

Spring Block 3

Length and height

Small steps

Step 1

Measure length using objects

Step 2

Measure length in centimetres

Step 3

Measure in metres

Step 4

Compare lengths and heights

Step 5

Order lengths and heights

Step 6

Four operations with lengths and heights

Measure length using objects

Notes and guidance

In this small step, children measure the lengths and heights of objects, using non-standard units of measure such as cubes or paper clips.

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.

Year 2 children may start to make comparisons of lengths they have measured, using accurate language such as “longer”, “taller” and “shorter than”.

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?
- Which object is longer/taller/shorter? How do you know?

Possible sentence stems

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

Single age small step links

- Measure length using objects (Y1)

- N/A

National Curriculum links

- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time (Y1)
- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time (Y1)

Measure length using objects

Key learning



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



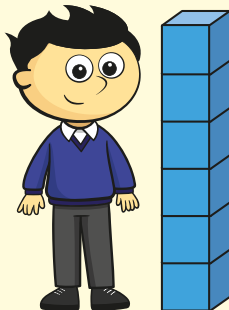
Ask them to measure the lengths of the objects using a non-standard unit of measure, for example cubes, bricks, paper clips or rubbers.



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?

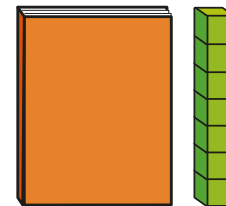
Encourage Year 2 children to explore who is taller and by how many objects.



- Complete the sentences.

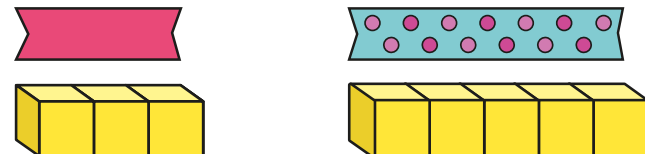


The pencil is _____ paper clips long.



The book is _____ cubes tall.

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

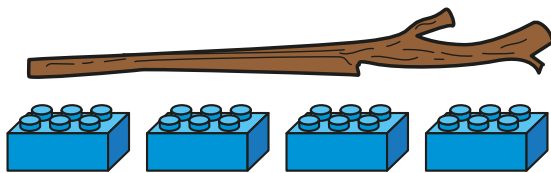


- ▶ What is the length of each ribbon?
- ▶ Write **longer** or **shorter** to complete the sentence.
The plain ribbon is _____ than the spotty ribbon.
- ▶ How much longer is one ribbon than the other?

Measure length using objects

Reasoning and problem solving

Jo is measuring the length of the stick.

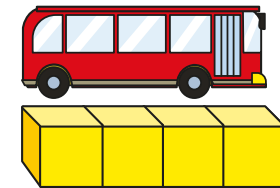
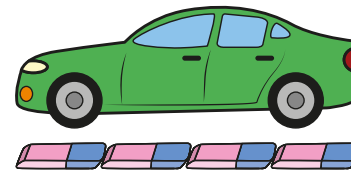


The stick is 4 bricks long.

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

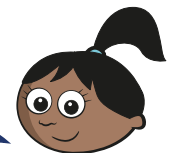
What mistake has Jo made?

Max and Sam are measuring the lengths of some toys.



Max

The car and the bus are the same length, because there are 4 rubbers and 4 cubes.



Sam

The car and the bus are not the same length.

Who is correct?

Why?



Sam

Measure length in centimetres

Notes and guidance

In this small step, children measure lengths and heights using a ruler and a standard unit of measure: centimetres.

Year 1 children are introduced to the abbreviation “cm”. Year 2 children may need reminding of the abbreviation and that they should record this with their written answers.

Discuss 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, ensuring that children understand the importance of starting from zero. Give examples that highlight why this is so important. Also show how to look to the nearest whole centimetre when measuring objects that are not an exact number of centimetres.

Year 1 children should use rulers with only centimetres, whereas Year 2 children use rulers with both centimetres and millimetres, although they will only measure in centimetres.

Things to look out for

- For measures that are not an exact number of centimetres, children may be unsure what to do.
- Children may not include units with their answer.

Key questions

- What does “cm” mean?
- Where do you need to begin measuring from? Why?
- What number does the start/end of the object line up with?

