Spring Block 3

Place value (within 50)

Small steps

Step 1	Count from 20 to 50
Step 2	20, 30, 40 and 50
Step 3	Count by making groups of tens
Step 4	Groups of tens and ones
Step 5	Partition into tens and ones
Step 6	The number line to 50
Step 7	Estimate on a number line to 50
Step 8	1 more, 1 less

Count from 20 to 50

Notes and guidance

In this small step, children count forwards and backwards between 20 and 50

Chanting games, such as “I count, you count”, give children the opportunity to count from different starting points alongside their peers.

Number tracks and half-hundred squares are useful representations to support children counting up to 50. When counting on a half-hundred square, ensure that they recognise the convention of moving to the next row after reaching a multiple of 10

Things to look out for

- As children have become familiar with teen numbers, they may use these interchangeably with multiples of 10, for example saying “thirteen” instead of “thirty”.
- When counting backwards from a multiple of 10, children may start going forwards again, for example 42, 41, 40, 41
- Children may reverse the digits of 2-digit numbers, for example writing “41” as “14”.

Key questions

- What number comes next?
- What number comes after ______?
- Will you say the number ______ when counting from ______ to ______?
- What numbers sound similar?
- What number comes before ______?

Possible sentence stems

- The number that comes after ______ is ______
- The number that comes before ______ is ______
- I will/will not say the number ______, because …

National Curriculum links

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

Count from 20 to 50

Key learning

Divide children into groups.

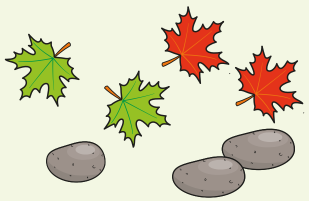
As you point to a group, they begin counting from 1. When you point to another group, they continue the count. Keep switching between groups.

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

Using a puppet, model counting forwards or backwards from 20 to 50 with deliberate mistakes, such as saying “fourteen” instead of “forty” or not continuing in the correct direction after counting a multiple of 10

Ask children to help the puppet to count correctly.

Encourage children to collect more than 20 natural objects. Discuss how lining the objects up can make them easier to count.



Put children in pairs and give them a half-hundred square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Ask children to take it in turns to count forwards or backwards from a given number.

While one child counts aloud, their partner checks by moving their finger on the half-hundred square. They then swap roles.

- Complete the number tracks.

40	41	42	43							

32	31	30								

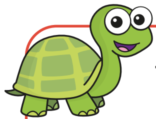
Count from 20 to 50

Reasoning and problem solving

Complete the number track.

				19	20	21			

15, 16, 17, 18, 22, 23, 24



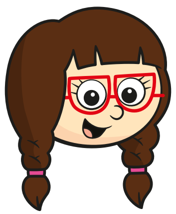
Tiny counts up from 24 to 40

Which of the numbers will Tiny say?

49 **29** **19** **39**

29, 39

Jo is counting.



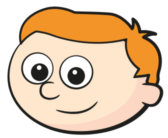
28, 29, 30, 13, 32

What mistake has she made?

Jo has reversed the digits when writing 31

Ron is counting back from 43

43, 42, 41,
40, 41, 42



What mistake has Ron made?

He has started counting forwards after counting 40

20, 30, 40 and 50

Notes and guidance

In this small step, children develop their understanding of multiples of 10 up to 50

Recap learning from Spring Block 1 about the equivalence of 10 ones and 1 ten using representations such as a ten frame or a bundle of 10 straws.

There are several representations that can be used in this step to highlight how many tens are in each number, for example ten frames, base 10, bead strings and towers of cubes. Give children practical opportunities to explore each number in different ways using a range of concrete resources. Children could move on to seeing e.g. 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 count groups of 10 as discrete objects rather than groups of objects, for example counting 4 packs of 10 pencils as "4 pencils".
- Children may not recognise that 40 is greater than 39, because they are looking at the digit in the ones place value position instead of the tens.

Key questions

- Is this a group of ten? How do you know?
- How many ways can you make ______?
- How many ones make 30?
- How many tens make 30?
- If you have 3 full ten frames, what number have you made?
- How many base 10 pieces make 50?

Possible sentence stems

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

National Curriculum links

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

20, 30, 40 and 50

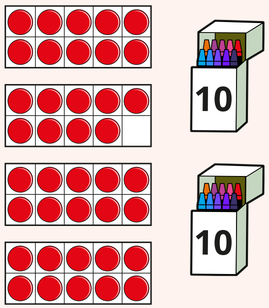
Key learning

Hide small objects outside and provide 5 ten frames for each group.

Each group collects objects to fill their ten frames. Prompt children to tell you how many they have found and how many groups of ten they have.

Show children representations of numbers, some of which show multiples of 10 and some of which do not.

Ask them to decide if the number shown is a multiple of 10 and to explain how they know.



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

30 is 3 crabs or 10 people and 1 crab. Ask children why 3 crabs make 30

Children could draw crabs to show each multiple of 10

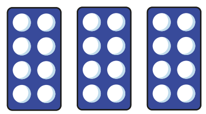
Put children into groups and give each group 5 ten frames.

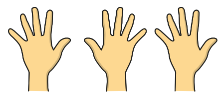
Children take turns to roll a 6-sided dice. They put the corresponding number of counters on the ten frames. The first group to reach 50 (5 full ten frames) wins.

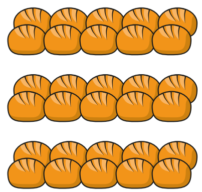
- Complete the table and continue the pattern.

Base 10	Number	How many tens?
		1 ten
	20	2 tens
		

- Which pictures show 30?



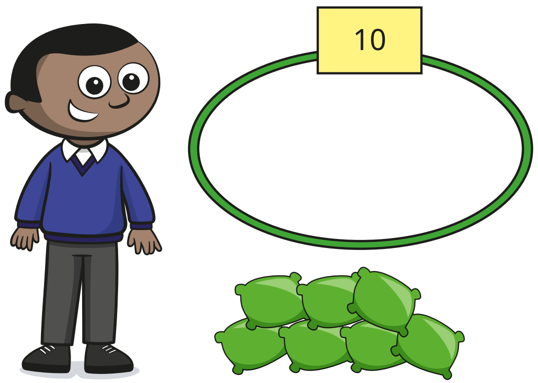




20, 30, 40 and 50

Reasoning and problem solving

Mo is playing a game.



He scores 10 points for every bean bag that lands in the hoop.

He scores 50 points in total.

How many bean bags does Mo get in the hoop?

Ben scores 10 fewer points than Mo.

How many points does Ben score?

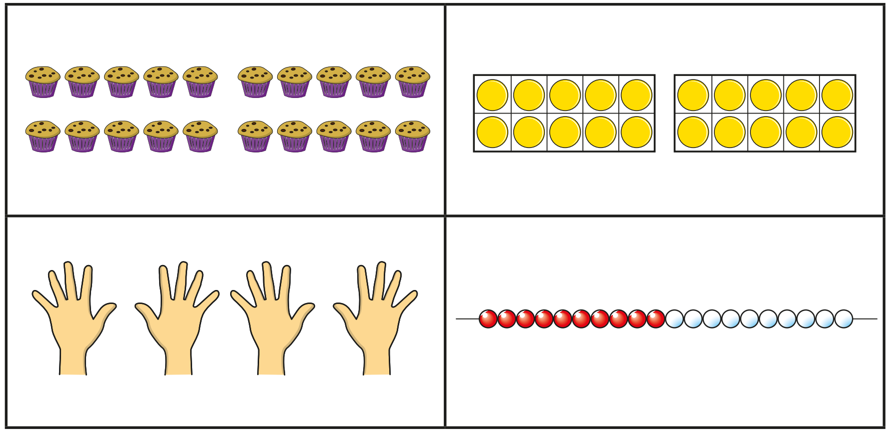
5

40

How many ways can you show each number?

One has been done for you.

10 ~~20~~ 30 40 50



multiple possible answers

Count by making groups of tens

Notes and guidance

In this small step, children learn how to count objects more efficiently by grouping into tens and ones.

Children should spend time practically counting groups of ten from objects such as counters, cubes and straws. Building towers of 10 cubes or bundling 10 straws will reinforce the concept of 1 ten being equal to 10 ones.

After grouping objects into tens practically, children practise counting pictures of objects and circling each group of ten.

It is important that children recognise that a 2-digit number is formed by counting the number of groups of ten for the first digit and the ones left over as the second digit.

Things to look out for

- Children may not correctly group objects into tens.
- Children may reverse the digits in a 2-digit number.
- Children may not generalise that the group of 10 objects is equal to 1 ten, which can lead to them counting, for example, 3 bundles of 10 straws and 4 extra straws as 7
- Children may write 2-digit numbers incorrectly. For example, if there are 3 tens and 4 ones, they may write this as 304 rather than 34

Key questions

- How many ______ are there?
- How did you count them?
- Is there an easier way to count the objects?
- How can you make sure you do not miscount any objects?
- How could you use a ten frame to help you count groups of ten?
- How many ones are there in 10?
- How many groups of ten are there and how many more?

Possible sentence stems

- ______ ones = ______ ten(s)
- There are ______ groups of 10 and ______ more.
  There are ______ in total.

National Curriculum links

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

Key learning

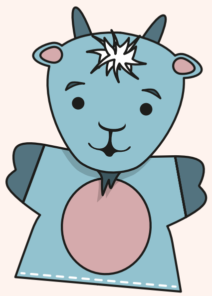
Using a puppet, model counting a large number of objects, such as 36 cubes.

Lose count or double count cubes to show the inefficiency of counting in ones.

Ask children if they can think of a better way to count.

Model counting 10 cubes and putting them in a group.

Continue grouping the rest of the cubes into tens.



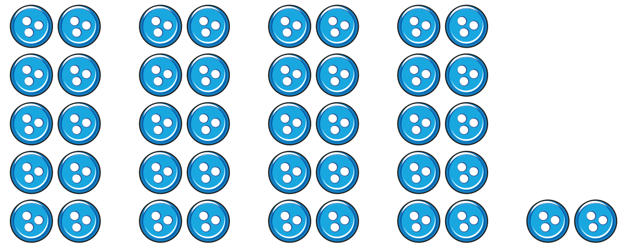
Give children a large number of objects.

Ask them to count by grouping into tens and ones.

Draw attention to different ways the children have grouped the sets of 10 objects, such as stacking, making arrays, putting into piles.

Discuss whether this affects the value of the 10 objects.

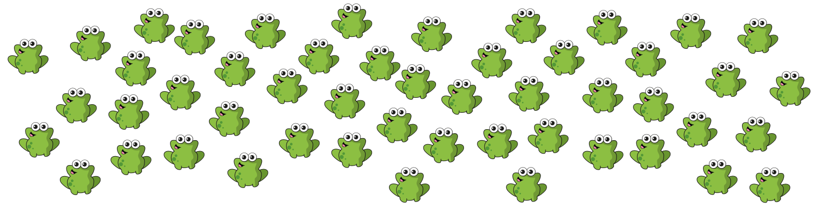
- Complete the sentences.



There are ______ groups of ten buttons and ______ buttons.

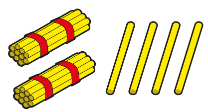
There are ______ buttons in total.

- Circle groups of 10 to count how many frogs there are.

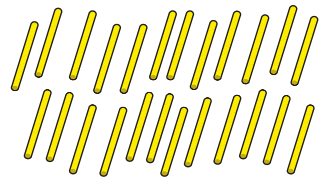


- Ann and Fay are counting straws.

Ann



Fay

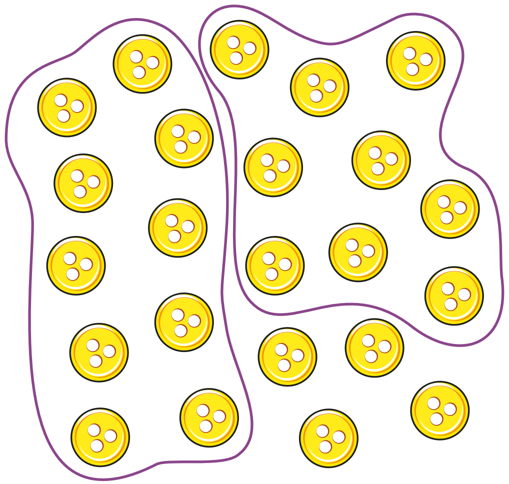


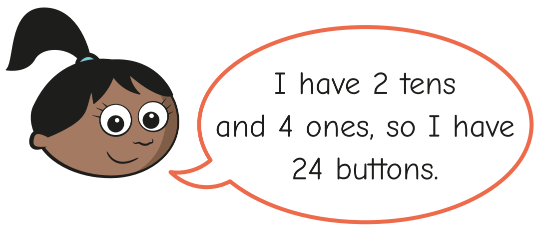
What is the same? What is different?

