Released February 2018

Years 1/2

Small Steps Guidance and Examples

Block 4 - Measurement

White Rose Maths

Year 1 /2– Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	**Number: Place Value**				**Number: Addition and Subtraction**				**Geometry: Shape**		**Measurement: Money**	
Spring	**Number: Multiplication and Division (Y1: Place Value to 50 included)**				**Number: Fractions**			**Measurement: Length and Height**		**Measurement: Mass, Capacity and Temperature**		**Consolidation**
Summer	**Year 1: Place Value within 100 Year 2: Statistics**		**Geometry: Position and Direction**		**Problem solving and efficient methods**		**Measurement: Time**			**Investigations**		**Consolidation**

Overview

Small Steps

Year 1	Year 2
Introduce weight and mass	Compare mass
Measure mass	Measure mass (g)
Compare mass	Measure mass (kg)
Introduce capacity	Compare capacity
Measure capacity	Millilitres
Compare capacity	Litres
	Temperature

Introduce Weight & Mass

Notes and Guidance

Children are introduced to weight and mass for the first time. They may already have concepts about mass from own personal experience of carrying objects.

The use of balance scales is essential to form an understanding of comparing mass, they should be allowed to pick up and feel the mass of objects before putting them on the scales and seeing what happens.

Mathematical Talk

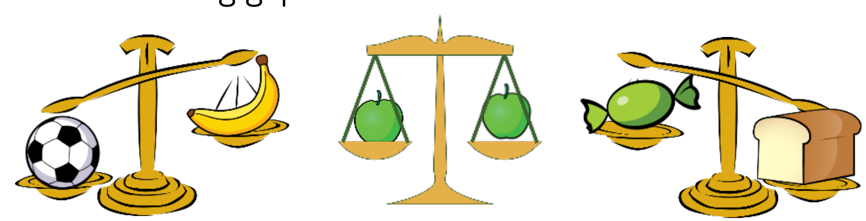
Hold my two objects, which is heavier/lighter? How do you know? How can we prove this?
If the balance scale is down, what does that tell us?
If the balance scale is up, what does that tell us?
If the balance is level, what does that tell us?
Which of these objects is heavier? How do you know?
Can you predict what the scale will do when I put these two objects on either side of the scale?

Varied Fluency

1. Using balance scales, compare and model how objects around school can be heavier or lighter than others.

Which object is heavier? Which object is lighter?
The ______ is heavier/lighter than the ______.

2. Fill in the missing gaps to make the sentences correct.



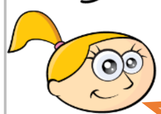
The ______ is heavier than the ______.
The ______ is lighter than the ______.
The ______ is equal to the ______.

3. Collect different objects from around your classroom. Use a balance scale to find the heaviest object.
Can you find 2 objects that are equal in mass?

Introduce Weight & Mass

Reasoning and Problem Solving

The class are seeing whether the balloon or apple will weigh more.



Kate

The balloon will go down because it is bigger than the apple.

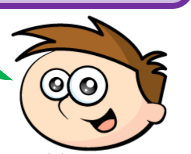
The balance will be level because they are both red.

Jessica

Jack

The apple will go down because it is lighter.

The balloon will go up because it is lighter.



Kenny

Who is correct? Explain why.

Kenny is correct. Jack is wrong because he has said lighter but the scale will go down.

Children may also explain why the other's are incorrect.

I'm thinking of an object. It is heavier than a pencil, but lighter than a dictionary,

Will

What object could Will be thinking of?
Prove it.
How many objects can you think of?

Children will use a balance scale to find objects that are heavier than a pencil, then to check that their chosen objects are lighter than the dictionary.

Examples may include: a bottle of water, pencil pot etc.

Compare Mass

Notes and Guidance

Children recap on Year 1 learning by comparing the mass of different objects. They will initially use balance scales to compare two objects.

Children compare mass using < and > and order objects based on their mass.

Mathematical Talk

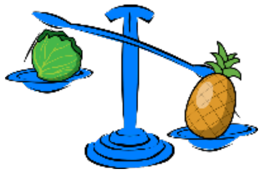
Look at the scale, which side is lower? What does this tell us about the objects?

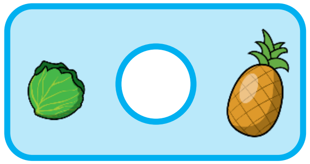
Which object is heavier? Which object is lighter?