Possible sentence stems

- The start/end of the object is lined up with _____ cm.
- The length/height of the object is _____ cm.

Single age small step links

- Measure lengths in centimetres (Y1)

- Measure in centimetres (Y2)

National Curriculum links

- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time (Y1)
- Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels (Y2)

Measure length in centimetres

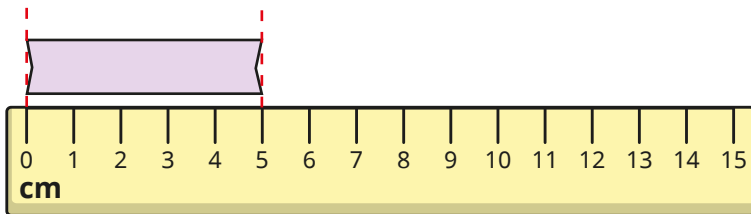
Key learning



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

Ask them to measure the lengths and heights of the objects in centimetres.

- How long is the ribbon?



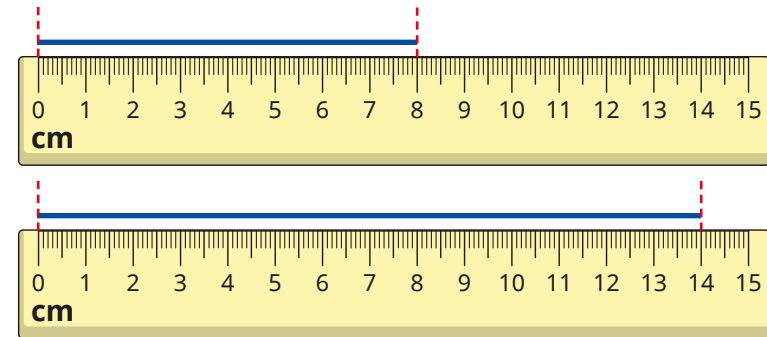
The ribbon is _____ cm long.



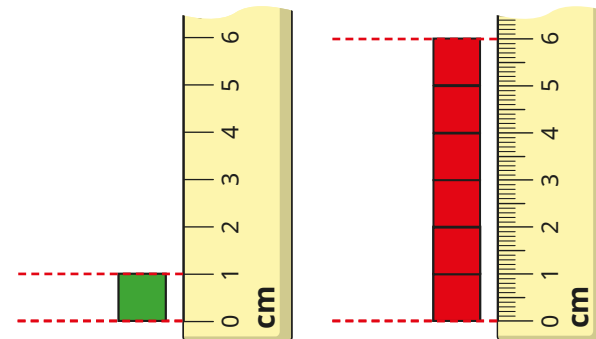
Give children a ruler and ask them to measure the lengths and heights of different objects in the classroom.

Ask them to record their measurements, using centimetres as their units.

- How long is each line?



- How tall is each tower?



- Use a pencil and ruler to draw the lines.

3 cm long

12 cm long

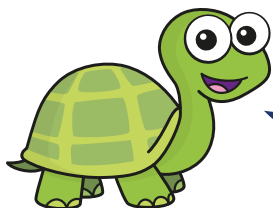
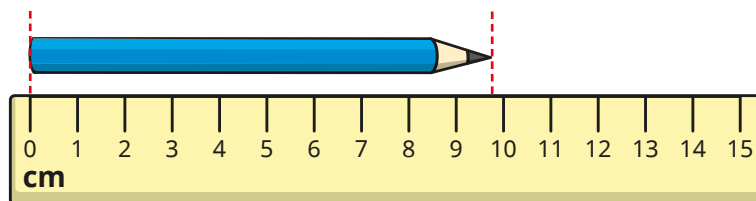
7 cm tall

4 cm tall

Measure length in centimetres

Reasoning and problem solving

Tiny is measuring the length of the pencil.



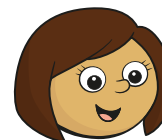
The length of the pencil is about 9 cm, because it does not get to 10 cm.

Is Tiny correct?

How do you know?

No

Kim and Mo want to measure the length of the string.



It is impossible.

Kim

Explain why Kim thinks this.

I think that I can find a way.



Mo

What way might Mo be thinking of?

Use a piece of string to explore this idea.