Count by making groups of tens

Reasoning and problem solving

Sam counts by grouping 10 buttons.



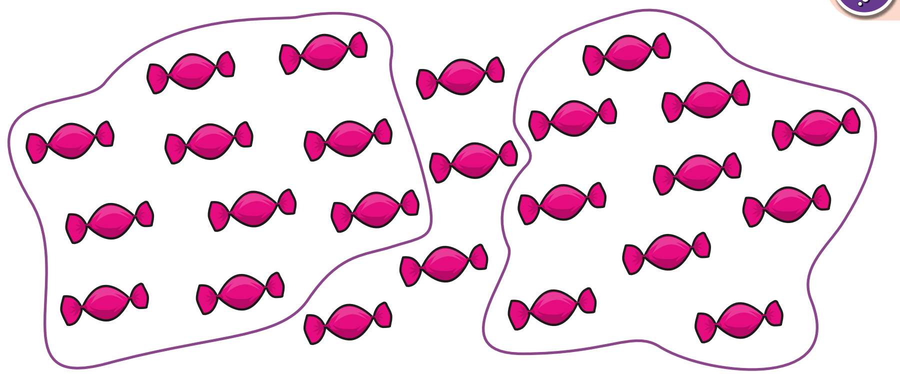


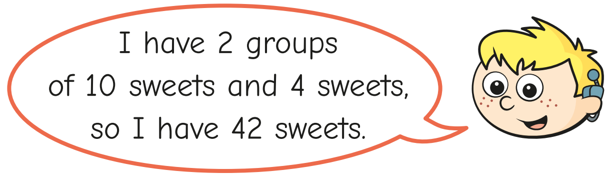
What mistake has Sam made?

How many buttons are there?

23

Max is counting sweets.





What mistake has Max made?

How many sweets does Max have?

24

Groups of tens and ones

Notes and guidance

This small step consolidates children's place value understanding of tens and ones.

Children continue to describe a number by the number of tens and ones the number is made from. Learning from the previous step is extended, as the representations of the tens and ones are not always in place value order.

Children need to count the number of groups of 10 and then the ones to find the total. All the representations still show that 10 ones make 1 ten, and children could still count individual ones to find the total. However, this is not efficient, so if children are still doing this, encourage them to recognise the groups of 10. Using base 10 is useful, as it gives children no option other than to count tens and ones, since they cannot split the ten apart.

Things to look out for

- Children may count the number of objects, rather than consider what each object represents.
- Children may reverse the digits of the 2-digit number, particularly if the representation is not organised in place value order.

Key questions

- How many ______ are there? How do you know?
- How many groups of ten are there? How many more are there?
- How many ones are there in 10?
- How many tens are there? How many ones?
- How many ______ are there in each pack/box?

Possible sentence stems

- There are ______ groups of 10 objects and ______ more objects.
  There are ______ objects in total.
- I have ______ tens and ______ ones.
  I have ______

National Curriculum links

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

Groups of tens and ones

Key learning

Show children 37 on ten frames.

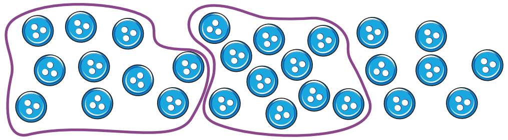
What do they notice about 37?

Get children to say out loud, “37 has 3 tens and 7 ones.”

Ask children to build 38 and 39 and talk to a partner about what they notice.

Explore other numbers to 50, getting children to verbalise how many tens and ones make up the number.

- How many buttons are there?



There are ______ groups of 10 buttons and ______ more buttons.

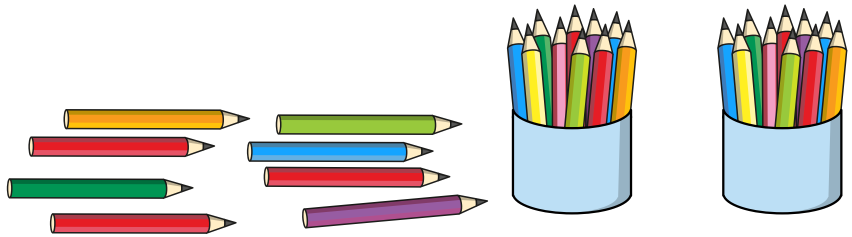
There are ______ buttons in total.

- How many flowers are there?

There are ______ groups of 10 flowers and ______ more flower.

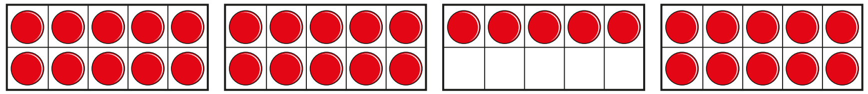
There are ______ flowers in total.

- Kay counts pencils by grouping them in tens.



How many pencils are there?

- How many counters are there?



Ask children to make a number up to 50 using base 10, without showing their partner.

Children should tell their partner how many tens and ones their number has.

Then their partner draws the number.

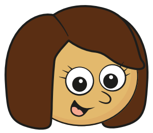
They check to see whether the drawing matches their number.

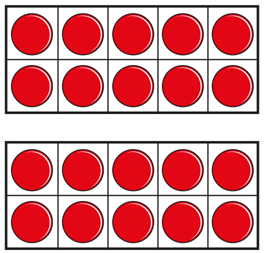
Groups of tens and ones

Reasoning and problem solving

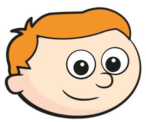
Kim and Ron are making the same number.

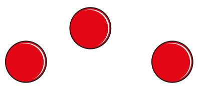
Kim's number has these tens.





Ron's number has these ones.





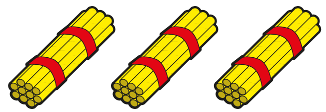
What number are Kim and Ron making?

How do you know?

23

Dan counts straws by grouping them in tens.

He has grouped as many tens as he can.



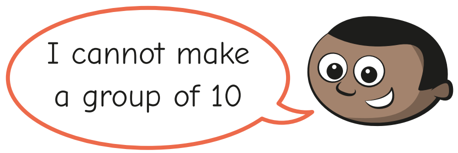
He has some ones left.

How many straws could Dan have in total?

between 31 and 39

Mo has some cubes.

He wants to count them by making tens.



How many cubes might Mo have?

between 1 and 9

Partition into tens and ones

Notes and guidance

In this small step, children develop their understanding of place value for 2-digit numbers as they begin to partition numbers to 50. They have already explored how many tens and ones make a number and they now use a part-whole model to partition a number into tens and ones.

Children first investigate partitioning with representations, followed by numbers. It is important that they see that the whole can be partitioned into tens and ones or ones and tens. The value of the whole and each part does not change in either order.

At this stage, children do not need to describe the part-whole model as an addition number sentence.

Things to look out for

- Children may partition a number into its digits, rather than considering the value of each digit, for example stating that 32 is made up of 3 and 2
- When the parts of a part-whole model are "the wrong way round", children may interpret the whole incorrectly.
- Where part-whole models are presented in different orientations, children may not correctly identify the whole.

Key questions

- How many tens are there? How many ones are there? What is the number?
- What is the whole? What are the parts?
- Does it matter which way round you draw the parts?

Possible sentence stems

- There are ______ tens.
  There are ______ ones.
  The number is ______
- ______ is the whole.
  ______ is a part and ______ is a part.

National Curriculum links

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

Partition into tens and ones

Key learning

Read *Count to 100* by Felicity Brooks.

Give children a picture of up to 50 birds.

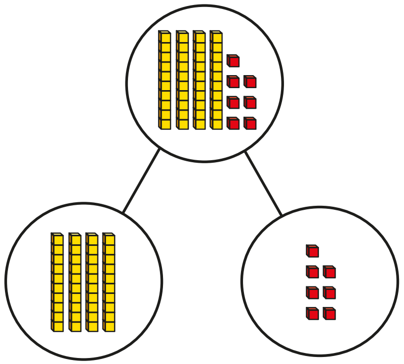
Can they partition the birds into tens and ones?

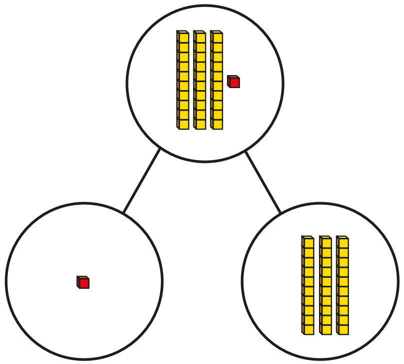
Ask children to use base 10 to make the number 32 and then to use a part-whole model to partition the number into tens and ones.

Can they tell you how many tens and ones there are in 32?

Repeat with other numbers.

- Complete the sentences to describe each part-whole model.

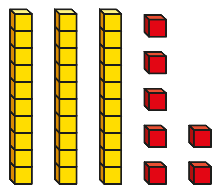


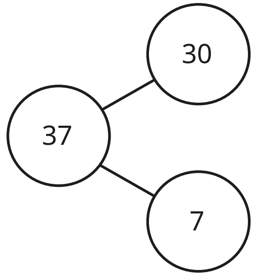


  - ______ is a part and ______ is a part.
    ______ is the whole.
  - There are ______ tens.
    There are ______ ones.
    The number is ______

What do you notice?

- How does the part-whole model match the base 10?





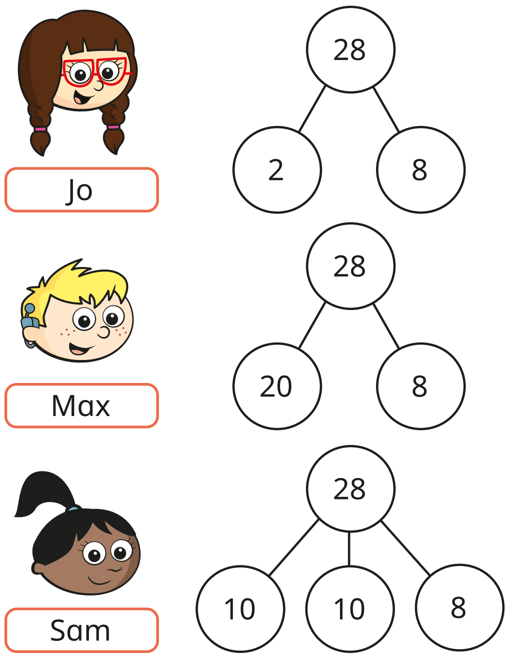
- Use a part-whole model to partition each number into tens and ones.

41 22 36 17 50

Partition into tens and ones

Reasoning and problem solving

Jo, Max and Sam each show a number in a part-whole model.

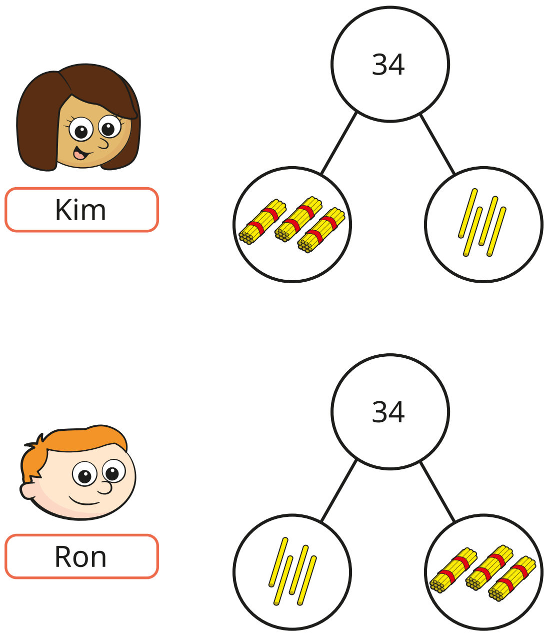


Who is correct?

How do you know?

Max and Sam

Kim and Ron use straws to show a number.



Who is correct?

How do you know?

Both children are correct.

The number line to 50

Notes and guidance

Children have used a number line to count to 10 and 20 in previous blocks; in this small step, the number line is extended to include numbers to 50

Encourage children to explore the similarities and differences between a number track and a number line. There are lots of opportunities for practical activities within this step, such as children creating their own number line on the playground.

Children see examples of number lines with different start and end point values, as well as number lines between zero and 50 or between multiples of 10. They use their knowledge of counting to label number lines counting up in 1s before labelling number lines counting in 10s. Building on this, they find the position of given numbers on unlabelled number lines.