Can you predict which object will be heavier?

Varied Fluency

1. Using the words 'more' and 'less' and the > or < symbols, describe the mass.





The lettuce weighs ______ than the pineapple.

2. Choose three objects. How can you use the balance scales to order them from the heaviest to lightest?

The ____ is heavier than the ____ but lighter than ____
The ____ is lighter than the ____ but heavier than ____

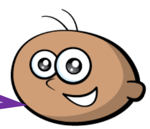
3. Complete the sentences:

____ bananas are equal to ____ donuts.
2 bananas are equal to ____ donuts.
____ banana is equal to 2 donuts.
Can you write sentences using 'more' or 'less' about the image?

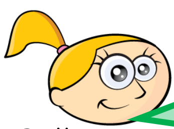
Compare Mass

Reasoning and Problem Solving

Apples weigh more than bananas.



Hamza



Sally

Two donuts are the same as two bananas.

Do you agree?
Explain why.

3 bananas weigh the same as two apples, so Hamza is correct - an apple must weigh more than a banana.
1 banana weighs the same as 2 donuts so Sally is incorrect.

One pear weighs 10 cubes.
How much does one pineapple weigh?
Explain how you know.

1 pineapple weighs 20 cubes.

Always, sometimes, never.

The bigger the box, the heavier it is.

Sometimes. Children can explore this using different sized boxes.

Measure Mass

Notes and Guidance

Children learn to use non-standard units (e.g. cubes, bricks) to weigh and compare the mass of an object.

Children use a non standard unit and recognise this stays the same to weigh the mass of an object. They use the non standard unit of measure to make the scales balance to work out how much an object weighs. Children learn that a non-standard unit of measure could be any object.

Mathematical Talk

When the scales are balanced, what does this mean? Can anyone think of any symbols we use in maths that are similar?

If I add one more _cube_ to this side, what will happen? How do you know? What if I take a _cube_ away?

What other objects could we use to weigh the mass of something? Which object do you predict will be heavier?

Varied Fluency

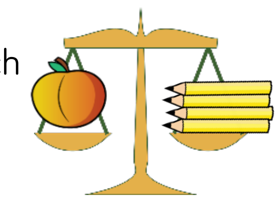
1. Use everyday objects e.g. banana, apple, book etc. Using a non standard unit of measure e.g. cubes, bricks etc, investigate how much each object weighs. Use the sentences to describe your investigation.

   The object weighs ☐ _cubes/bricks._
   I need ☐ more/less to make the scales balance.

2. Weigh an object e.g. a book, using cubes and then weigh the same object using bricks. What do you notice? Complete the sentence using the words; *heavier, lighter, more, less*
   The ☐ the non standard unit of measure, the ☐ units are needed.

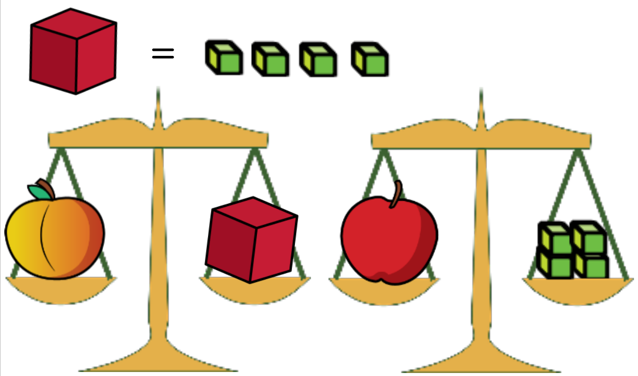
3. Using other non-standard units, weigh and compare the mass of an object in relation to another object.

   For example: 1 peach weighs the same as 4 pencils



Measure Mass

Reasoning and Problem Solving



Raj says,

The apple is heavier than the peach, because it weighs 4 cubes.

Jack says,

The apple and the peach weigh the same.

Who do you agree with?
Explain why.

Possible answer

I agree with Jack, because 1 brick weighs the same as 4 cubes so the apple and the peach weigh the same.

How many cubes does the teddy bear weigh?
Explain how you know.

The teddy bear weighs 5 cubes. I can take 1 cube off of each side of the scale and it will still balance.