Children explore straightening out pieces of string to measure their lengths, ensuring that they start measuring from zero.

Measure in metres

Notes and guidance

In this small step, children begin to measure lengths and heights using metre sticks and tape measures, with a specific focus on measuring in metres.

This is likely to be the first time that Year 1 children have measured in metres. Although they may be familiar with the terminology being used in everyday life, “m” as the abbreviation of metres will need to be formally introduced. Remind all children of the importance of recording units with their answers.

The examples within this step refer only to full metre lengths and children are not expected to work with mixed units at this point. They do not need to be aware of the conversion between metres and centimetres, but should know that a metre is bigger than a centimetre, so metres are more commonly used when measuring larger objects.

Things to look out for

- Children may not line up the object they are measuring with zero.
- When using metre sticks to measure, children may not line them up correctly end to end.

Key questions

- How long is a metre stick?
- What does “m” mean?
- Why do you need to start measuring from zero?
- Is a metre longer or shorter than a centimetre?

Possible sentence stems

- The object is _____ metre sticks long.
- The length/height of the object is _____ m.

Single age small step links

• N/A

• Measure in metres (Y2)

National Curriculum links

- Measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time (Y1)
- Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels (Y2)

Measure in metres

Key learning



Give children a metre stick and ask them to measure the lengths and heights of different objects in the classroom to the nearest metre.

Get them to say out loud: “_____ is _____ metres long/tall.”

Ask them to record their measurements, using “m” as their unit.



Ask children to use metre sticks to measure the length of the school hall to the nearest metre.

Observe how they do it and check that they line up their metre sticks correctly.



Give children a metre stick or tape measure and ask them to find different objects outside that are either longer or shorter than a metre.

Get them to draw their objects in a sorting diagram.

longer than a metre

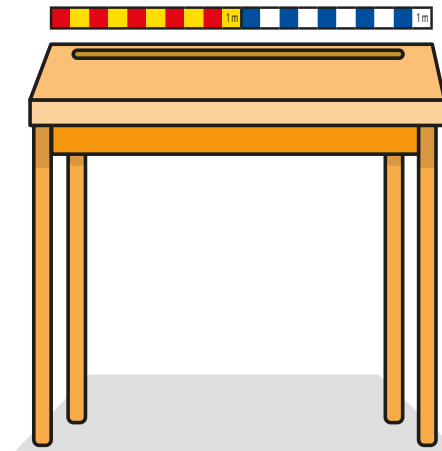
shorter than a metre



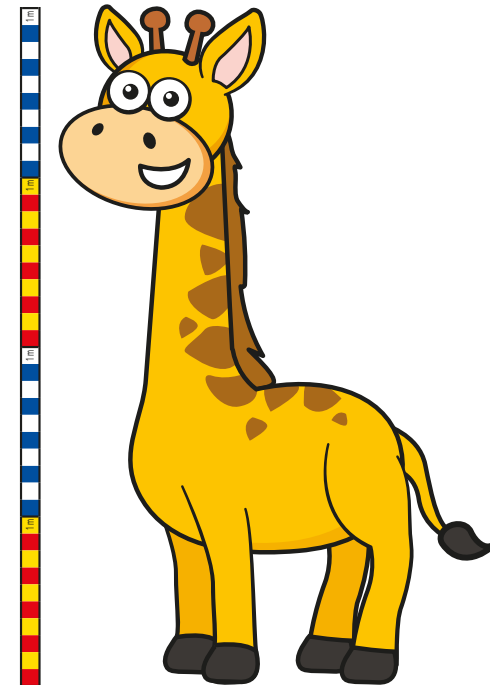
- Here are two different coloured metre sticks.



- ▶ What is the length of the desk?




- ▶ What is the height of the giraffe?



Measure in metres

Reasoning and problem solving

Jo has a metre stick.




I cannot measure the length of the classroom, because my metre stick is not long enough.

Is Jo correct?
Explain your answer.

No


The length of my mum's car is 4 cm.



What mistake do you think Ron has made?

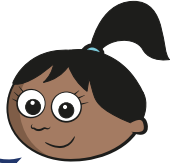
Ron has used centimetres instead of metres.

Max and Sam want to measure the length of the school hall.



I am going to measure in centimetres.

Max



I am going to measure in metres.

