Mathletics

Series C Student

Measurement

My name

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Series C – Measurement

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Length – language of length

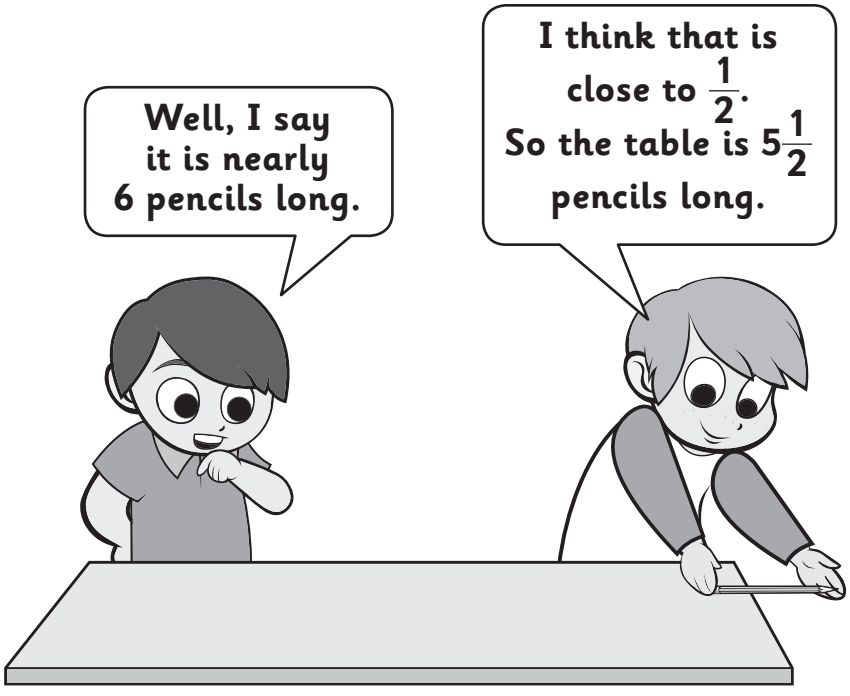
You will need: a partner

1 What are some words we use when we measure and talk about length? Brainstorm with a neighbour and record.

longer than

shorter than

2 How many pencils long is this page?
Was your answer a whole number or was it between 2 numbers?
What are some different ways we can deal with this when it happens?



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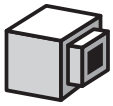
Length – measure with informal units

1 Estimate and measure the length of each object using pop sticks and cubes.

2 Find 2 more classroom objects and measure their length. Add them to the table.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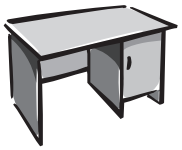				
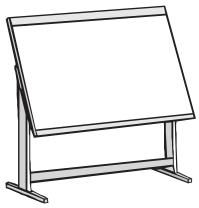				
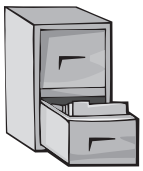				

3 Did you need more cubes or more pop sticks to measure the objects? Why?

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Length – choose an appropriate unit to measure

You will need: a partner centicubes lunchboxes

pop sticks

What to do:

a Estimate and measure the length of your classroom with lunchboxes.

estimate ☐ **measure** ☐

b Estimate and measure the length of your classroom with pop sticks.

estimate ☐ **measure** ☐

What to do next:

a If we asked you to measure the length of your classroom with centicubes, would you want to do it? Why or why not?

b Now either measure the classroom with the centicubes OR choose something you think might be better to use.

I measured with: _____

estimate ☐ **measure** ☐

c If you chose something else, why did you choose it?

