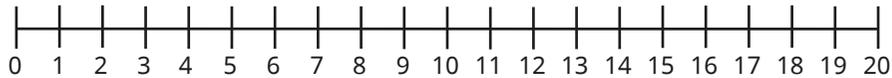
Can children find 1 more and 1 less than 15?

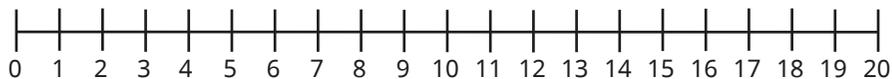Can they find all the numbers that are greater than 11? Less than 14?

Can they find all the numbers in between 12 and 18?
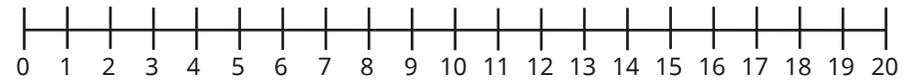
- Ann counts from 8 to 15

  Circle all the numbers that she will say.

  0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

- Circle all the numbers that are greater than 7

  0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

- Circle all the numbers that are less than 13

  0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
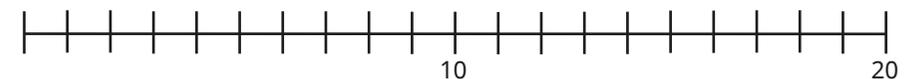
- What numbers are the arrows pointing to?

  0   10

  10   20

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

  0   10   20
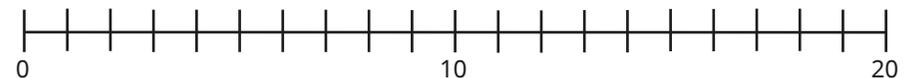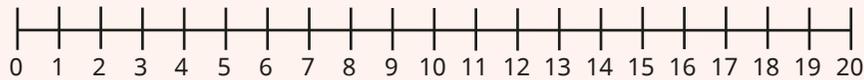
  Label 7, 17 and 19 on the number line.

  10   20

Use a number line to 20

Reasoning and problem solving

Ask children to pick a number on the number line.

```
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 20
```

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
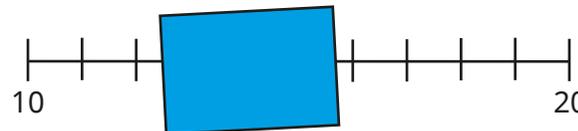

All number lines start from 1

Do you agree with Tiny?

Why?

No
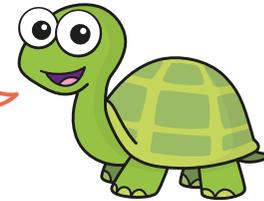
Which numbers are hidden by the card?

```
+--+--+--[    ]--+--+--+--+
10                        20
```

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.

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 _____

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.

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.

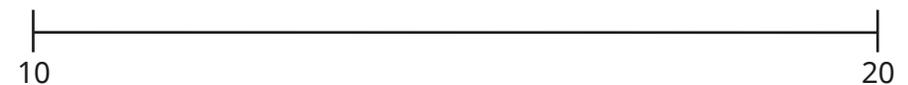Discuss what changes if the number line is zero to 20. Which number will be halfway? Where will 5 and 15 be? Where will 12 come?

- 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?

  0   10

  10   20
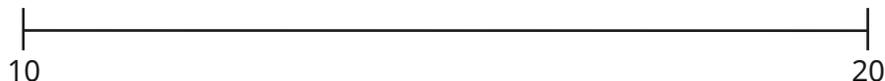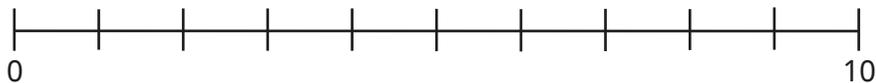
- Estimate where 4 belongs on the number line.

  0   10
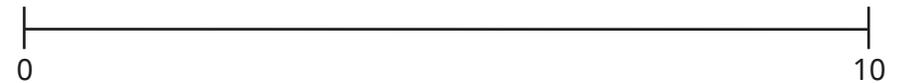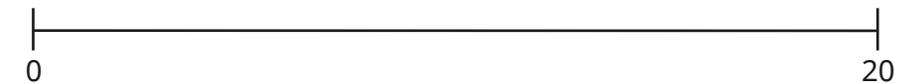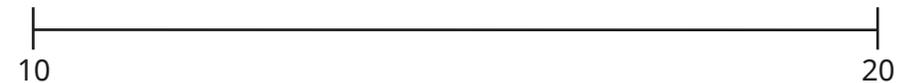
  Estimate where 14 belongs on the number line.