Sam

Whose way of measuring will be easier?
Explain your answer.

Sam's

Compare lengths and heights

Notes and guidance

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

Children need to understand that height is a type of length and that the language they use changes, depending on the type of length. Once this learning is embedded, children can revisit the inequality symbols covered earlier in the year as a way of comparing lengths and heights. They should also be exposed to objects that have the same length or height and use “is the same” or “is equal to” to compare.

The focus of the step is on comparing lengths and heights given the same unit of measure, for example 75 cm and 62 cm. However, Year 2 children could also compare lengths and heights where the numerical value is the same, but the unit is different, for example $8\text{ cm} < 8\text{ m}$.

Things to look out for

- Children may confuse the words “longer” and “taller”.
- Children may think that centimetres are bigger than metres, because the word is longer.

Key questions

- Which object is longer/taller/shorter? How do you know?
- Which is longer, 1 cm or 1 m?
- Why is it important that you line the objects up before comparing them?
- What does “ $<$ ”, “ $>$ ”, “ $=$ ” mean?

Possible sentence stems

- _____ is longer/taller/shorter than _____
- _____ cm/m is greater/less than _____ cm/m.

Single age small step links

- Compare lengths and heights (Y1)

- Compare lengths and heights (Y2)

National Curriculum links

- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time (Y1)
- Compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$ (Y2)

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?

Ask them to measure the length of each object.

What do they notice?

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.

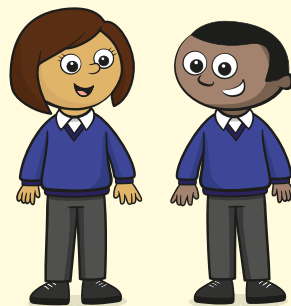
How do they know?

Ask who is shorter.

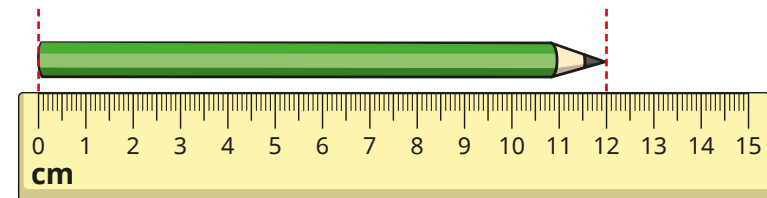
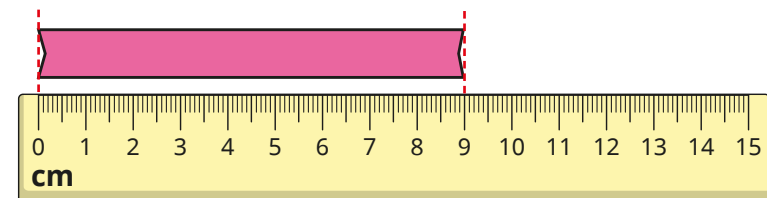
How do they know?

Repeat with other pairs of children.

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



- Kay measures the lengths of a ribbon and a pencil.



- ▶ How long is the ribbon? How long is the pencil?
- ▶ Write **longer** or **shorter** to complete the sentences.

The ribbon is _____ than the pencil.

The pencil is _____ than the ribbon.

- Write $<$, $>$ or $=$ to compare the lengths.

6 metres 16 metres

23 cm 23 m

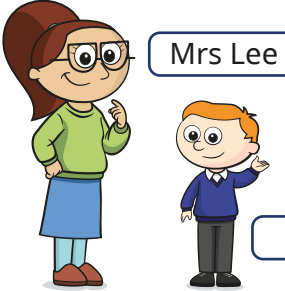
67 cm 76 cm

32 centimetres 32 cm

Compare lengths and heights

Reasoning and problem solving

Mo, Max and Kim are comparing the heights of Mrs Lee and Ron.



Mrs Lee

Ron

Mo: Mrs Lee is tall than Ron.