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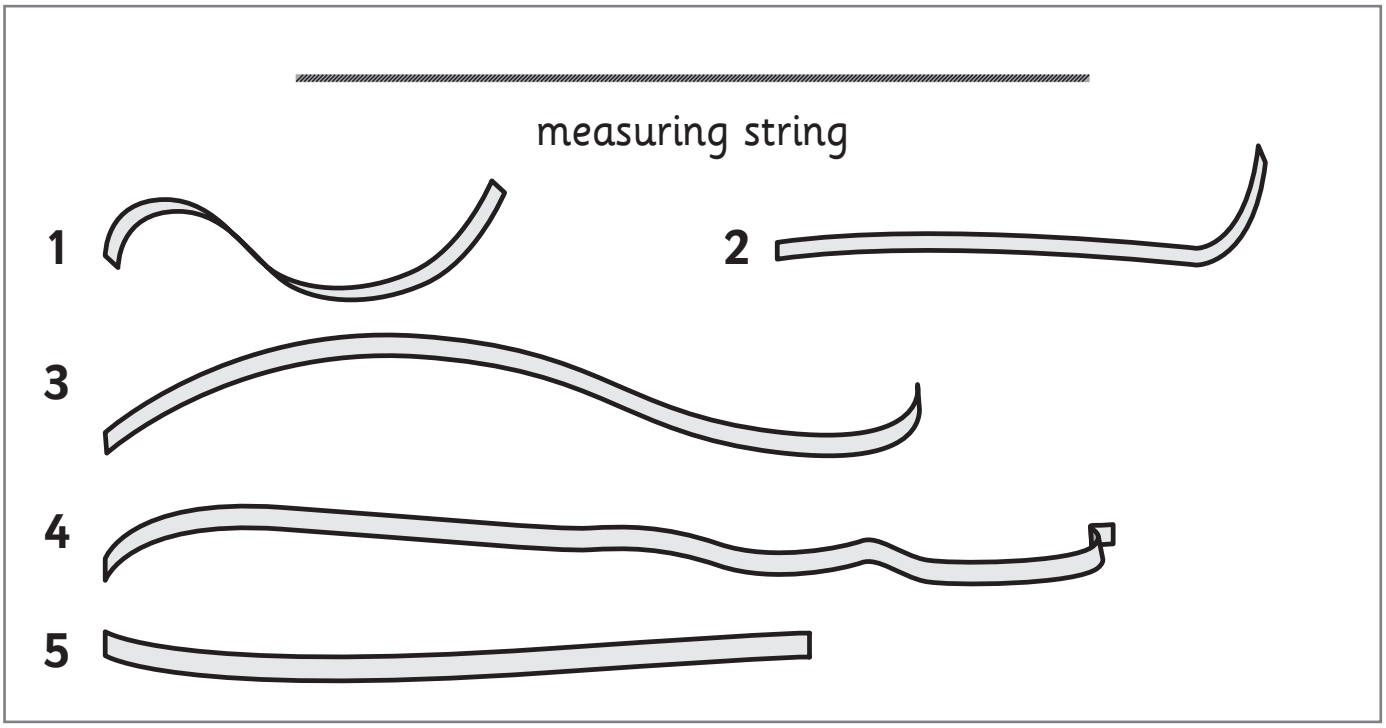
Length – compare and order lengths

You will need: string scissors

What to do:

Look at the measuring string below. Now look at streamer 1. Write 1 in the box where you think it belongs. Do the same for the other pieces of streamer.

Longer than the string.	Shorter than the string.	Same length as the string.



What to do next:

Now cut a piece of string the same length as the measuring string and use it to measure the streamers. Are there any surprises?

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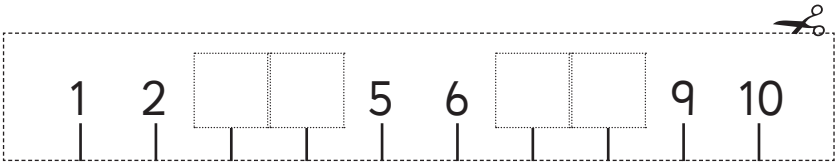
Length – centimetres

Sometimes it is important for everyone to use exactly the same measuring unit. We can't use hands or feet because they are all different. And not everyone in the world has the same counters or building blocks.

To solve this problem we invented units that are the same EVERYWHERE. One of these is the **centimetre**. We can write this as **cm**.

1 Cut out the ruler below. Finish labelling the cm markers. Find 5 things around the classroom that are shorter than the ruler and measure them.

	Item	Estimate	Measure
a		cm	cm
b		cm	cm
c		cm	cm
d		cm	cm
e		cm	cm



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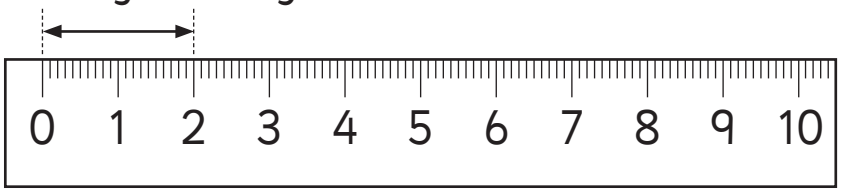
Length – centimetres

When we measure with rulers we are measuring the cm **spaces** between the numbers. The numbers count the spaces.

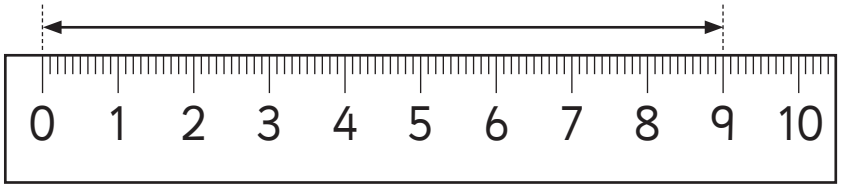
1 How many cm long is each arrow?