  10   20

  What is the same? What is different?

- Estimate where 15 belongs on each number line.

  10   20

  0   20

  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?

10   20

How do you know?

18

What could the missing numbers be?

0   20

How do you know?

3, 10, 17

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

0   1   2   3   4   5   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
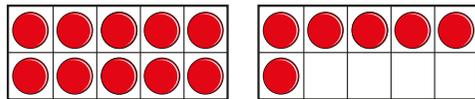
Compare numbers to 20

Key learning
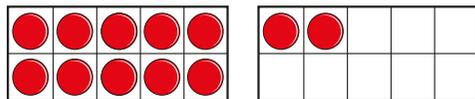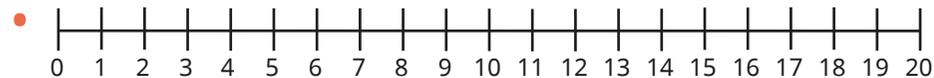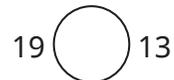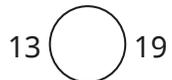
- Mo and Kim have each made a number.

  Mo

  Kim

  ▶ What number has Mo made?

  ▶ What number has Kim made?

  ▶ Who has made the greater number?

- 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

  ▶ 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   ▶ Twenty is _____ 0

  ▶ 13 is _____ 9   ▶ 12 is _____ twelve.

  ▶ Eleven is _____ 16   ▶ 10 is _____ 20

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

  14 ◯ 9   19 ◯ 20   13 ◯ 12

- Jo and Max have some marbles.

  I have eighteen marbles.

  Jo

  I have fifteen marbles.

  Max

  Who has more marbles?

  How do you know?

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Compare numbers to 20

Reasoning and problem solving

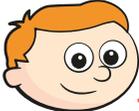Ron and Sam have three jars of sweets.

A **B** **C**

12 ? 17

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 _____

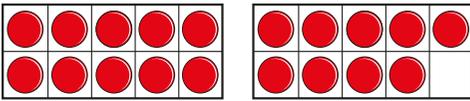- The greatest/smallest number is _____
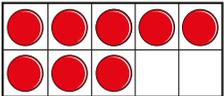
National Curriculum links

- 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
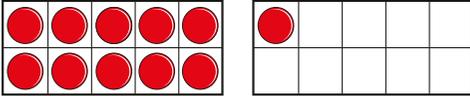
Order numbers to 20

Key learning

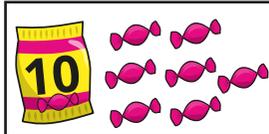- Mo, Max and Kim use counters to make numbers.

Mo

Max

Kim

  ▶ 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.

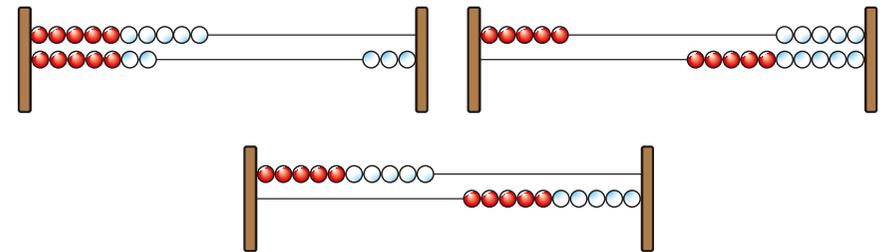   Start with the smallest number.

- 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.
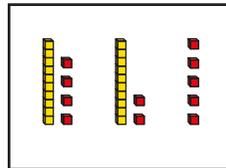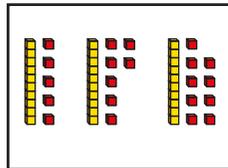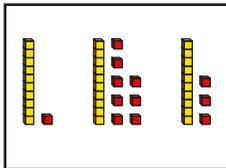
Order numbers to 20

Reasoning and problem solving

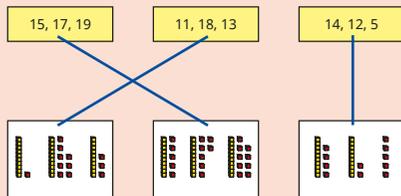Match the labels to the pictures.

| 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.

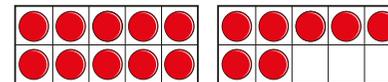| 15, 17, 19 | 11, 18, 13 | 14, 12, 5 |

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.