Things to look out for

- Children may think that number lines can only go up in 1s.
- 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 from zero.

Key questions

- Where does the number line start?
- Where does the number line end?
- Where do the numbers go on a number line?
- How can you use a number line to decide which number is greater/less?
- 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 ______
- The number line is going up in ______

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
- Given a number, identify 1 more and 1 less

The number line to 50

Key learning

Use chalk to draw number lines with different start and end point values on the playground. Children practise starting on a given number and hopping to another number. Discuss which numbers they land on, and which ones they do not land on.

Challenge children to use the number lines to find 1 more or 1 less than a given number.

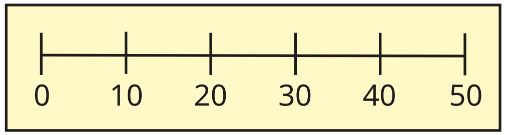
Give six children a number from 25 to 30

Ask them to order themselves into a number line.

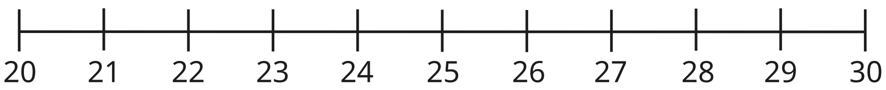
What is the next number? What is the previous number?

- What is the same? What is different?

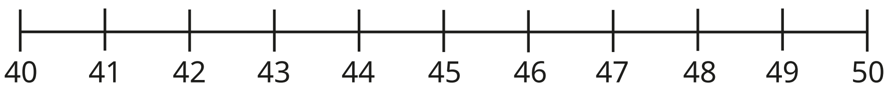
0	10	20	30	40	50



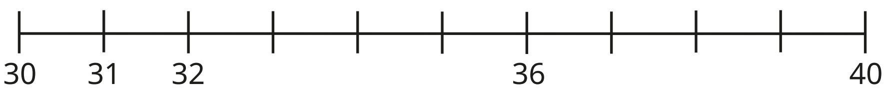
- Circle all the numbers on the number line that are less than 23

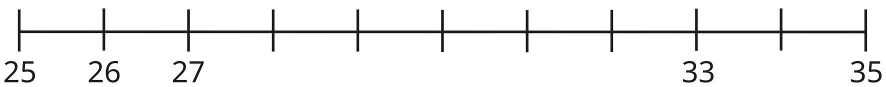


Circle all the numbers on the number line that are greater than 45



- Complete the number lines.



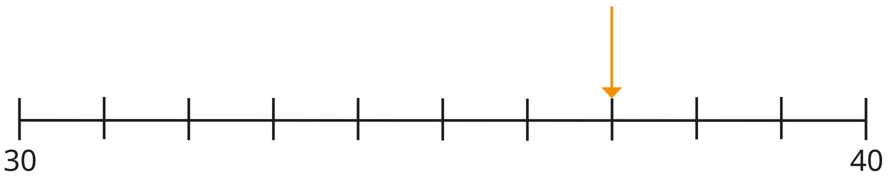


What is the same about the number lines? What is different?

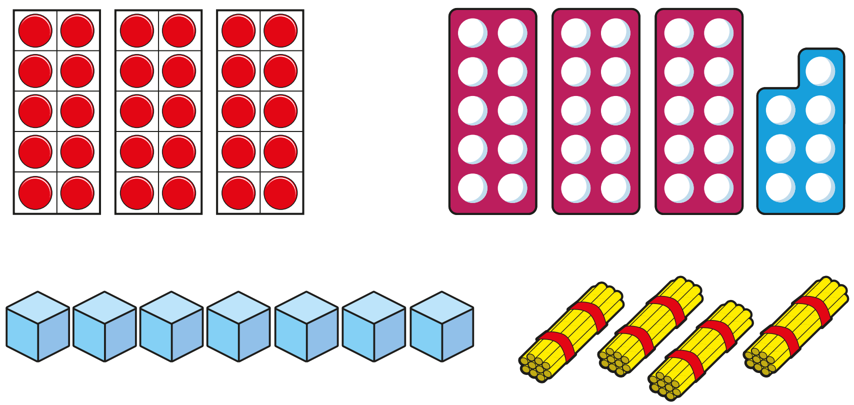
The number line to 50

Reasoning and problem solving

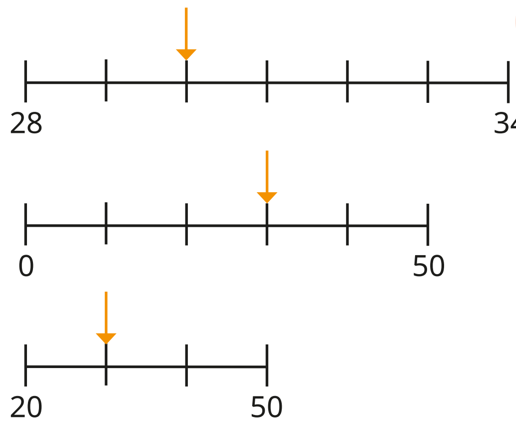
Ben draws an arrow on the number line.

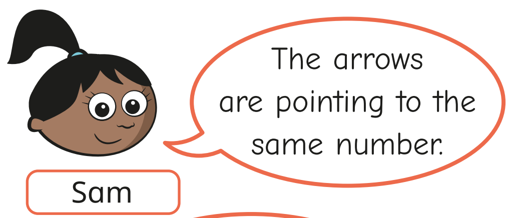


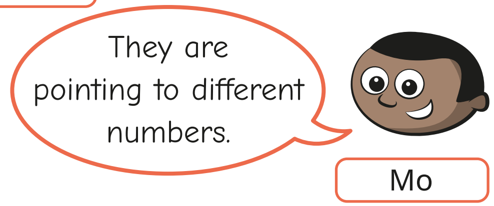
Which picture matches Ben's number?



37 (number pieces)







Who is correct?

Sam

Estimate on a number line to 50

Notes and guidance

Building on the previous small step, children estimate the positions of numbers on number lines up to 50

Children have estimated on number lines to 20, but they may need to recap the idea of an estimate being a "best guess". Remind them that estimates are not exact. Explore the process of finding a midpoint on a blank number line by asking what number is halfway between the start and end point numbers.

Discuss how that makes it easier to estimate the position of a number. After finding the midpoint, children can then position the number using proportional reasoning.

Things to look out for

- Children may position a number at the multiple of 10 on the number line, as they do not recognise that numbers can be between intervals.
- Children may think that they have an incorrect answer if their answer is slightly different from their partner's. As these are estimates, they could both be correct.
- Some children may find it difficult that there is not an exact answer when estimating.

Key questions

- What does "estimate" mean?
- Can you find halfway on the number line?
- What number is halfway between ______ and ______?
- Is ______ less than halfway or more than halfway? How do you know?
- Where is ______ on the number line? How do you know?
- Which two multiples of 10 is ______ between?

Possible sentence stems

- Halfway is ______
- ______ is here on the number line because …
- ______ is closer to ______, so it goes here on the number line.

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

Estimate on a number line to 50

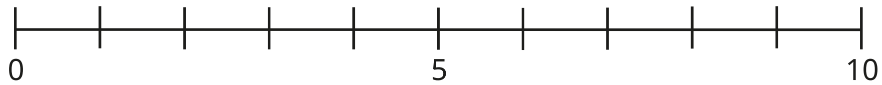
Key learning

Use chalk to draw a line on the playground. Label one end 20 and the other end 30

Give a child a number card for 25 and ask them to position themselves on the number line, explaining their position. Discuss with the class whether they agree. Give another child a number card for 22. Discuss whether 22 is greater or less than 25. Why is this important? Give other children numbers to join the number line.

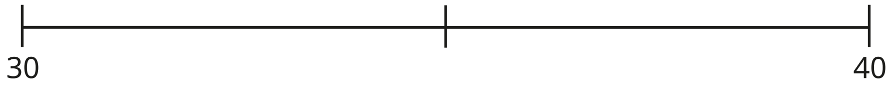
Ask what number would be halfway if the number line was changed to show 20 to 40

- Draw arrows to 4 and 9 on the number line.

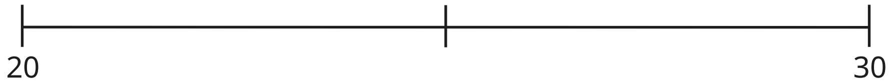


Use your answer to help you estimate where 24 and 29 are on this number line.

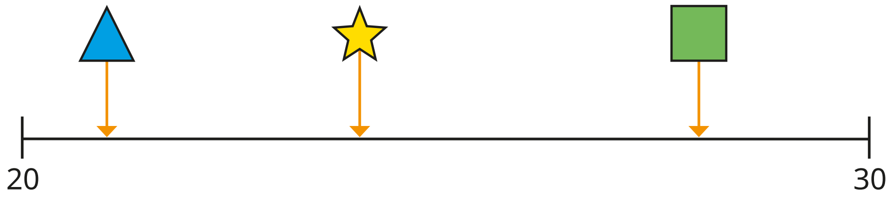
- Draw an arrow to 32 on the number line.



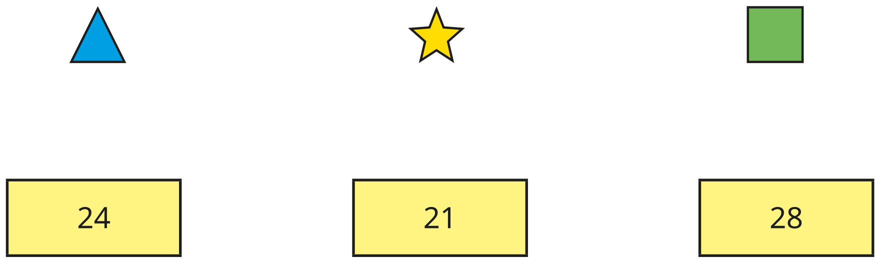
Draw an arrow to 28 on the number line.



- Here is a number line.



Match the shapes to the numbers.



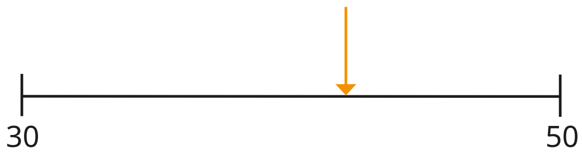
Estimate on a number line to 50

Reasoning and problem solving

What number could the arrow be pointing to?

e.g. 41

Ann draws an arrow on a number line to show a number.



What could Ann's number be?

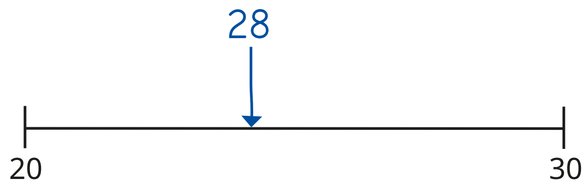
What can Ann's number **not** be?

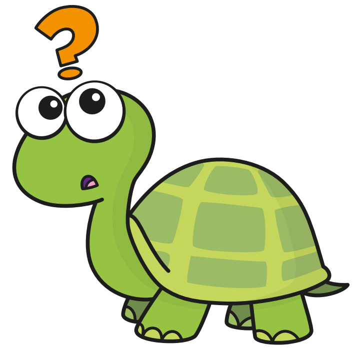
Compare answers with a partner.

any number between 40 and 45

less than 40 or greater than 45

Tiny estimates where 28 belongs on the number line.





How do you know that Tiny is incorrect?

25 is the halfway point on the number line.

28 is greater than 25 so should be between halfway and 30

1 more, 1 less

Notes and guidance

In this final step, children apply their counting skills to find 1 more and 1 less than any number between zero and 50. They have already found 1 more and 1 less than numbers within 20 in a previous block.

As children are still developing their understanding of 2-digit numbers, it is important that they find 1 more and 1 less of a number using concrete resources and representations. Initially, they could make a number using a ten frame and counters, before working out 1 more and 1 less by adding or removing counters. Children could then use number lines alongside concrete resources to count forwards or backwards.

Things to look out for

- Children may find it difficult to find 1 less than a multiple of 10. For example, they may write ”1 less than 40 = 49”
- When using base 10 to find 1 less than a multiple of 10, children may just subtract a ten, for example 3 base 10 ten pieces is 1 less than 4 base 10 ten pieces.
- When finding 1 more than a multiple of 10, children may add 10, for example 1 more than 30 = 40

Key questions

- How can you represent the number ______?
- How can you find 1 more?
  How does this change the number?
  Which digit changes? Why?
- How can you find 1 less?
  How does this change the number?
  Is it only ever the ones digit that changes?