Measure Mass (g)

Notes and Guidance

In Year 1, children have experienced measuring mass using non-standard units. In Year 2, they will use gram weights and balance scales before moving on to use standard scales.
Children will apply their counting in 2s, 5s and 10s skills to measuring mass in grams.
Give children the opportunity to feel the mass of gram weights so they can use this to estimate.

Mathematical Talk

What does the balance scale being level tell us?
What symbol could we use? (=)

How much heavier is this object? How could you work it out?

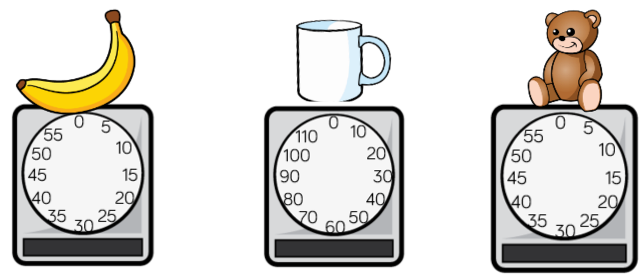
If I add 100 g to the scale, what would the new mass be?

Varied Fluency

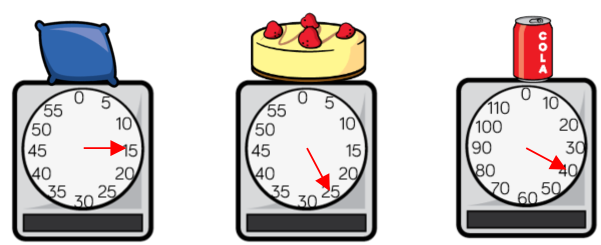
1. Using gram weights in multiples of 5 to measure the mass of objects using a balance scale.

   The ☐ weighs ☐ grams.

2. Use scales to record the mass of objects in grams.

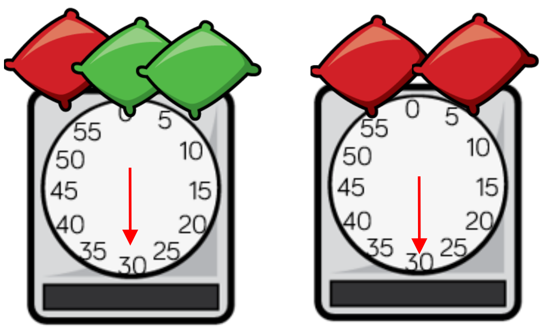


3. Order the items from heaviest to lightest.



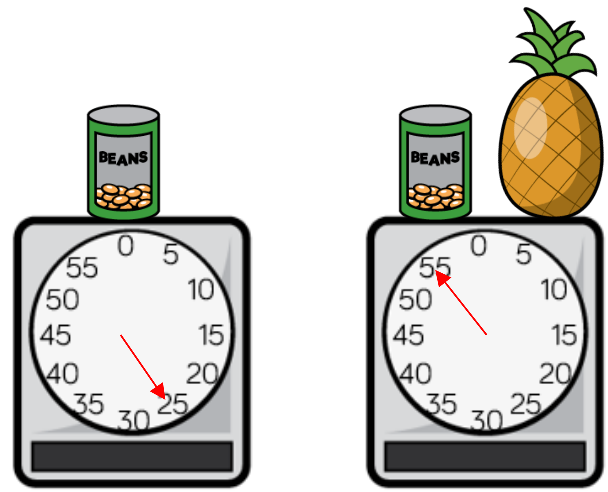
Measure Mass (g)

Reasoning and Problem Solving



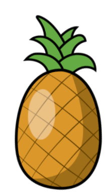
Which is heavier, the red or the green beanbag? Give your reasoning.

The red beanbag weighs more because it weighs the same as **two** green beanbags.



The 

weighs ☐ g

The  weighs ☐ g

The tin of beans weighs 25 g, and the pineapple weighs 30 g

Compare Mass

Notes and Guidance

Children continue to use non-standard units to weigh objects and now focus on comparing the mass of two objects. They use balance scales to compare two objects and use the language of 'heavier', 'lighter' and 'equal'.
Once children are confident using this language they can use < and > to compare mass.

Mathematical Talk

How many cubes weigh the same as ______? Which object is heavier? Which object is lighter?