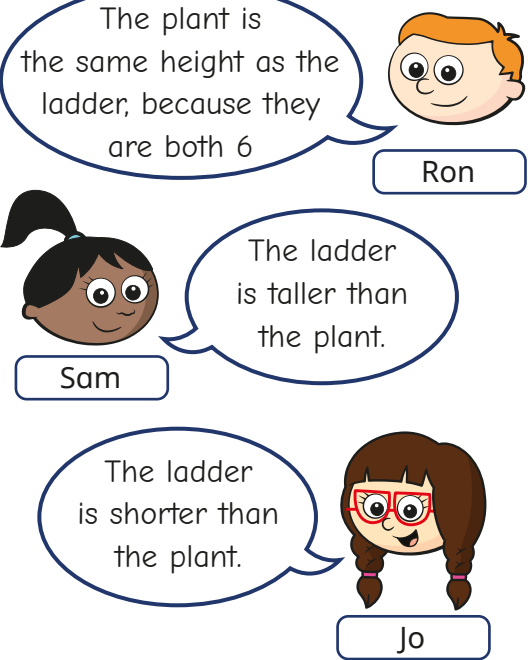
Max: Ron is short than Mrs Lee.

Kim: Mrs Lee is longer than Ron.

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

Mo: Mrs Lee is **taller** than Ron.
 Max: Ron is **shorter** than Mrs Lee.
 Kim: Mrs Lee is **taller** than Ron.

A plant is 6 cm tall.
 A ladder is 6 m tall.



Ron: The plant is the same height as the ladder, because they are both 6

Sam: The ladder is taller than the plant.

Jo: The ladder is shorter than the plant.

Who is correct?
 How do you know?

Sam

Order lengths and heights

Notes and guidance

In this small step, children begin to order lengths and heights. Introduce Year 1 children to the terms “shortest”, “longest” and “tallest”, but they also continue to use “shorter”, “longer” and “taller” when comparing objects to put them in order. Children order lengths from longest to shortest, heights from tallest to shortest, and vice versa. They order both given lengths and heights, and objects that they have measured themselves.

As in the previous step, the focus is on lengths and heights where the unit of measure is the same. This supports children’s understanding of ordering numbers within 100, which they have covered previously. Year 2 children could be challenged to order lengths and heights such as 30 cm, 15 cm and 30 m, where they need to consider the units in one instance and the numerical values in the other.

Things to look out for

- Children may use the inequality symbols incorrectly by using two different ones in the same statement, for example $14\text{ cm} < 20\text{ cm} > 18\text{ cm}$.
- Children may confuse “longer”, “longest”, “taller” and “tallest”.

Key questions

- Which object is the longest/tallest/shortest? How do you know?
- Which is longer, 1 cm or 1 m?
- What is the difference between “longest” and “tallest”?

Possible sentence stems

- _____ cm/m is greater/less than _____ cm/m.
- _____ cm/m is shorter/longer/taller than _____ cm/m.
- _____ is the shortest/longest/tallest.

Single age small step links

• N/A

• Order lengths and heights (Y2)

National Curriculum links

- Compare, describe and solve practical problems for: lengths and heights; mass/weight; capacity and volume; time (Y1)
- Compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$ (Y2)

Order lengths and heights

Key learning



Give children three objects.

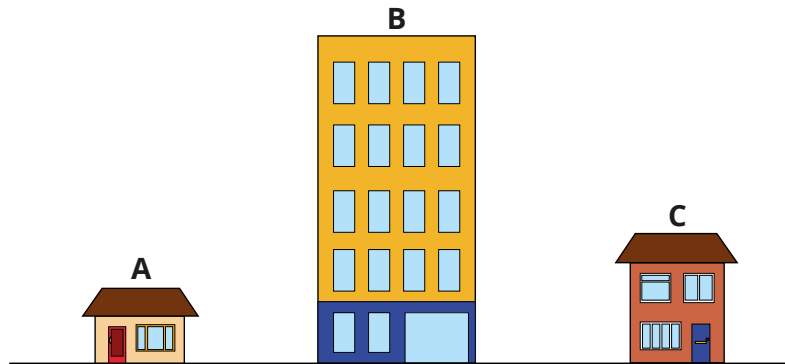
Ask them, without measuring, which is the longest.
How do they know?

Ask them which is the shortest. How do they know?

Now ask them to measure the length of each object.
Ask how this shows which one is the longest and which one is the shortest. What do they notice?