Possible sentence stems

- ______ is 1 more than ______
- ______ is 1 less than ______
- 1 more than ______ is ______
- 1 less than ______ is ______

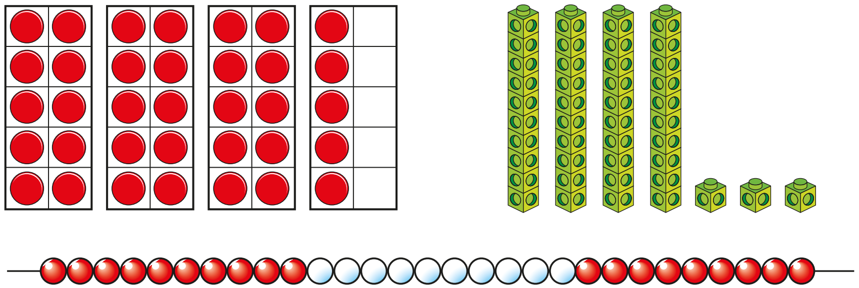
National Curriculum links

- 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
- Given a number, identify 1 more and 1 less

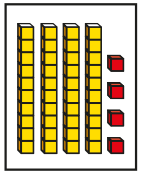
1 more, 1 less

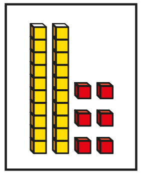
Key learning

- Make 1 more and 1 less than each number.



- Write numbers to fill in the boxes.

1 less  1 more

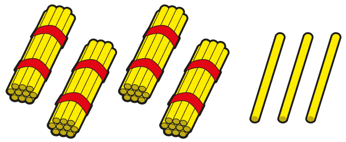
1 less  1 more

- Use the number track to fill in the missing numbers.

30	31	32	33	34	35	36	37	38	39	40

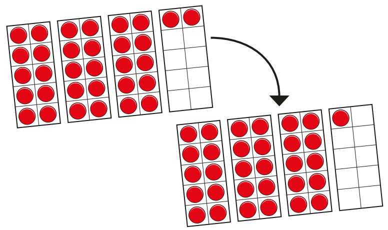
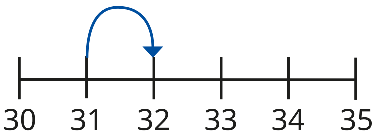
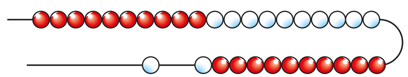
  - ______ is 1 more than 34
  - 34 is 1 more than ______
  - ______ is 1 less than 39
  - 39 is 1 less than ______

- Dan has these straws.



  - How many straws does Dan have?
  - If Dan gives one straw away, how many straws will he have left?
  - If Dan is given one more straw, how many straws will he have?

- What is the same about each picture? What is different?

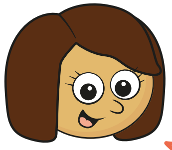
	32 is 1 more than 31
	

1 more, 1 less

Reasoning and problem solving

Kim is thinking of a number.

My number has 3 tens.



1 less than my number makes the tens digit change.

1 more than my number has 1 one.

What is Kim's number?

30

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

When I find 1 more than a number, I only change the ones digit.

Talk about it with a partner.

sometimes true

Use the number cards to complete the sentences.

28 **29** **30** **31** **32**

______ is 1 less than ______

______ is 1 more than ______

How many different ways can you find?

multiple possible answers, e.g.

28 is 1 less than 29

32 is 1 more than 31

Spring Block 4

Length and height

Small steps

Step 1	Compare lengths and heights
Step 2	Measure length using objects
Step 3	Measure length in centimetres

Compare lengths and heights

Notes and guidance

In this small step, children compare lengths and heights of objects using language such as "longer than", "shorter than" and "taller than".

Children understand that height is a type of length and that the language they use changes, depending on what type of length they are describing and comparing.

Children should also be exposed to objects that have the same length or height and use the language of "is the same" or "is equal to" to compare.

At this stage, children only compare the lengths and heights of pairs of objects. Ordering lengths and heights is covered later in Key Stage 1

Things to look out for

- Children may confuse the words "longer" and "taller".
- If children do not line up the objects they are comparing, they may decide incorrectly which is longer/taller.
- Children may think that two different objects cannot be equal in length/height.

Key questions

- Which object is longer? How do you know?
- Which object is taller? How do you know?
- Which object is shorter? How do you know?
- What is the difference between "longer" and "taller"?
- Why is it important that you line the objects up before you compare them?
- Can two different objects have the same length? How do you know?

Possible sentence stems

- ______ is longer than ______
- ______ is taller than ______
- ______ is shorter than ______
- Before I can compare lengths or heights, I need to make sure that …

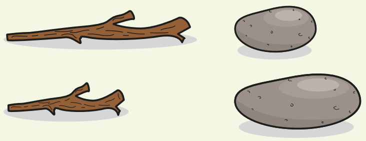
National Curriculum links

- Compare, describe and solve practical problems for: lengths and height; mass/weight; capacity and volume; time

Compare lengths and heights

Key learning

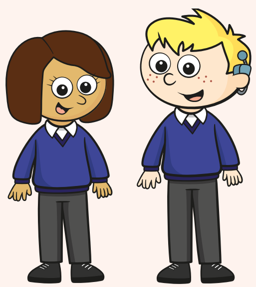
Tell children to find two objects, for example a stick and a pebble.



Ask which object is longer/shorter. How do they know?

Challenge them to find another object that is longer/shorter than the objects they have.

Choose two children to stand side by side.



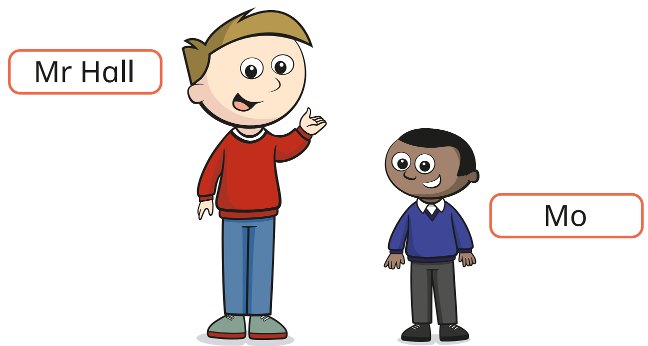
Ask the rest of the class which child is taller. How do they know?

Ask who is shorter. How do they know?

Repeat with other pairs of children.

Challenge children to find a partner who is taller/shorter than them.

- Mr Hall and Mo are comparing their heights.



Choose a word to complete each sentence.

taller shorter

- ▶ Mr Hall is ______ than Mo.
- ▶ Mo is ______ than Mr Hall.

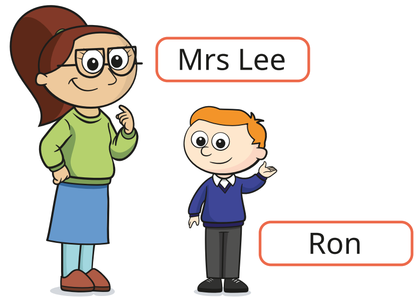
- Write **longer** or **shorter** to compare the ribbons.

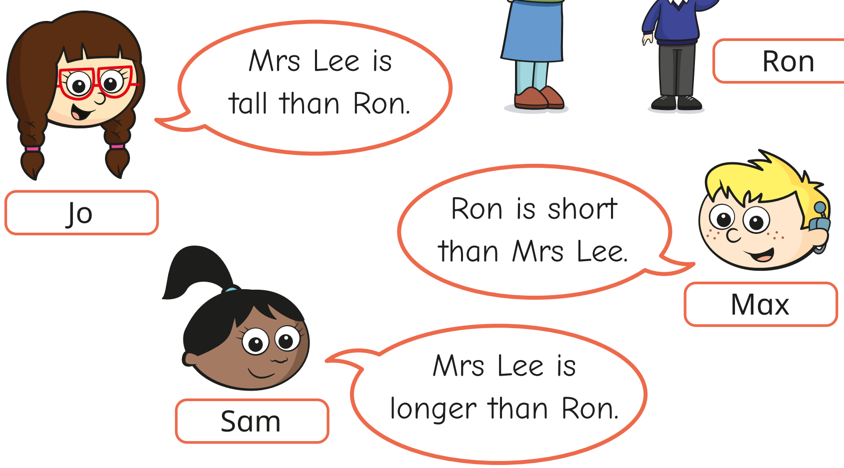
- ▶ The plain ribbon is ______ than the stripy ribbon.
- ▶ The stripy ribbon is ______ than the plain ribbon.

Compare lengths and heights

Reasoning and problem solving

Jo, Max and Sam are comparing the heights of Ron and Mrs Lee.





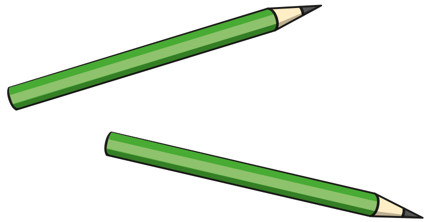
Improve the children's sentences to make them more accurate.

Jo: Mrs Lee is **taller** than Ron.

Max: Ron is **shorter** than Mrs Lee.

Sam: Mrs Lee is **taller** than Ron.

Kay thinks that the pencils are the same length.



How can Kay check if she is correct?

Line up the pencils at one end.

Ask children to find an object in the classroom that is longer than their rubber, but shorter than their pencil.

Ask them to find a classmate who is shorter than them, but taller than someone else.

multiple possible answers

Measure length using objects

Notes and guidance

In this small step, children begin to measure the lengths and heights of objects, using non-standard units of measure such as cubes or paper clips. As in the previous step, they explore both lengths and heights.

It is important that children know that in order to measure the length of something they need to use a consistent unit of measure. They should see that it is not useful to measure the length of something using a range of objects, for example a combination of cubes and paper clips. Similarly, the chosen unit of measure should be equal in size, for example all the paper clips must be the same.

Learning from the previous step is consolidated, as children make comparisons of lengths they have measured. They should see that for accurate comparisons they must use a consistent unit of measure, for example cubes for both items.

Things to look out for

- Children may think that they can use a combination of different objects to measure a length.
- When comparing lengths, children may think that they can use a different unit of measure for each item.

Key questions

- What could you use to measure the length/height of this object?
- Why do you have to use objects that are the same size to measure something?
- What would happen if you chose a different unit to measure the object?
- Where do you need to start/end measuring?
- Which object is longer/taller/shorter? How do you know?
- How much longer/taller/shorter is the ______ than the ______?

Possible sentence stems

- The length/height of the ______ is ______ cubes.
- The ______ is longer/taller/shorter than the ______
- The ______ is ______ cubes longer/shorter than the ______

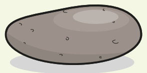
National Curriculum links

- Compare, describe and solve practical problems for: lengths and height; mass/weight; capacity and volume; time
- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time

Measure length using objects

Key learning

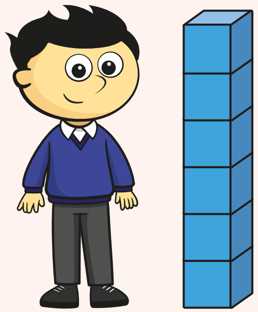
Ask children to find some objects, for example small sticks or pebbles.



Ask them to measure the lengths of the objects using a non-standard unit of measure, for example cubes, bricks, paper clips or rubbers.

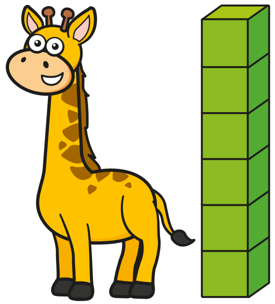
Ask children to measure each other's heights using a non-standard unit of measure, for example building blocks or sticks of equal length. Children may find it easier to lie on the floor rather than stacking the objects in a tall tower.

Ask children what would happen if they changed the unit of measure. Will the number of objects they use change? Why?
Will the person's actual height change? Why?



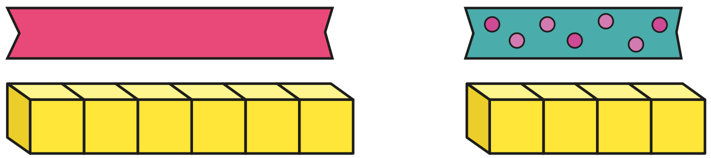
- Complete the sentences.

The train is ______ paper clips long.



The giraffe is ______ cubes tall.

- Max uses cubes to measure the lengths of two ribbons.