a



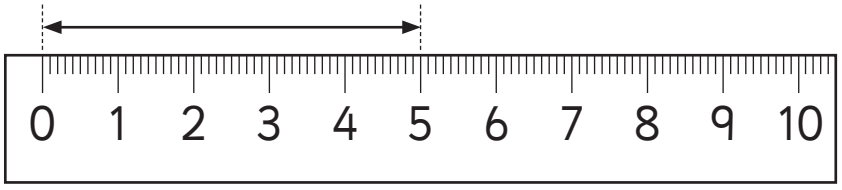
cm

b



cm

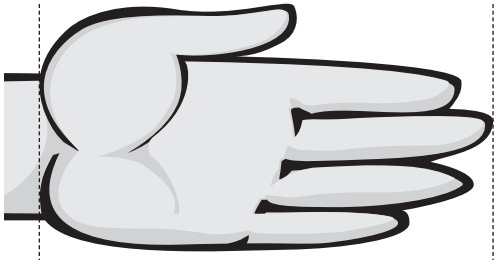
c



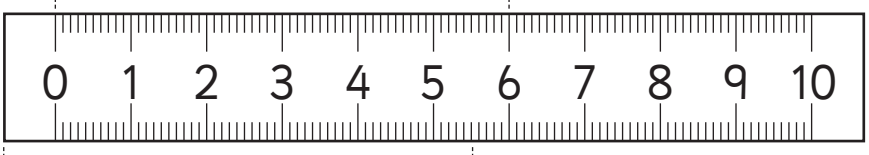
cm

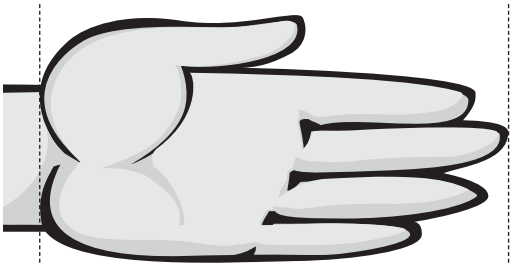
Look at a ruler. The numbers start a little bit past where the actual ruler starts and end a little bit before where the ruler ends. We measure from the 0, not from the start of the ruler.

2 ☑ the person who has ruled accurately.



6 cm ☐





$5\frac{1}{2}$ cm ☐

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Length – centimetres

You will need: a ruler 4 jelly snakes

What to do:

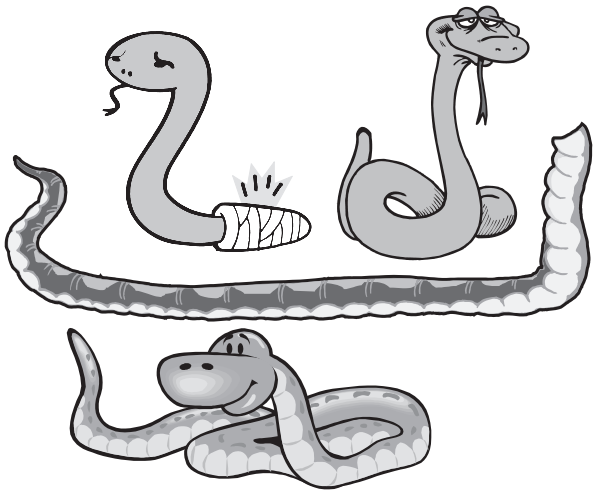
You have been hired by the local lolly shop to develop some magical new jelly snakes.

Leave one of your snakes as it is. He is called Average Joe.

One of your snakes is called Tail-free.
Yep, bite that tail off.

One of your snakes is called Headless.
You know what to do.

One of your snakes is called Stretchy.
How stretchy can you make her?
Be careful! She is called Stretchy, not 2-Bits.



What to do next:

a Measure Average Joe with a ruler to the nearest cm.
How many cm long is he?

cm

b Now using Average Joe's length as your guide, estimate how long you think each of your other snakes will be. Measure them.

Snake	Estimate	Measure
Tail-free	cm	cm
Headless	cm	cm
Stretchy	cm	cm

Now:

Reunite the snakes with their missing body parts in your stomach.

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Length – centimetres

You will need: a partner, a ruler, a pencil, your foot

What to do:

Take off one shoe and sock and stand in the box below. Ask your partner to trace around your foot with a pencil. Measure the length of your foot with a ruler to the nearest cm.

My foot is ☐ cm long.

What to do next:

Find 5 partners. Compare and order your feet, standing in line from shortest foot to longest foot.

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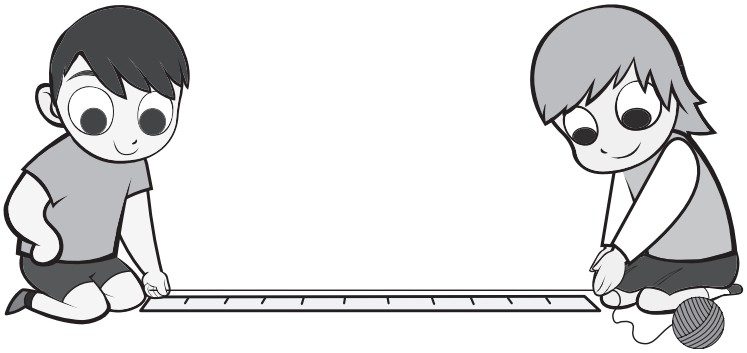
Length – metres

Would you like to measure the distance from your classroom to the office in cm? Why or why not?

Measuring distances like that in cm would take a long time and it would be easy to get confused. We use the unit **metre** for longer distances. We can write this as **m**. A metre is 100 cm.