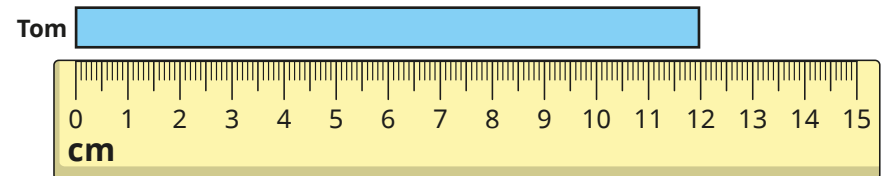
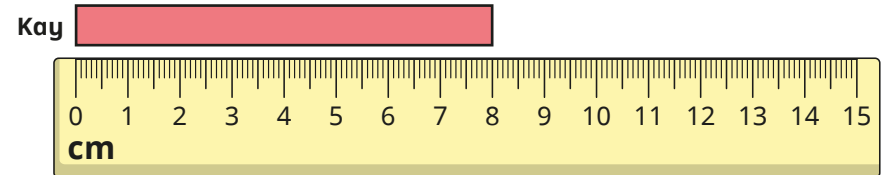
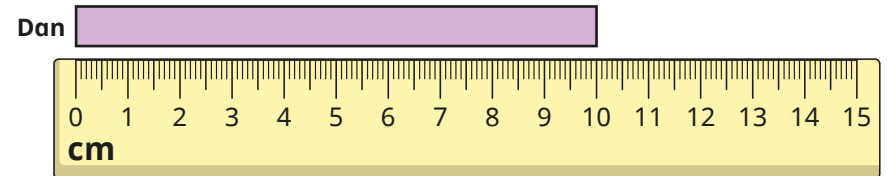
Repeat for finding which objects are the tallest and shortest.

- Here are three buildings.



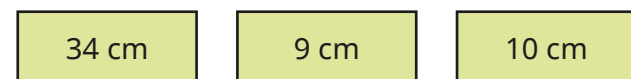
- ▶ Which building is the tallest?
- ▶ Which building is the shortest?
- ▶ Put the buildings in order from tallest to shortest.

- Dan, Kay and Tom are comparing the lengths of ribbons.



- ▶ Whose ribbon is the longest? Whose ribbon is the shortest?
 - ▶ Put the ribbons in order from longest to shortest.
- Write the lengths in order.

Start with the shortest length.



Order lengths and heights

Reasoning and problem solving

Four children are measuring their heights.

Ben is taller than Fay, but not as tall as Max.

Ann is taller than Max.

Write the children's names in order of their heights.

Start with the shortest child.



Fay, Ben, Max, Ann

An oak tree is 22 m tall.

An elm tree is 14 m tall.

A pine tree is taller than the elm tree, but shorter than the oak tree.

How tall could the pine tree be?

Compare answers with a partner.



15 m, 16 m, 17 m,
18 m, 19 m, 20 m,
21 m

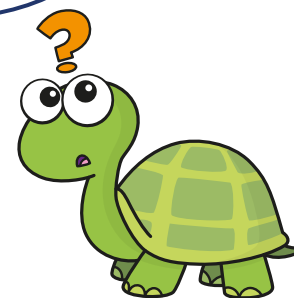
A train is 12 m long.

A playground is 25 m long.

A pencil is 12 cm long.

Tiny wants to put the lengths in order.

I cannot order the lengths, because the units are different.



Is Tiny correct?

Explain your answer.



No



Four operations with lengths and heights

Notes and guidance

In this small step, children draw on their knowledge of the four operations from earlier in the year and apply it to their understanding of lengths and heights.

Year 1 children solve one-step problems relating to lengths and heights, and Year 2 children progress to solving two-step problems. They use concrete and pictorial representations to support them in understanding the questions, and in calculating efficiently.

It is important that children understand that when adding and subtracting with lengths and heights, the units that they are working with need to be the same. At this stage, they are not required to calculate with mixed units.

Things to look out for

- Children may add and subtract lengths and heights with different units.
- Children may write a unit on a multiplier. For example, when finding 4 times the size of 3 cm, they may write $4 \text{ cm} \times 3 \text{ cm} = 12 \text{ cm}$.
- Word problems can often be more difficult for children to unpick, and concrete and pictorial representations can be used to support this understanding.

Key questions

- What do you need to do first? How do you know?
- Do you need to add or subtract/multiply or divide?
- Are you working with centimetres or metres?