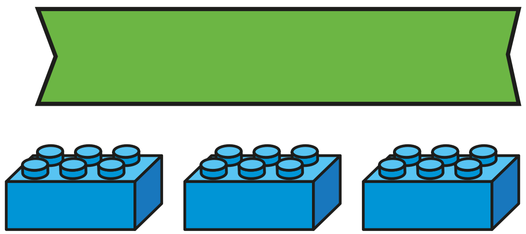
  - What is the length of each ribbon?
  - Write **longer** or **shorter** to complete the sentence.

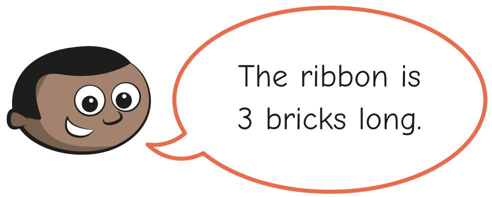
    The plain ribbon is ______ than the spotty ribbon.
  - How much longer is one ribbon than the other?

Measure length using objects

Reasoning and problem solving

Mo is measuring the length of the ribbon.

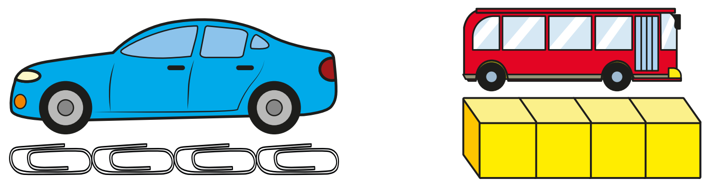


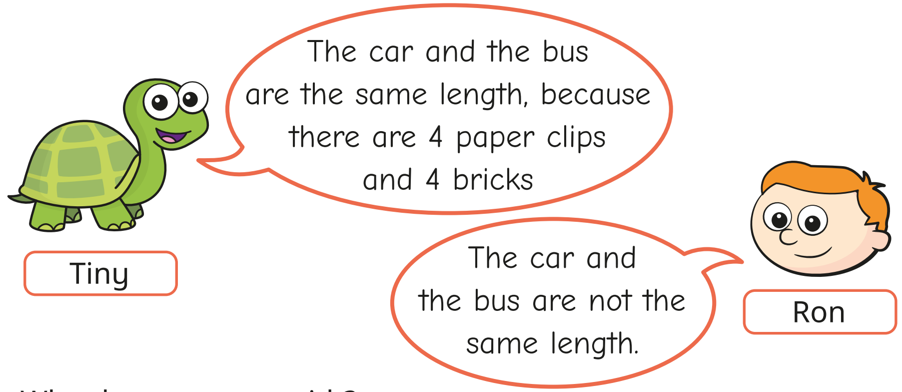


What mistake has Mo made?

Mo has left gaps between the units of measure (bricks).

Tiny and Ron are measuring the length of a car and a bus.





Who do you agree with?

Why?

Ron

Measure length in centimetres

Notes and guidance

Building on the previous step, children measure the lengths and heights of objects using a ruler and a standard unit of measure: centimetres. They are introduced to the abbreviation “cm”, so that they do not have to write the full word.

Discuss with children why it is helpful to have a standard unit of measure that can be used around the world. Model how to align a ruler with the object being measured. Also show how to look to the nearest whole centimetre when measuring objects that are not an exact number of centimetres.

Learning from the first step is consolidated, as children make comparisons of lengths they have measured.

Things to look out for

- Children may measure from the start of the ruler rather than from zero.
- Children may just look at the final number without ensuring that the ruler is lined up so that zero is at the beginning of the object.
- For measures that are not an exact number of centimetres, children may be unsure what to do.

Key questions

- What does “cm” mean?
- Why is it helpful to have a standard unit of measure?
- Where do you need to begin measuring from?
- How does using a ruler help you to compare the lengths/heights of objects?
- Which object is longer/taller/shorter? How do you know?
- How much longer/taller/shorter is the ______ than the ______?
- What could you do if the object is not lined up exactly with a number on the ruler?

Possible sentence stems

- The ______ is ______ cm long/tall.
- The ______ is longer/taller/shorter than the ______

National Curriculum links

- Compare, describe and solve practical problems for: lengths and height; mass/weight; capacity and volume; time
- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time

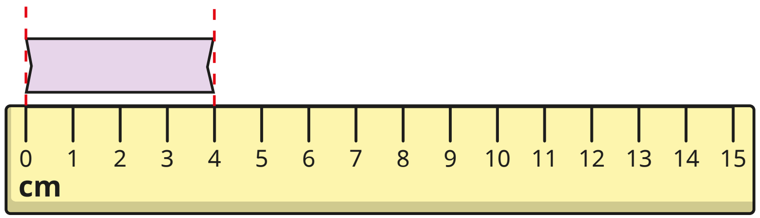
Measure length in centimetres

Key learning

Tell children to find some objects, for example small sticks or pebbles, that they will be able to measure using a ruler.

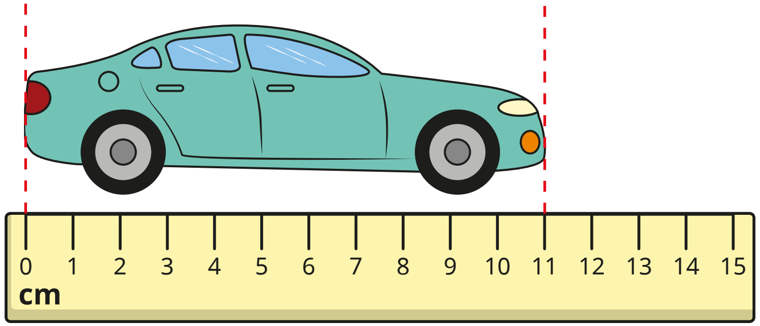
Ask children to measure the lengths of the objects in centimetres.

- How long is the ribbon?

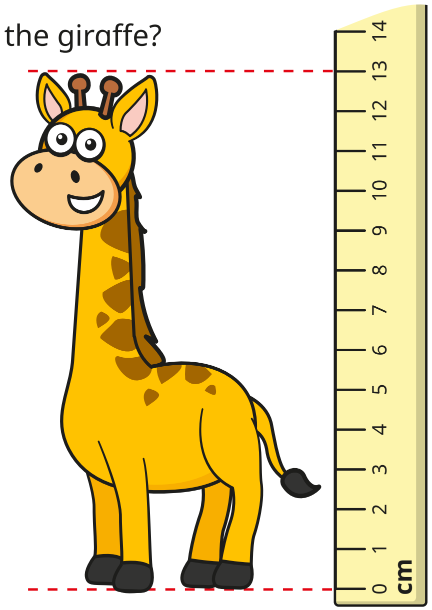


The ribbon is ______ cm long.

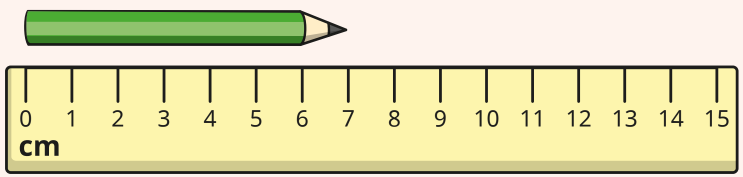
- What is the length of the car?



- How tall is the giraffe?



Give children a pair of objects, such as pencils of different lengths. Ask them to measure the length of each object.

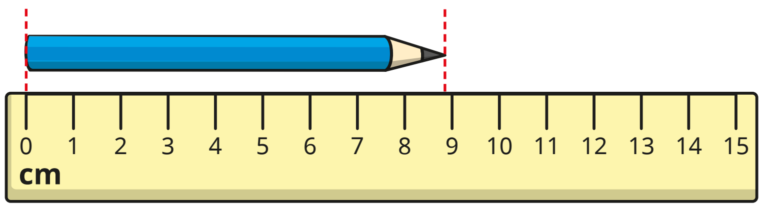


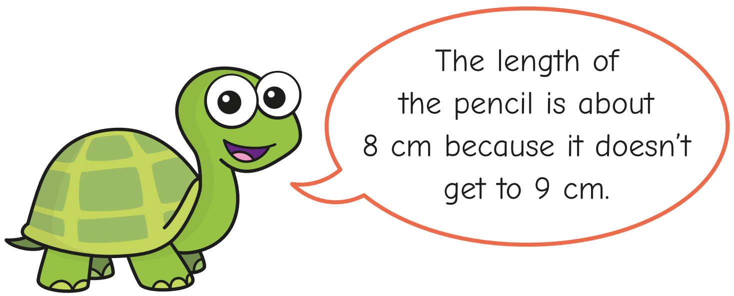
Ask which object is shorter and which is longer.

Measure length in centimetres

Reasoning and problem solving

Tiny is measuring the length of the pencil.



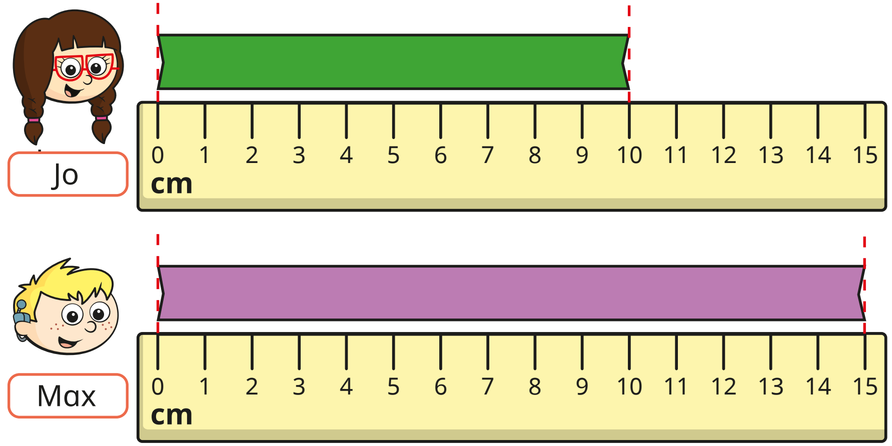


Do you agree with Tiny?

Why?

No

Jo, Max and Sam are comparing the lengths of some ribbons.



How long could Sam's ribbon be?

11 cm, 12 cm, 13 cm, 14 cm

Spring Block 5

Mass and volume

Small steps

Step 1	Heavier and lighter
Step 2	Measure mass
Step 3	Compare mass
Step 4	Full and empty
Step 5	Compare volume
Step 6	Measure capacity
Step 7	Compare capacity

Heavier and lighter

Notes and guidance

In this block, children are formally introduced to mass for the first time. They may have some understanding of describing something as heavy or light from their own experience or from previous learning in Reception.

Children begin by holding objects to compare them, using the language of "heavier" or "lighter". They then use balance scales to check their comparisons. They need to understand that the heavier object is lower on the balance scale. At this stage, children do not need to measure the actual mass of objects in order to compare them.

Children may assume that larger objects are heavier than smaller objects or that objects that are the same size/shape have the same mass. Comparing the mass of a large inflated balloon and a small ball of modelling clay, and comparing the mass of an inflated and a water-filled balloon should help to overcome these misconceptions.

Things to look out for

- Children may think that larger objects are always heavier.
- Children may think that if an object can hold something inside, it must be heavy. For example, they may think a box must be heavy because it can hold things inside it.

Key questions

- Which object do you think is heavier/lighter?
- Is a ______ heavier or lighter than a ______?
- How can you show which object is heavier/lighter?
- Are large objects always heavier than small objects? How do you know?
- How does the balance scale show which object is heavier?
- If two objects are the same size and shape, does that mean that they have the same mass? How do you know?

Possible sentence stems

- The ______ is heavier/lighter than the ______
- The ______ has the same mass as the ______
- I know which object is heavier/lighter because …

National Curriculum links

- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time
- Measure and begin to record the following: lengths and heights; mass/weights; capacity and volume; time

Heavier and lighter

Key learning

Read *Mighty Maddie: Comparing Weights* by Stuart J Murphy.

Ask children to describe objects as lighter or heavier, as Maddie did when tidying her room. Do they agree with Maddie that the teddy bear is light and the toy train is heavy?

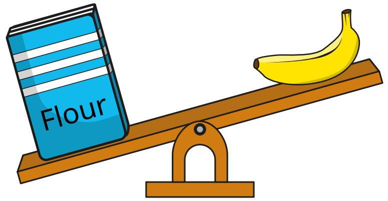
Ask children to draw an object that they think is heavy and an object that they think is light. They can explain to a partner why they chose each object.

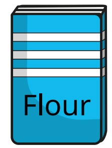
Did children draw similar objects?

Collect different objects from outside or from around the classroom.

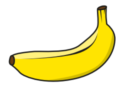
Use a balance scale to compare pairs of objects using the language of "heavier" and "lighter". Challenge children to find two objects that have the same mass. Ask children to find the heaviest and lightest objects that they can.