You will need: a partner, a metre ruler, string, scissors

What to do:



a Measure a piece of string against a metre ruler and cut it. Look at your piece of string – it is 1 metre long.

b Find 3 lengths or distances you think your string metre would be the right unit to measure with. Measure them and record your findings below.

What to do next:

Did you find some of your lengths were parts of a metre? How did you choose to record these? Compare your way with that of another group. Would you use your way again?

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Length – metres

You will need: a partner a trundle wheel your string metre

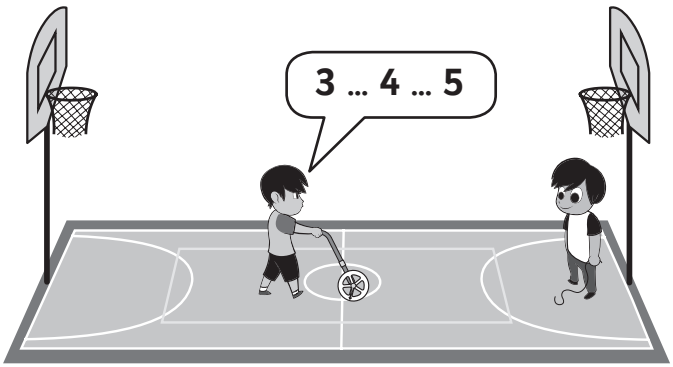
What to do:

Carefully wrap your metre piece of string around the wheel. What do you find?

What to do next:

a Measure the length of the basketball court using the string metre. How many metres is it?

b Now measure the basketball court with the trundle wheel, making sure you start with the zero placed correctly and that you count the clicks. What do you find?



c Try another distance and measure it with both the string and the trundle wheel. Record your results.

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Length – metres

You will need: a partner, a trundle wheel, a ball or Frisbee

What to do:

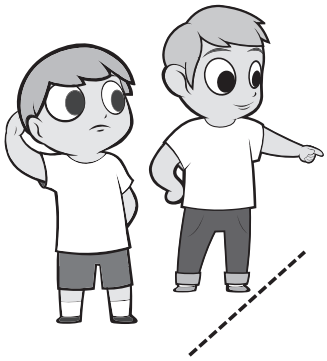
a Think about how far it is from your classroom to the library. Measure the distance to the nearest metre. Record your findings here.

The distance between my classroom and the library is _____ m.

b What is another distance you and your partner think would be about the same? How close were you?

_____ is _____ m.

What to do next:



From a starting line throw a ball or Frisbee. Predict how far away you think it is. Measure the distance with the trundle wheel.

Throw the ball or Frisbee 3 more times. Do your estimates get closer with practice?

a	estimate	m	measure	m
b	estimate	m	measure	m
c	estimate	m	measure	m
d	estimate	m	measure	m

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Length – centimetres and metres

You will need: a partner, streamers, a metre ruler, scissors

What to do:

Measure, cut and label each piece of streamer.

a 1 × 1 metre piece of streamer

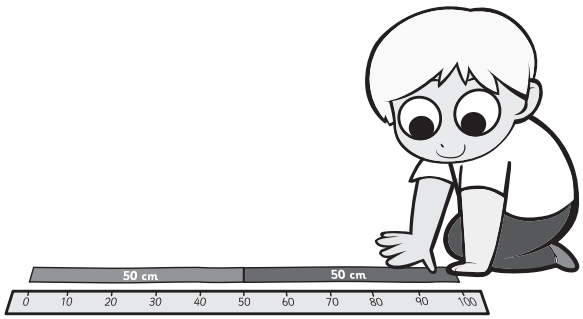
b 5 × 10 cm pieces of streamer

c 2 × 50 cm pieces of streamer

d 5 × 20 cm pieces of streamer

What to do next:

Tape your 1 metre piece of streamer to the floor. Use your other pieces of streamer to find combinations that equal 1 metre. Record them below.



Try:

Can you cut some different lengths of streamers that when added together, also equal 1 metre?

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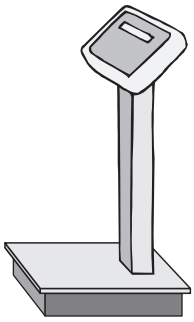
Mass – language of mass

We find the mass of something by measuring how heavy it is.
The more mass something has, the heavier it is.

1 If you used these to measure something, what would you be measuring?



_____

2 Look at the words below. Colour any words you might use when you measure and talk about mass.

heavier than

edges

more mass than

volume

less mass than

exactly

a bit more

shorter than

weigh

long

different

area

heavy

lighter than

vertex

about the same

capacity

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Mass – measure by hefting

You will need: a partner, objects, a bag, a balance scale

What to do:

Put 10 classroom objects in the bag.

Take two objects out and draw one in each box.

Take turns hefting the objects. Which one do you think is heavier? Put a tick in the box next to it. If you think they are the same, write = (equals) in the box between them.

Place the objects on a balance scale and compare them. Which is heavier? Circle it.

Do this until you have compared all the objects.