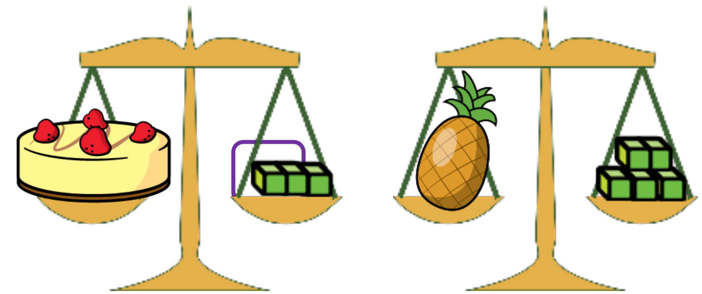
Which object do you predict will be heavier/lighter?

Can we order the objects from heaviest to largest?

Can I weigh this object with cubes and this object with bricks and order them? Explain why.

Varied Fluency

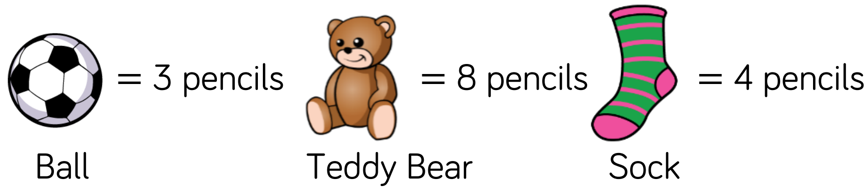
1. Complete the sentences below.



One cake weighs roughly ☐ cubes.
One pineapple weighs roughly ☐ cubes.
A cake is ☐ than a pineapple. *(heavier/lighter)*

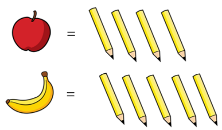
2. Find and weigh 4 objects, finding their mass in cubes. Order them from lightest to heaviest.

3. Can you order the objects from heaviest to lightest?



Compare Mass

Reasoning and Problem Solving

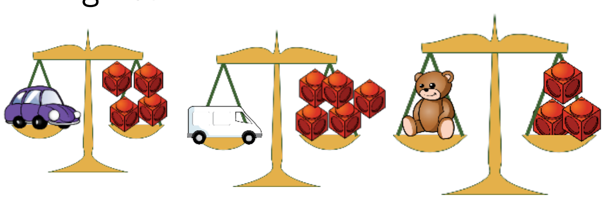


How many sentences can you write about the banana and the apple?

Possible responses:
Banana weighs one more pencil than the apple.
The apple is lighter than the banana.

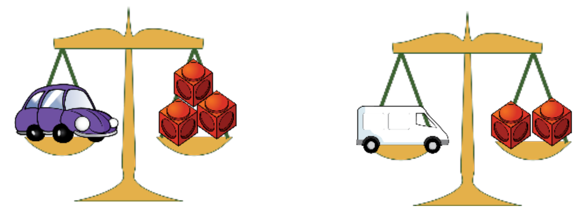
Can you match the clue to the images?

- My object weighs more than the car.
- My object is less than 5 cubes.
- My object is not the heaviest or the lightest.



- Van
- Teddy
- Car

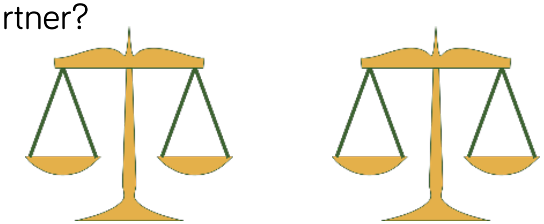
Look at the balance scales below.



Which statements are true?

- The toy car is heavier than the van.
- The van is heavier than the car.
- The car is lighter than the van.
- The van is lighter than the car.
- The car and van weigh the same amount.

Can you make your own version for your partner?



The car is heavier than the van.
The van is lighter than the car.

Measure Mass (kg)

Notes and Guidance

Children use their knowledge of measuring mass in grams to start to measure mass in kilograms.
They apply their counting in 2s, 5s and 10s to measuring mass and reading scales in kilograms.
Give children the opportunity to feel the mass of kilogram weights and real life objects that weigh 1 *Kg*, so they can use this to estimate.

Mathematical Talk

How much do you think one tin of beans weigh?
Explain why you think that.

Which is heavier, one gram or one kilogram?

What else do you think we might measure in kilograms?