- Which object is lighter?



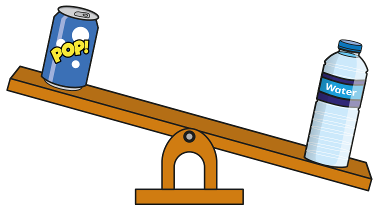


or



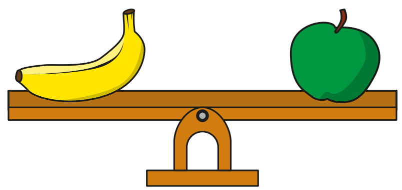
How do you know?

- Write **heavier** or **lighter** to complete the sentence.



The bottle is ______ than the can.

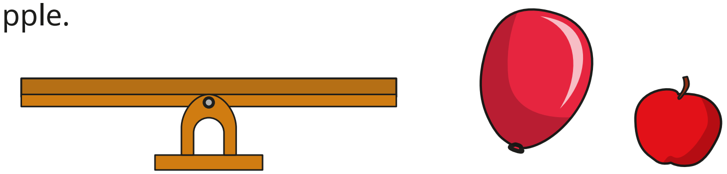
- What do you know about the masses of the banana and the apple?

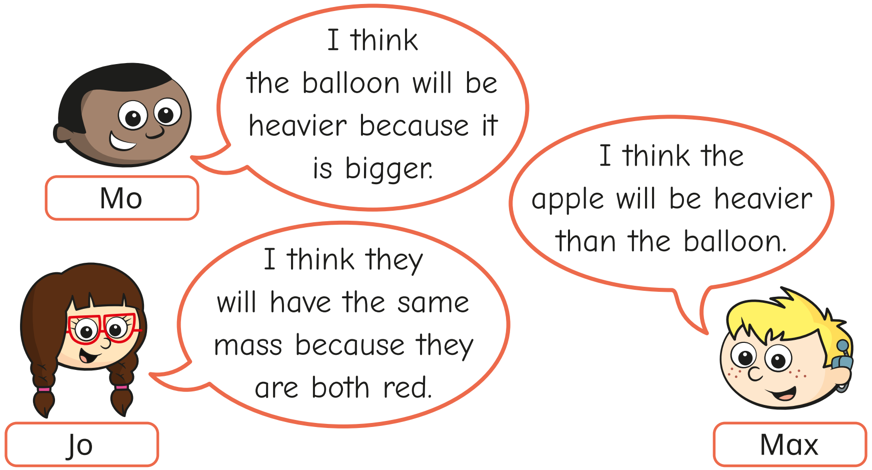


Heavier and lighter

Reasoning and problem solving

Mo, Jo and Max are comparing the mass of a balloon and an apple.

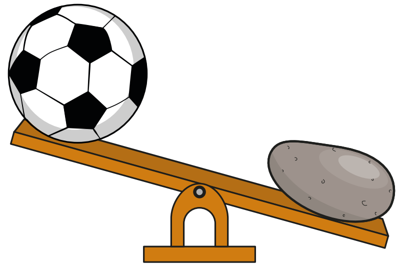


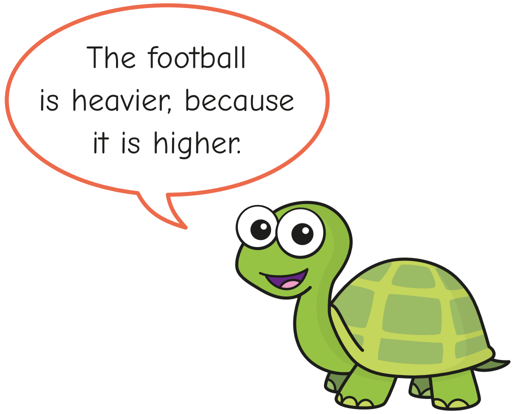


Who do you agree with?

Why?

Max





Do you agree with Tiny?

Why?

No

Measure mass

Notes and guidance

In this small step, children use a variety of non-standard units, such as cubes or bricks, to measure the mass of an object.

Building on the previous step, children should understand that when a scale is balanced, objects have the same mass. On a balanced scale, the number of non-standard units on one side tells them the mass of the object on the other side. Highlight the importance of choosing the same non-standard unit to measure the mass. Measuring the mass of an object using an assortment of different non-standard units, such as a number of cubes, pencils and wooden bricks, makes it difficult to record the object's mass.

Children may find it difficult to balance objects exactly. If an object does not balance exactly, encourage them to use the closest number or to try a different non-standard unit.

Things to look out for

- Children may find it difficult to balance objects exactly using non-standard units. For example, an object may be heavier than 3 bricks, but lighter than 4 bricks.
- When using objects as non-standard units for measuring, children may think that a certain type of object has a certain mass, for example that all cubes have the same mass, or all bricks have the same mass.

Key questions

- What does it mean when the scales are balanced?
- How do you know if two objects have the same mass?
- If you add one more cube, what will happen?
  If you take away one cube, what will happen?
- Which classroom objects are the best units to measure the mass of the object? Why?
- Why should you not use a variety of objects to measure the mass of an object?
- What is the mass of the ______ in cubes?

Possible sentence stems

- The mass of the ______ is the same as the mass of ______ cubes.
- The mass of the ______ is ______ cubes.

National Curriculum links

- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time
- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time

Measure mass

Key learning

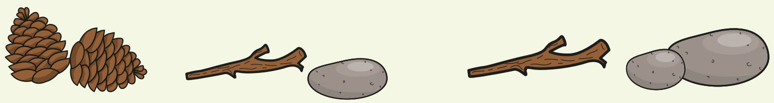
Read *So Light, So Heavy* by Susanne Strasser.

Ask which animals were as heavy as the elephant.

Take children outside to collect objects and then get them to record the mass of each object using non-standard units, for example cubes.

Ask children to complete the sentence for each object.

The mass of the ______ is the same as ______ cubes.



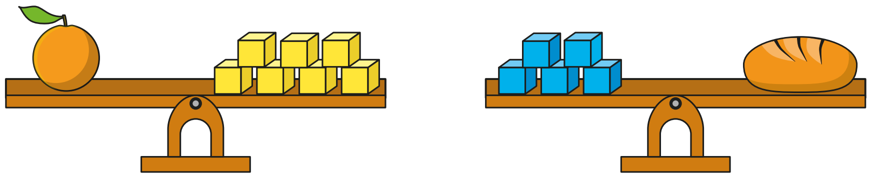
Remind children how to find and record the mass of an object using cubes.

Repeat for the same object using a different non-standard unit, for example pencils or bricks.

What do children notice?

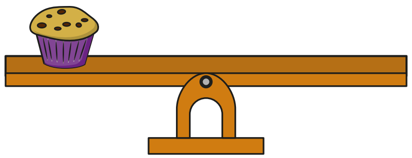
Discuss whether pebbles would be a good unit to measure the mass of something.

- What is the mass of each object?

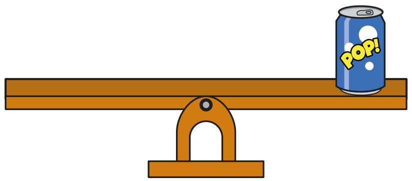


The mass of the ______ is ______ cubes.

- Draw cubes to balance the scales.
  - The mass of the muffin is 4 cubes.



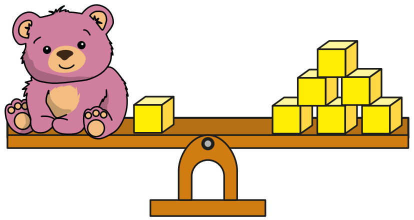
  - The mass of the can is 9 cubes.



Measure mass

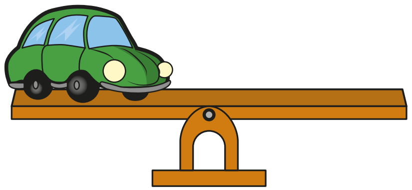
Reasoning and problem solving

What is the mass of the teddy bear?



How do you know?

5 cubes

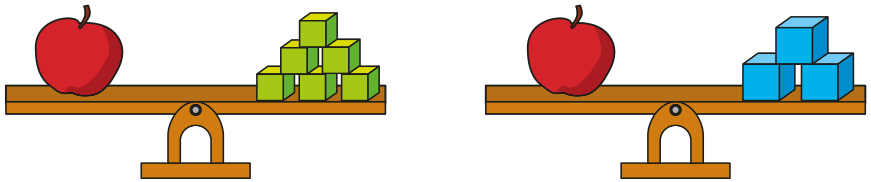


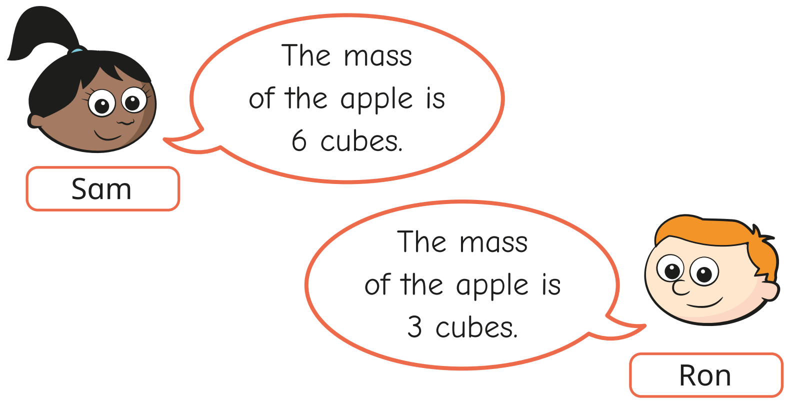
The toy car is heavier than 5 cubes, but lighter than 9 cubes.

Draw cubes on the scales to show what the mass of the car could be.

6, 7 or 8 cubes

Sam and Ron are finding the mass of an apple.





Who do you agree with?

Why?

Both children are correct.

Compare mass

Notes and guidance

In this small step, children compare the masses of two objects, still using non-standard units of measure.

Children should know that if, for example, an apple has the same mass as 6 cubes and a banana has the same mass as 4 cubes, then the apple is heavier than the banana, provided the cubes have the same mass.

Children use their knowledge of “heavier” and “lighter” from earlier in the block to compare the masses of objects. It is important that children are also exposed to examples of objects that have the same mass as each other.

Once children are confident comparing two objects, they can begin to order the masses of more than two objects and to use the language of “heaviest” and “lightest”.

Things to look out for

- Children may try to use different non-standard units to measure the masses of objects, which will not allow accurate comparisons to be made. For example, if the mass of an apple is 5 cubes and the mass of an orange is 2 bricks, this does not necessarily mean that the mass of the apple is greater.

Key questions

- What does it mean when the scales are balanced?
- What is the mass of the ______ in cubes?
- Which of the two objects is heavier/lighter? How do you know?
- How much heavier/lighter is the ______ than the ______?
- Why do you need to use the same unit to measure the masses of the objects?

Possible sentence stems

- The mass of the ______ is ______ cubes.
- I know that the ______ is lighter/heavier than the ______ because …
- The heaviest/lightest object is the ______

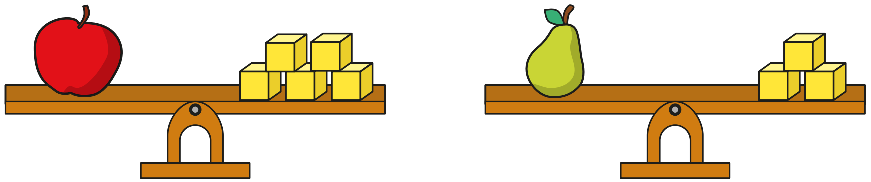
National Curriculum links

- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time
- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time

Compare mass

Key learning

- Ron is measuring the mass of fruit using cubes.



  - What is the mass of the apple?
  - What is the mass of the pear?
  - Choose a word to complete the sentence.

heavier   lighter

The apple is ______ than the pear.

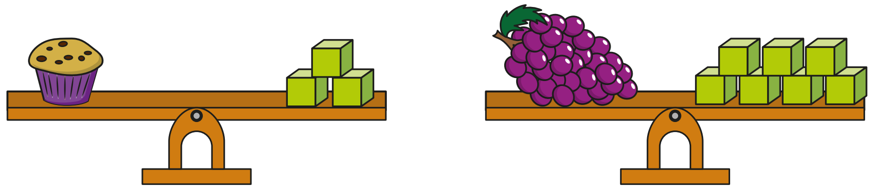
How do you know?

Collect two objects from outside.