☐	**Object 1**	⋮	**Object 2**	☐
☐	**Object 3**	⋮	**Object 4**	☐
☐	**Object 5**	⋮	**Object 6**	☐
☐	**Object 7**	⋮	**Object 8**	☐
☐	**Object 9**	⋮	**Object 10**	☐

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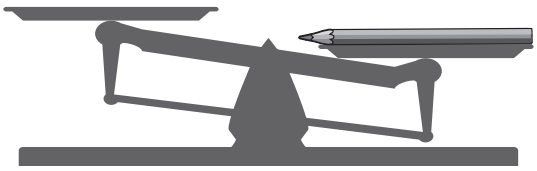
Mass – measure with balance scales

You will need: a partner objects a balance scale

What to do:

Find things in the classroom to put on the other side of the scales to make them look like this. Draw the objects on the scale.

a



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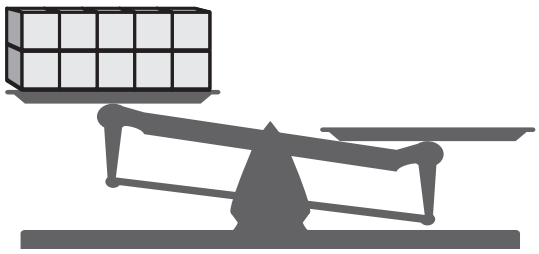

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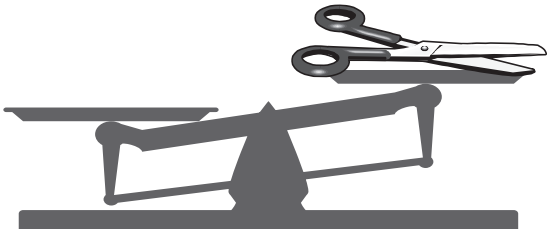
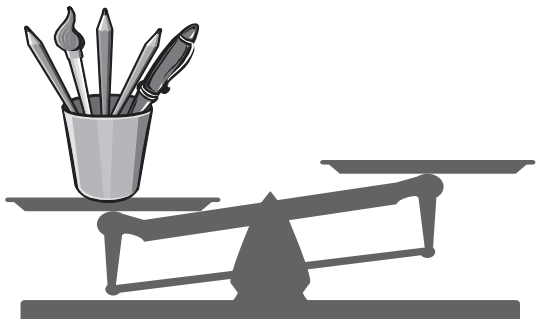


d



e

f

What to do next:

Choose one of your finished scales and write a sentence comparing the mass of the two objects on it.

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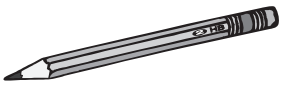
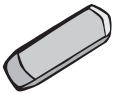
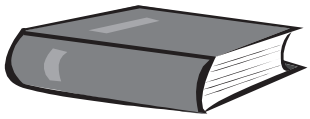
Mass – measure with informal units

You will need: objects, a balance scale, cubes, base-10 ones

What to do:

Estimate and use a scale to measure how many cubes will balance:

	Item	Estimate	Measure	Measure
a				
b				
c				
d				

What to do next:

Now balance the same objects using base-10 ones. Record your measurement in the last column. Before you begin, do you predict you will use the same, more or fewer blocks?

☐ same ☐ more ☐ fewer

Why?

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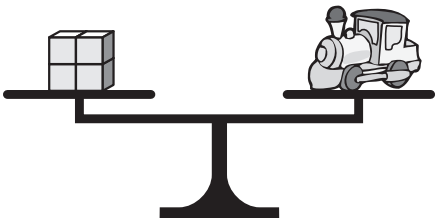
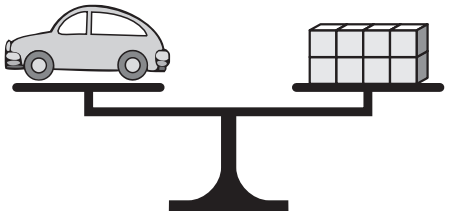
Mass – measure with informal units

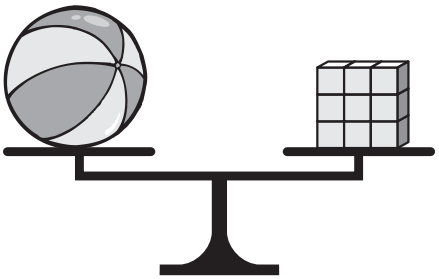
1 How many cubes balance the toys?



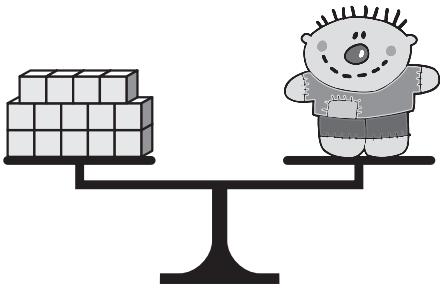
a ___ cubes balance the train.



b ___ cubes balance the car.



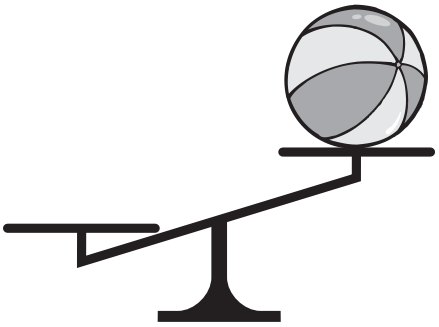
c ___ cubes balance the ball.