Possible sentence stems

- _____ is _____ cm/m long/tall.
- _____ lots of _____ cm/m is _____ cm/m.
- _____ of _____ cm/m is _____ cm/m.

Single age small step links

- N/A

- Four operations with lengths and heights (Y2)

National Curriculum links

- Solve problems including addition and subtraction, using concrete objects and pictorial representations, including those involving numbers, quantities and measures (Y2)
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts (Y2)

Four operations with lengths and heights

Key learning



Give children two towers of cubes of different height.

Ask them, without measuring, which is taller.

How do they know?

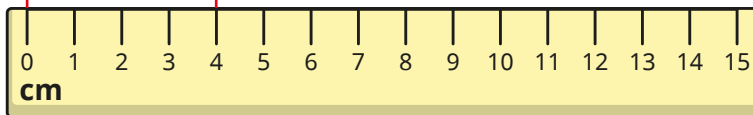
Ask them which is shorter? How do they know?

Now ask them to work out the difference between the towers.

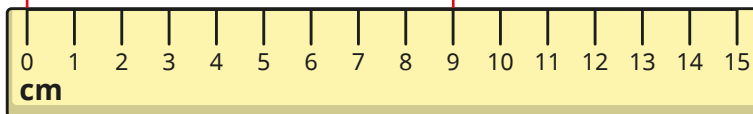
Tower A is _____ cubes taller/shorter than Tower B.

- Mo and Sam each have a pencil.

Mo

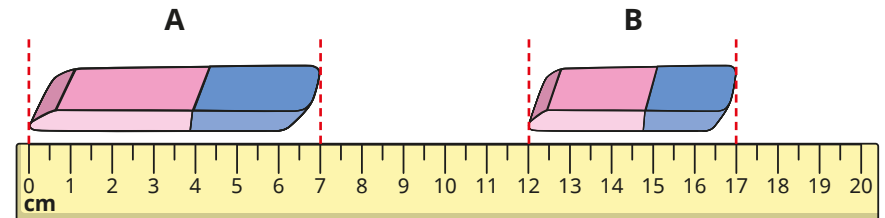


Sam



- ▶ How much longer is Sam's pencil than Mo's?
Mo and Sam put their pencils together.
- ▶ How long are the pencils altogether?

- Ron measures the lengths of two rubbers.



How much longer is rubber A than rubber B?

What is the total length of the rubbers?

- Kim has a toy car, a toy plane and a toy train.
The car is 32 cm long.
The plane is 13 cm longer.
▶ How long is the plane?
The car is double the length of the train.
▶ How long is the train?
- A shed is 2 m tall.
A house is 4 times as tall as the shed.
How tall is the house?

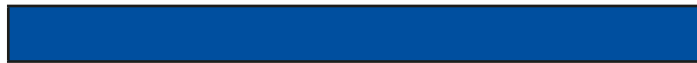
Four operations with lengths and heights

Reasoning and problem solving

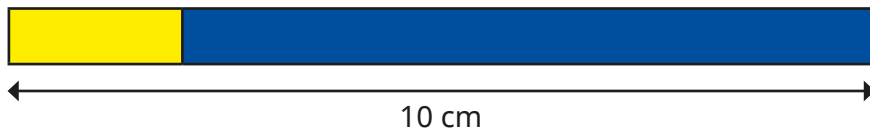
Here is a strip of yellow paper.



A blue strip of paper is 4 times longer than the yellow strip.



The strips are joined end to end.



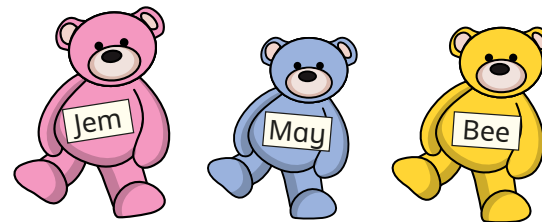
How long is the yellow strip?

How long is the blue strip?

2 cm

8 cm

There are three teddies called Jem, May and Bee.



- Jem is 14 cm taller than May.
- May is 6 cm shorter than Bee.
- Bee is 52 cm tall.

How tall is May?

How tall is Jem?

How much taller is Jem than Bee?

How did you work out the answers?

46 cm

60 cm

8 cm