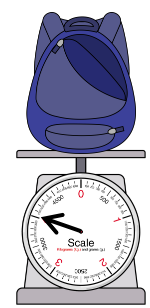
Varied Fluency

1. Find the mass of the sweets and the beans.

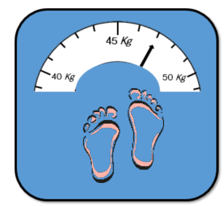
The sweets weigh ☐ *kg*

The beans weigh ☐ *kg*

2. Read the scales to find the mass of each.

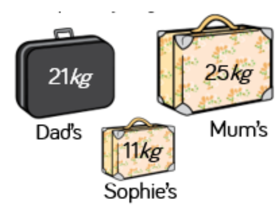


The bag weighs ☐ *kg*



The person weighs ☐ *kg*

3. Sophie's family are going on holiday. At the airport they weigh their suitcases. Compare the weight of their cases.



Sophie's case ◯ Dad's case

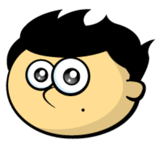
Mum's case weighs ☐ *kg* more than Dad's case.

Measure Mass (kg)

Reasoning and Problem Solving

Which unit would you measure the objects in?
Grams or Kilograms?

A child



A banana

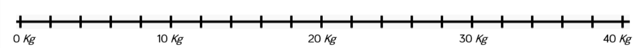
A pencil

A laptop

The red beanbag weighs more because it weighs the same as **two** green beanbags.

The brown parcel weighs twice as much as the blue parcel.
The green parcel weighs 2 *kg* more than 30 *kg*
The blue parcel weighs 12 *kg* less than the green parcel.

Draw an arrow to show where each parcel would be on the scale.



The green parcel weighs 32 kg

The blue parcel weighs 20 kg

The brown parcel weighs 40 kg

Introduce Capacity

Notes and Guidance

Children are introduced to capacity. They explore the concept in a practical way, using a variety of containers. They compare the volume in a container by describing whether it is full or empty and use ‘greater than’ and ‘less than’ to further describe the volume.

Children understand that when a container is full, the capacity is equal to the volume but when the container is empty the capacity is the same but the volume is zero.

Mathematical Talk

Look at my bottle, is it full? Is it empty?
Compare my two bottles, which has more liquid in? Which has less?

How can we show the container is nearly full or nearly empty?

What’s the same? What’s different? If the container is different can we compare the volume easily? Why?

Varied Fluency

1. Use different containers filled with liquid or rice. Use the words and sentence stems to describe the volume and capacity.

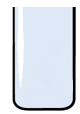
full | empty | greater | less

The container is ______.
The amount of liquid in container 1 is _______ than the amount of liquid in container 2

2. Using a container and rice, show me:

- A full container
- An empty container
- A half full container
- A nearly full container
- A nearly empty container
- More than half full container

3. Match the sentence to the correct image.



The container is full.
The container is empty.
The container is half full.
The container is more than half full.

Introduce Capacity

Reasoning and Problem Solving

Always, Sometimes. Never

The tallest container holds the most liquid.

Identical containers can have a different capacity.

Sometimes.

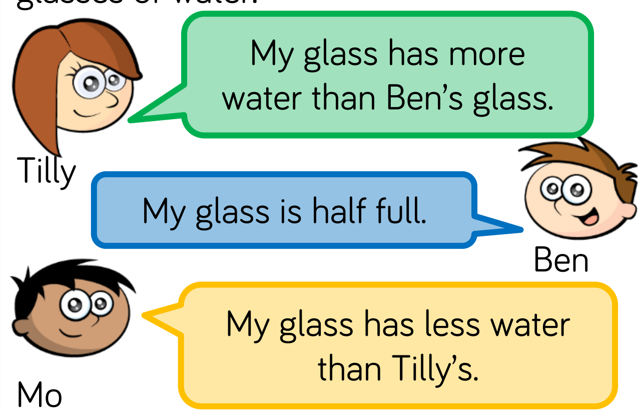
Never. If the containers are identical they will have the same capacity but can have different volumes of liquid in.

Mary has a full bottle of orange. She fills another container with the orange.

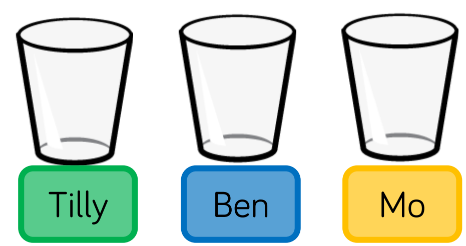
Which has a larger capacity - the bottle or the container? Explain how you know?