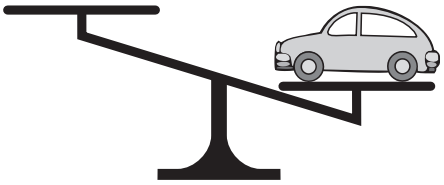
d ___ cubes balance the doll.

2 Draw a toy from above on the other side that could make the scales look like:

a



b



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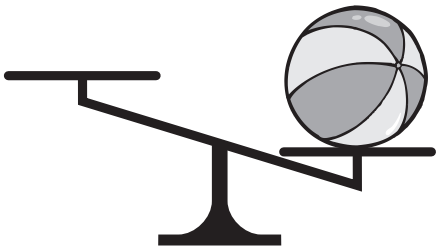
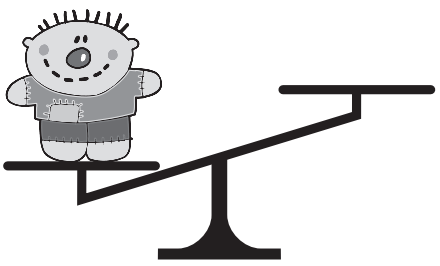


d



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Mass – compare and order 3 or more masses

You will need: a partner 3 classroom objects a balance scale

What to do:

Compare the masses of the objects using the scale and then order them in the boxes from lightest to heaviest.

lightest | | | | **heaviest**

Explain how you decided on your order.

What to do next:

Choose two books from your library shelf that are about the same size but have different masses. Use the scale to check.

Now choose another book that you think would be heavier than the lighter book but lighter than the heavier book. In other words, the one that would fit in the middle!

Use the scale to check. How did you go?

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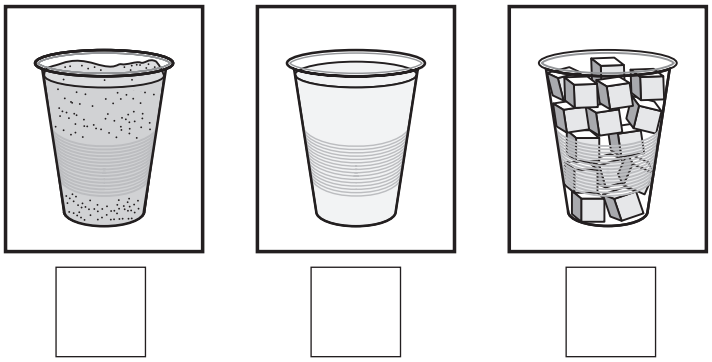
Mass – compare and order 3 or more masses

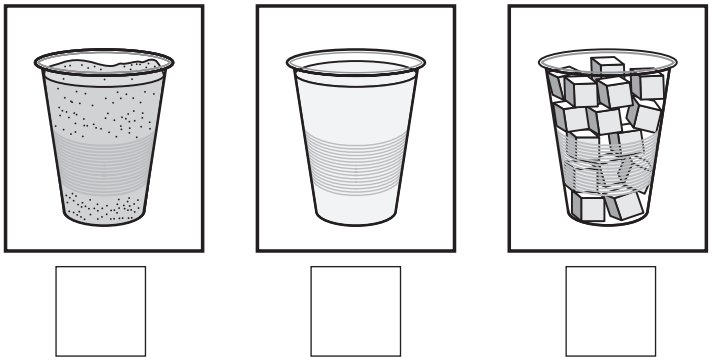
You will need: a partner, 3 plastic cups, sand, water, base-10 ones

What to do:

a Fill 1 cup with sand, 1 with water and 1 with ones blocks. Predict their order from lightest to heaviest and label the cups to match your predictions.

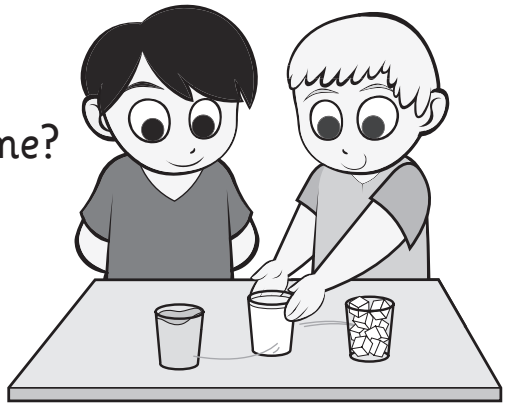


b Use the balance scales to measure and compare the cups. Label the cups. How did you go with your prediction?



What to do next:

Why do you think they have different masses? They are all a cup full. Why aren't they the same?



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Mass – size and mass relationship

Are big things always heavy? Are small things always light?

1 Draw or write something that you think is:

a **big and heavy**

b **big and light**

c **small and heavy**

d **small and light**

2 Can you find something around the school that is smaller than your pencil case or tin but heavier than it? Draw it.

3 You will need 2 containers and a scale for this activity. Fill a cup with sand. Fill another container with base-10 ones so that they both have the same mass. Do think you will you need the same size container? How will you know they have the same mass? Record your findings.