Ask children to predict which object is heavier and which is lighter. Measure the mass of each object in cubes to find out which object is heavier.

How much heavier is it?

- Complete the sentences.

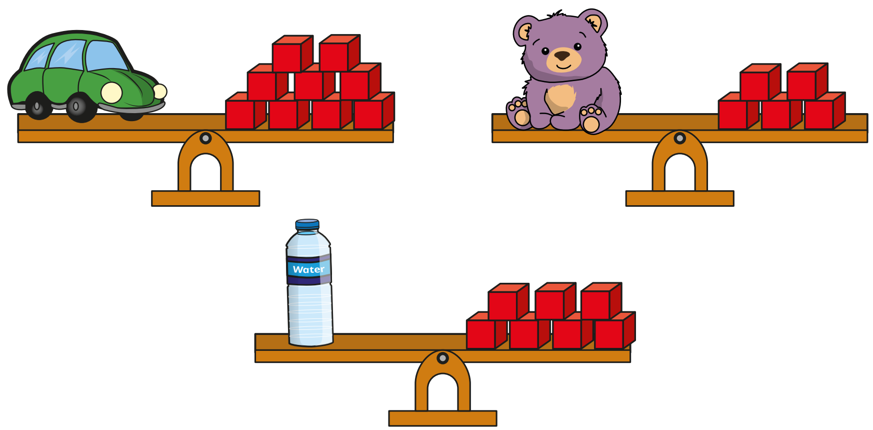


The mass of the muffin is ______ cubes.

The mass of the grapes is ______ cubes.

The muffin is ______ than the grapes.

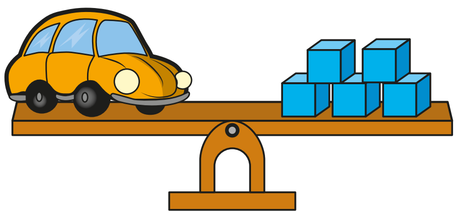
- Order the objects from lightest to heaviest.

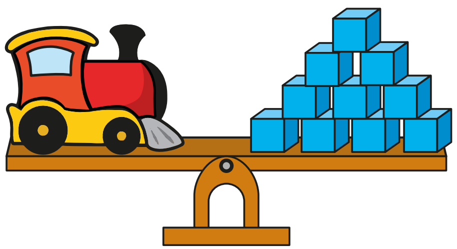


Compare mass

Reasoning and problem solving

How much heavier is the train than the car?

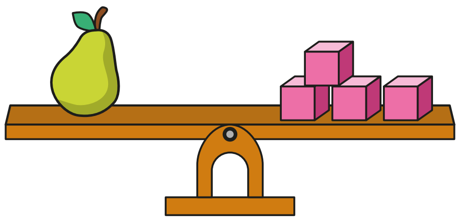


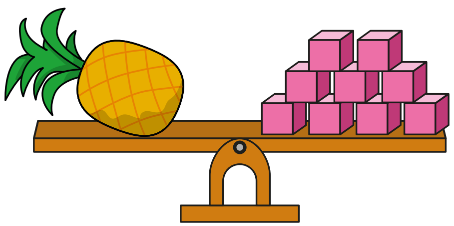


How did you work it out?

5 cubes

An apple is heavier than the pear, but lighter than the pineapple.





What could the mass of the apple be?

5, 6, 7 or 8 cubes

Full and empty

Notes and guidance

In this small step, children are introduced to volume and capacity for the first time. They begin by exploring practically the idea that capacity is the maximum amount that something can hold. Ensure that they experience a range of different sizes and shapes of containers and begin to make basic comparisons to see which has the greater capacity.

Children then explore the concept that volume is the amount of something inside a container. They describe the volume in a container using phrases such as "empty", "nearly empty", "nearly full" and "full".

At this stage, no formal measurements of volume or capacity, such as litres, are used.

Key questions

- Which container do you think can hold more water? Why?
- Can two glasses that look different hold the same amount of water? Why?
- Does a taller/wider glass always hold more water?
- What does "full"/"empty" mean?
- How are "nearly empty" and "nearly full" different?

Possible sentence stems

- I think that this container can hold more water because …
- The glass is full/empty because …
- The glass is nearly empty/nearly full because …

Things to look out for

- Children may believe that different shapes or sizes of containers must have different capacities or that a taller container must have a greater capacity than a shorter one, regardless of width.

National Curriculum links

- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time
- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time

Full and empty

Key learning

Read *A Beach For Albert: Capacity* by Eleanor May.

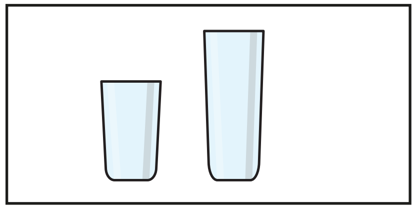
Children compare how much water each of the containers can hold and make suggestions about what other items Albert could use to carry the water.

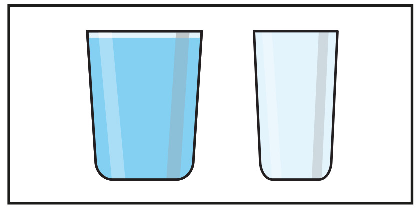
Encourage children to describe how much water is in the pool using phrases such as “empty”, “nearly empty”, “nearly full” and “full”.

Provide children with a variety of different sizes and shapes of container. Get them to predict which one has the greatest capacity. Challenge children to investigate how they can work out which container has the greatest capacity, for example filling one container with water and then pouring the water into another container.

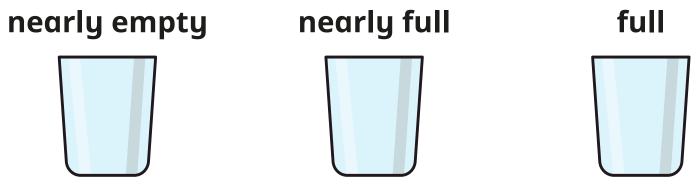
Provide pairs of children with a container and a jug of water. As they pour water into their containers, ask them to describe the volume of water in the container using phrases such as “empty”, “nearly empty”, “nearly full” and “full”.

- In each pair, which container has the greater capacity?





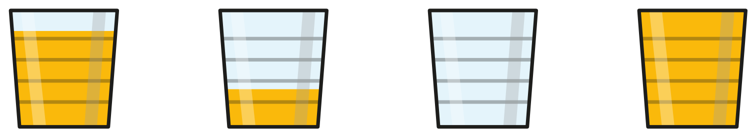
- Show the volume in each glass.



Compare answers with a partner.

- Choose words to complete the sentence about each glass.

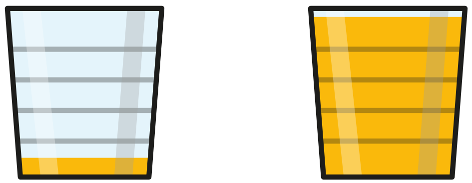
empty	nearly empty	nearly full	full



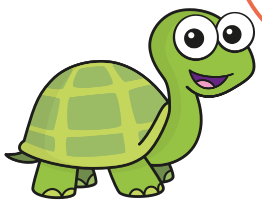
The glass is ______

Full and empty

Reasoning and problem solving



The glasses are the same size, so the volume of juice in each glass is the same.

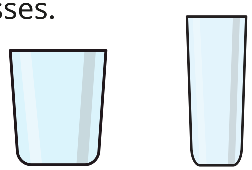


Do you agree with Tiny?

Explain your reasons.

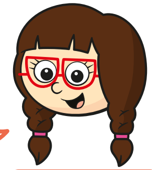
No

Jo and Max are comparing their glasses.

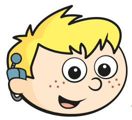


Jo **Max**

My glass can hold more water.



Jo



Max

No, my glass can hold more water.

Why do Jo and Max think this?

Whose glass can hold more water?

Jo **Max** **cannot tell**

cannot tell

Compare volume

Notes and guidance

In this small step, children develop their understanding of volume further and start to compare volumes using the language of "more than" and "less than".

Initially, children make simple visual comparisons between identical containers, using the language introduced in the previous step. They should still be exposed to a range of different size and shape containers. Children then compare and order more than two glasses. This can include following instructions to show a certain volume, for example showing more than half full, but less than nearly full.

Challenge children to also compare volumes in containers with different capacities. For example, if glasses are the same height but different widths and the level of the water is the same, then the wider glass must have a greater volume of water inside. Practical explorations of these types of problems will be key.

Key questions

- What does "empty"/"nearly empty"/"nearly full"/"full" mean?
- If the glasses are the same size and shape, how do you know which has more water in it?
- How can you order the volumes from greatest to smallest?
- What do you know about two glasses that are the same height, but one is wider than the other?

Possible sentence stems

- The glass is ______
- Glass A has ______ water than glass B.
- I know that there is ______ water in glass ______ because …

Things to look out for

- When comparing volumes in different-sized containers, children may believe that if the water level is higher up the container, then the volume of water must be greater.

National Curriculum links

- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time
- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time

Compare volume

Key learning

- Use the words to describe the volume of juice in each glass.

empty	nearly empty	nearly full	full

A B C

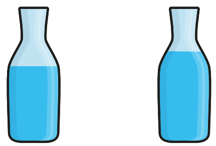
Glass ______ is ______

Write **more** or **less** to compare the volumes.

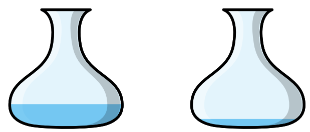
- ▶ Glass A has ______ juice than glass C.
- ▶ Glass C has ______ juice than glass A.
- ▶ Glass C has ______ juice than glass B.
- ▶ Glass B has ______ juice than glass A.

- Write **more** or **less** to compare the volumes.

A B



A B



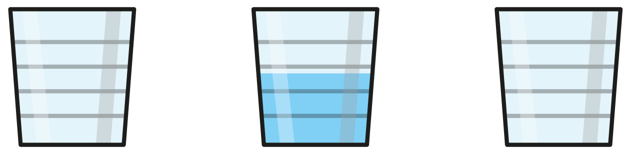
Container A has ______ water than container B.

- Glass A has more water than glass B.

  Glass C has less water than glass B.

  Show the volume of water that could be in glasses A and C.

A B C



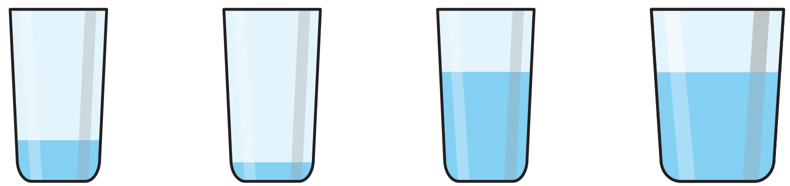
- Glass C has less juice than glass A but more juice than glass B.

  Show the volume of juice that could be in glass C.

A B C

- Put the glasses in order from smallest to greatest volume.

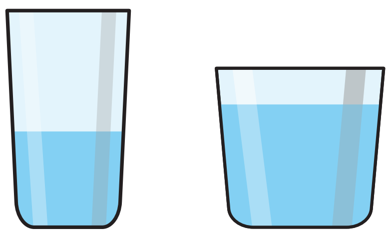
A B C D

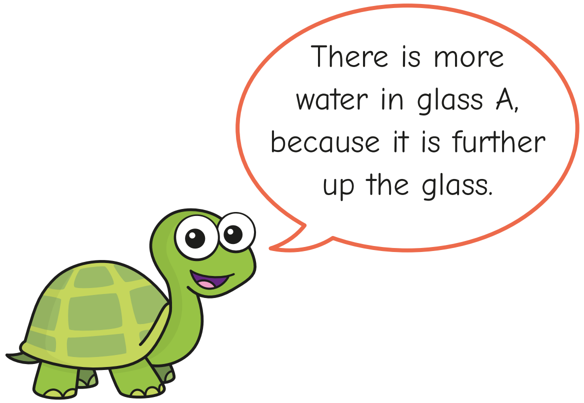


Compare volume

Reasoning and problem solving

The glasses can hold the same amount of water.