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Mass – size and mass relationship

You will need: a partner, modelling clay, a balance scale, centicubes

What to do:

a Divide your modelling clay into 2 balls of equal mass. How will you know that they are equal?

b Now, flatten one of the balls. Do you think they still have equal mass? Tick your answer.

☐ yes ☐ no

c Measure their mass on the scales. What do you find?

d Try it again by making both balls a different shape. Do you get the same result? Tick your answer.

☐ yes ☐ no

What to do next:

Combine both balls of clay and mould them into a cube shape. Build a cube with centicubes that is about the same size. Which cube do you predict will be heavier? Test this out.

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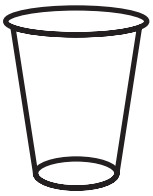
Volume and capacity – capacity of containers

When we find out how much a container can hold, we are measuring capacity.

1 How would you describe how full these containers are? There are some ideas on the help strip below.

a  _____

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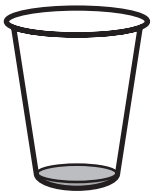
f  _____

2 What sort of container do you think could be filled with 5 cups of water? Draw it.

Help

full	empty	half	between	quarter
a bit	three quarters		nearly	

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Volume and capacity – capacity of containers

You will need: a partner a spoon a cup a bucket

sand or water a lunchbox

What to do:

a How many spoonfuls of water or sand will fill your cup?

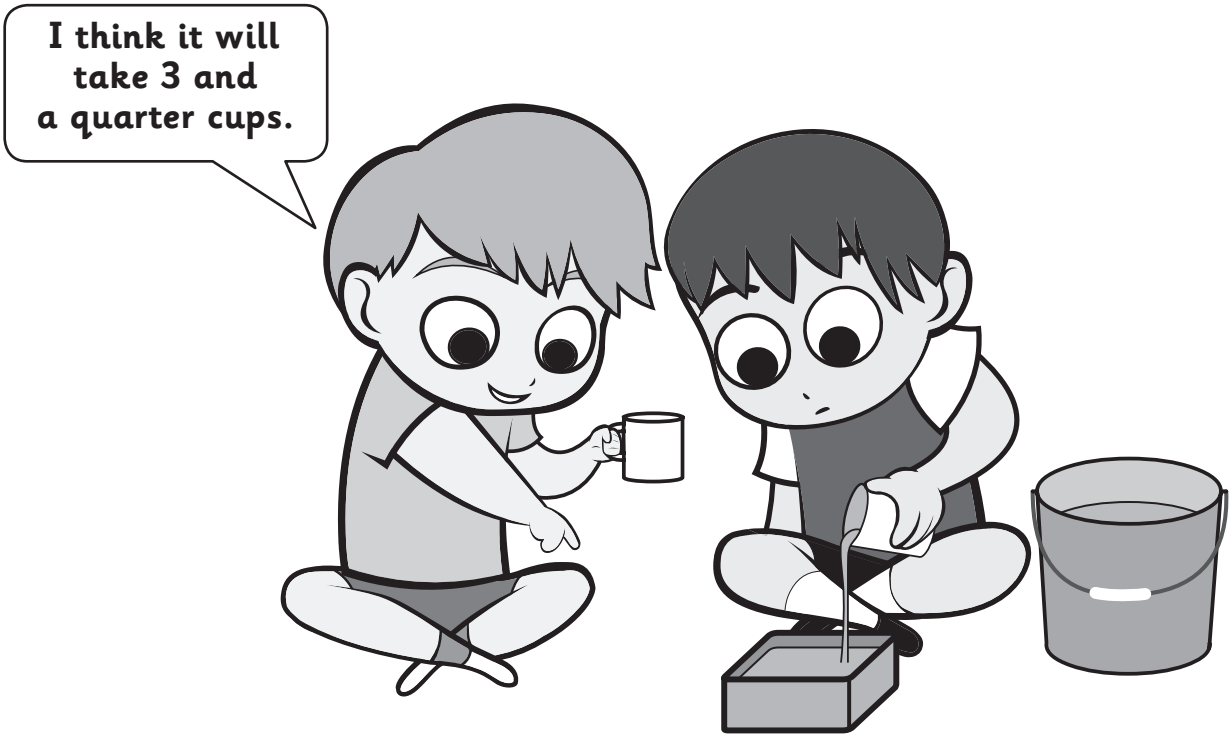
estimate ☐ **measure** ☐

b How many cups of water or sand will fill your lunchbox?

estimate ☐ **measure** ☐

c How many lunchboxes of water or sand will fill your bucket?

estimate ☐ **measure** ☐



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Volume and capacity – capacity of containers

You will need: a partner, a cup, a 2 L plastic bottle, a funnel, sand or water, a permanent marker

What to do:

a Can you see the markers on the side of the jug? These tell us how full the jug is and help us if we need a set amount. Can you think of a time we would use them?

b You are going to make your own specially marked container. Pour cups of water or sand into the plastic bottle until the bottle is full. Use a funnel if you have one to make it easier. Each time you pour a cupful in, mark the side of the bottle.

What to do next:

a Pour 2 cups of water or sand out of the bottle. How will you know you have done this correctly?

b How much is left in the bottle? Show how you know.

c Take turns telling each other how much to pour out of the bottle until it's all gone. Check each other's decisions.

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Volume and capacity – compare and order

You will need: a partner, a cup, a mug, a jug, sand or water, a lunchbox

What to do:

a Order your containers from the one that holds the least to the one that holds the most. How will you prove this?

b Draw the containers in order in the boxes below and explain how you worked it out.

least **most**

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Volume and capacity – compare and order

You will need: a partner, cups, lunchboxes, sand or water, jugs or bottles

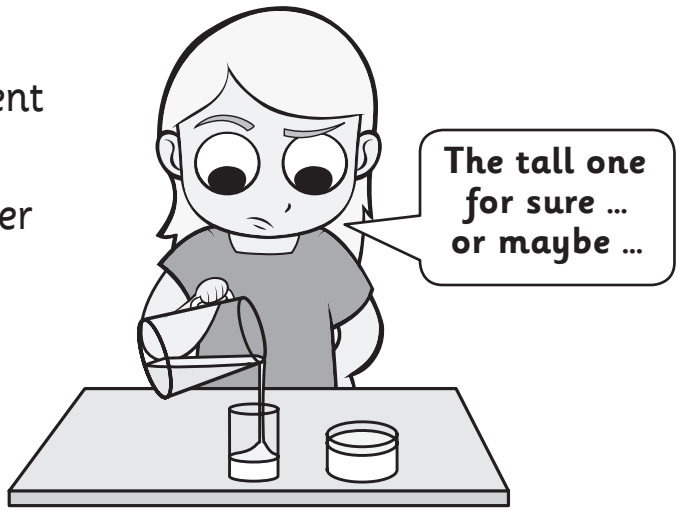
What to do:

a Fill a container with sand or water. Can you find a different shaped container with the same or nearly the same capacity? Draw the two containers in the box below.

b Would you have expected that they had the same capacity? Why or why not?

What to do next:

Take turns giving each other 2 different shaped containers. Ask each other to predict which one will have the greater capacity. Measure them and see.



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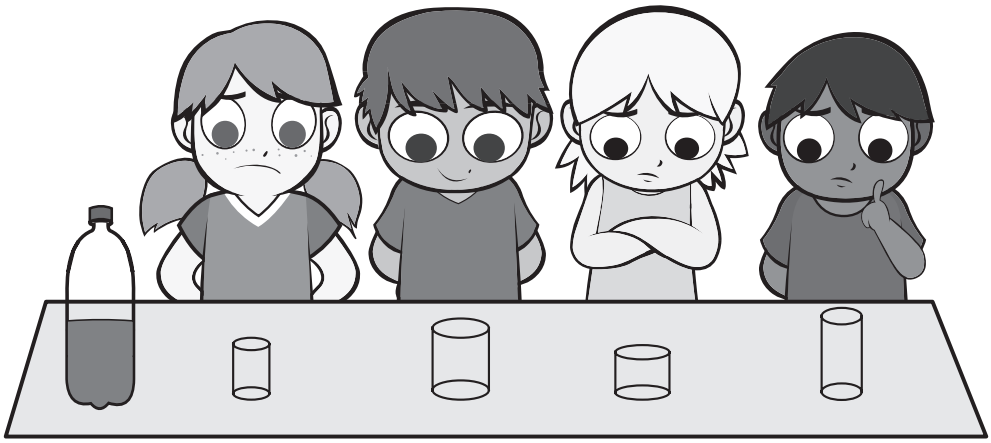
Volume and capacity – compare and order

You will need: a group of 4 kids; a 1.25 L plastic bottle; 4 different sized cups or small containers; measuring equipment; a spoon

What to do:

Half fill the plastic bottle with water. Choose a cup to be your own. Now, find a way to share the water out between the 4 cups so that each of you has a fair share. How will you know you have done it? Are you all happy with your share?



What to do next:

a For this activity you will need water, a spoon and a cup. Half fill the cup using the spoon. How many spoonfuls of water did it take?

b Can you work out how many spoonfuls in a whole cup? Do you have to keep filling spoonful by spoonful or is there a different way to work it out?

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Volume and capacity – volume

When we find out how much space a container or object takes up, we are measuring volume. The more space an object takes up, the more volume it has.

One way of measuring volume is to fill it and count how many objects are in it.

You will need: a partner cubes lunchboxes

What to do:

a Estimate how many cubes it will take to fill your lunchbox. Write your estimate. **estimate** ☐

b Do you think your lunchbox has a greater or smaller volume than your partner's lunchbox? Write why you think so.

c Fill your lunchbox with cubes. **measure** ☐

d Whose lunchbox had greater volume? Did this surprise you?

What to do next:

Estimate the volume of a tote tray in cubes.

estimate ☐ **measure** ☐

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