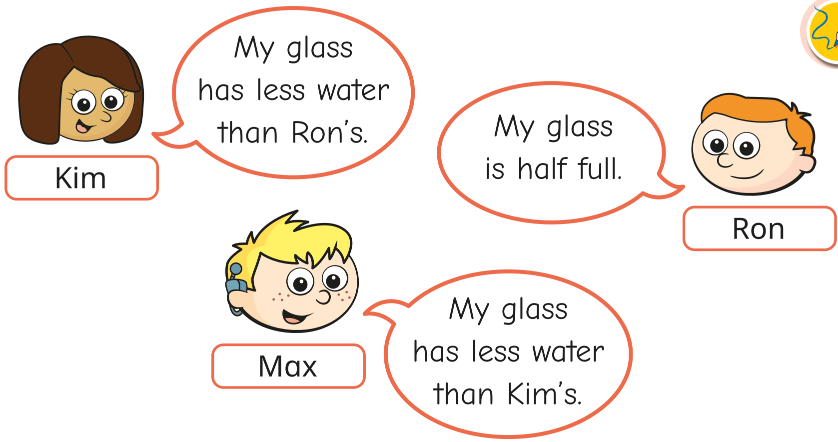




Explain Tiny's mistake.

Glass A is less than half full and glass B is more than half full, so glass B must have more water.

Kim, Ron and Max are describing their glasses of water.



Show how much water could be in each glass.

Compare answers with a partner.

multiple possible answers

Measure capacity

Notes and guidance

In this small step, children measure the capacity of different containers using non-standard units of measure. They formalise their understanding that the capacity of a container is how much of something it can hold. This can be cups of water or sand, cubes or marbles and so on.

Show children that to measure the capacity of a container, they need to make sure that the unit of measure remains the same, for example the same size of marble or the same size of cup. They also need to see that to accurately measure the capacity of a container, they must fill the container to the top.

Discuss different non-standard units of measure, and how some are more accurate than others. For example, cups of water and sand are more accurate than cubes or marbles because they take up more of the space in the container.

Things to look out for

- Children may not completely fill the container or the unit of measure, for example a cup.
- Children may use pebbles or marbles of different sizes when measuring the capacity of a container.

Key questions

- How can you measure how much liquid fills this container?
- What else can you fill the container with?
- How many cups of sand are needed to fill the container?
- How many marbles are needed to fill the container?
- Which unit of measure is more accurate? Why?
- If the cubes/marbles are smaller, will it take more or fewer cubes/marbles to fill the container than larger ones?
- If a cup is larger, will it take more or fewer cups to fill a container? How do you know?

Possible sentence stems

- ______ cubes are needed to fill the container.
- The capacity of the container is ______ cups of water.

National Curriculum links

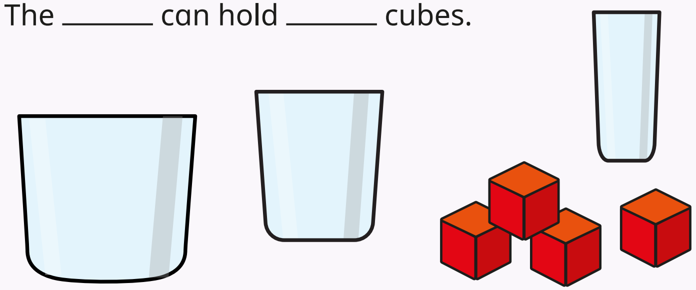
- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time
- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time

Measure capacity

Key learning

Give children cubes of the same size and different containers. Ask them how many cubes they can fit into each container and to complete the sentence for each container.

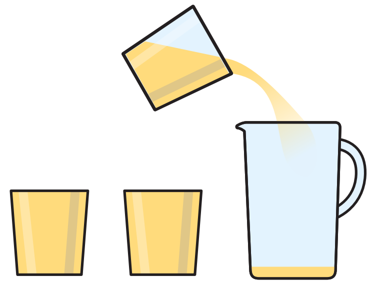
The ______ can hold ______ cubes.



As a class, measure and record the capacities of different containers using cubes, water and sand. Make sure children see that each cup of water must have the same amount in it.

What do children notice? Ask if they think that cubes or cups of water/sand are better for measuring capacity. Can they explain why?

- 3 cups of sand fill one container.

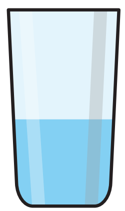


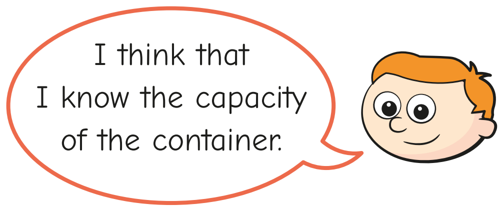
Complete the sentences.

The capacity of 1 jug is ______ cups of sand.

The capacity of 2 jugs is ______ cups of sand.

- Ron has poured 2 glasses of water into the container.





Why does Ron think this?

How could he check?

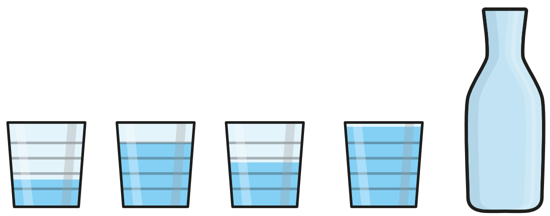
What is the capacity of the container?

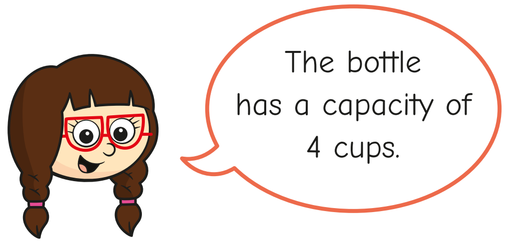
Measure capacity

Reasoning and problem solving

Jo pours these cups of water into the bottle.

The water fills the bottle.



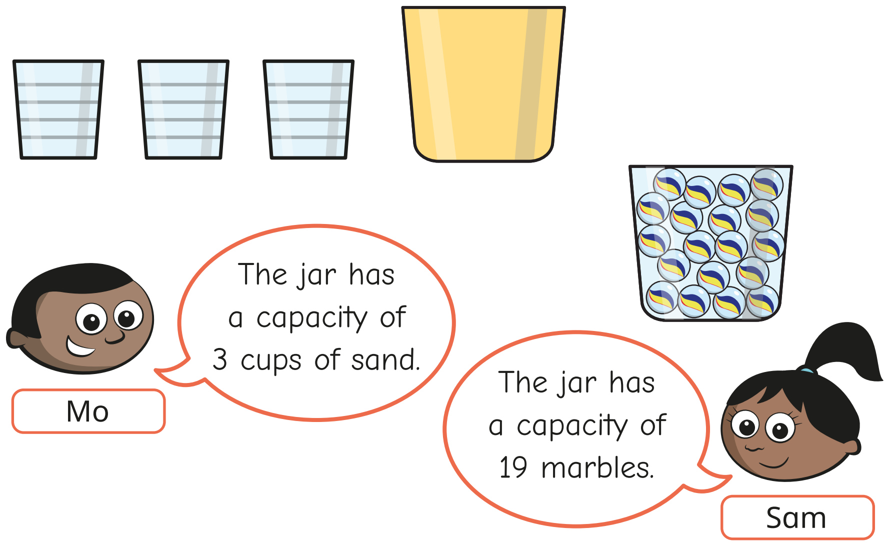


Do you agree with Jo?

Explain your answer.

No

Mo and Sam are measuring the capacity of a jar.



Who has used a more accurate measurement?

How do you know?

Mo

Compare capacity

Notes and guidance

In this small step, children compare the capacities of different containers, still using non-standard units of measurement.

Children recognise that if container A has a capacity of 3 cups of water and container B can hold more than 3 cups of water, then container B has a greater capacity than container A. They then move on to using inequality symbols to record this.

It is important that children know that the units of measure need to be the same for both containers in order to compare capacities. Remind them of the importance of filling each container to the top.

Finally, children compare more than two containers, putting them in either ascending or descending order of capacity.

Things to look out for

- Children may not completely fill each container.
- Children may not use the same units of measure for each container.
- Children may confuse the inequality symbols for "greater than" and "less than".

Key questions

- What can you use to measure the capacities of the containers?
- How many cups of water can the container hold?
- Which container can hold more marbles?
- Does container A hold more or less water than container B?
- Which container has the greater capacity? How do you know?
- How many more ______ does container A hold than container B?

Possible sentence stems

- Container A has a ______ capacity than container B.
- I know that container A has a ______ capacity because …
- I need to use the same unit of measure because …

National Curriculum links

- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time
- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time

Compare capacity

Key learning

Give children different-sized containers and cups of water as the unit of measure. Ask them to complete the sentences for each set of containers.

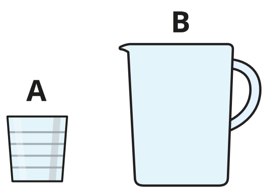
Container ______ can hold ______ cups of water.

Container ______ has a greater capacity than container ______

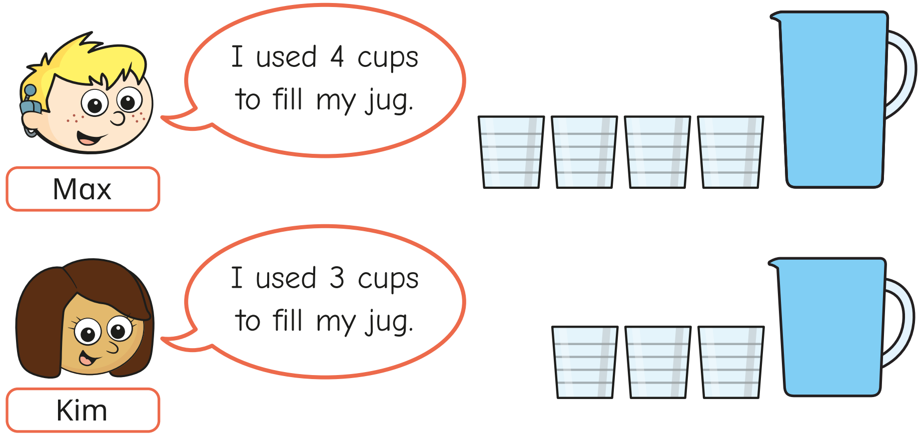
As a class, measure and record the capacities of different containers, using a range of non-standard units. Line up the containers in order, from smallest capacity to greatest for each non-standard unit. Discuss whether the containers are in the same order each time.

- Which container has the greater capacity?

  How do you know?



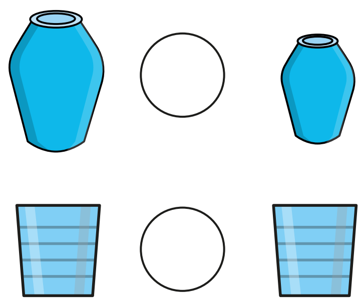
- Max and Kim are measuring the capacities of two jugs.



  Which jug has the greater capacity?

  How do you know?

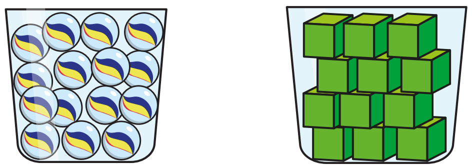
- Write < , > or = to compare the capacities of the containers.

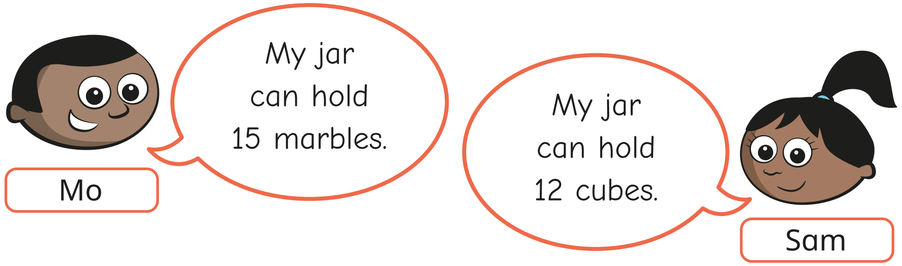


Compare capacity

Reasoning and problem solving

Mo and Sam are comparing the capacities of two jars.





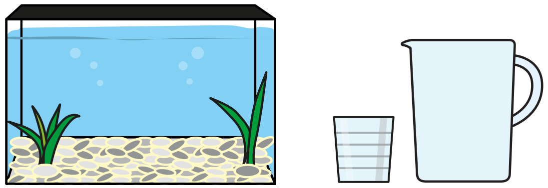
Can you tell which jar has the greater capacity?

Why?

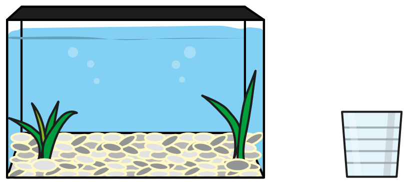
No

Dan fills his fish tank with 3 jugs of water.

Each jug can hold 4 cups of water.



Kay fills her fish tank with 8 cups of water.



Whose fish tank has the greater capacity?

How do you know?

Dan’s