The bottle must have a larger capacity because Mary filled the container and the bottle has some orange left over.

Tilly, Ben and Mo are describing their glasses of water.



Can you fill in how much water could be in each of the children's glasses?



Label each glass using 'full', 'empty', 'nearly', 'half full' or 'quarter full'

Various representations for Tilly's and Mo's as long as they show that Mo's is less than Tilly's and Tilly's is more than half full.

Compare Capacity

Notes and Guidance

Children build on their understanding from Year 1 to explore the difference between capacity and volume. They use containers to compare capacity and volume and recognise the capacity is the amount of liquid a container can hold and the volume is how much liquid is in the container.

Children use the language 'quarter', 'half' and 'three quarters full'.

Mathematical Talk

Which container has the largest/smallest capacity? Can we order them from largest to smallest?

Can we show the same volume in each container? Does it look the same? Why?

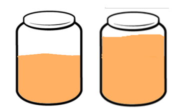
Which container has the more or less liquid in?

How many mugs does it take to fill the bottle? Is this more or less than the pot? Can we find the difference?

Varied Fluency

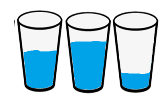
1. Take three different containers. Using water or rice, which container has the largest capacity? Show me each container where the volume is: quarter full, half full and then three quarters full.

2. Complete the sentences using the words 'less', 'more' or equal'.



A B

Container A has ☐ than container B.

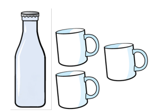


A B C

Container C has ☐ than container B.

Container A has ☐ than container C but _____ than container B.

3. Complete the sentences:



The pot can fill ☐ mugs.

The bottle can fill ☐ mugs.

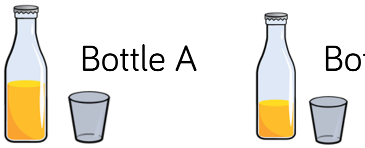
Which holds more?

Use other containers to investigate how many mugs of rice they take to fill.

Compare Capacity

Reasoning and Problem Solving

Steph pours juice from two identical bottles into two identical glasses.



Which glass has the most juice in?
Which has the least juice in?
Explain why.

Glass A has the least juice in and Glass B has more juice in. Bottle A has more juice left over which means it has less juice poured out.

Choose different sized containers in your classroom. Measure how much liquid each container can hold. Order your containers from which one can hold the most water to the least. Compare the containers using <, > or =

Measure Capacity

Notes and Guidance

Children find the capacity of different containers using non standard units of measure. They understand to measure the capacity of a container the unit of measure must stay the same, for example the same cup, the same spoon etc. They explore the difference between capacity and volume by also measuring how much liquid can fill a container compared to how much liquid is in a container.

Mathematical Talk

How can we measure how much liquid will fill my container? What could I use?

Can I start measuring the capacity with a spoon and then switch to a jug? Why not?

How many bowls of liquid fill the bottle?
How many cups of liquid are in the bottle?
How is this different? How is this the same?

Varied Fluency

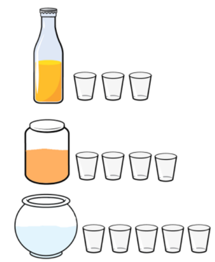
1. Take three different containers. Fill each container with liquid or rice using; a spoon, a cup, a large jug.
   Discuss which unit of measure will take more/less to fill each container.

2. Choose five different containers from your classroom. Predict which container will have the largest/least capacity.

   Using a consistent unit of measure, complete the sentence for each container.

   The capacity of the ☐ is ☐ units.

3. Measure the volume of liquid in each one using glasses as the unit of measure.

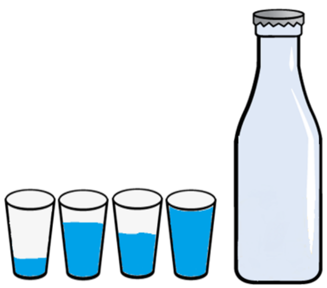


The volume of liquid in the bottle is about ☐ units.
The volume of liquid in the jar is about ☐ units.
The volume of liquid in the bowl is about ☐ units.

Measure Capacity

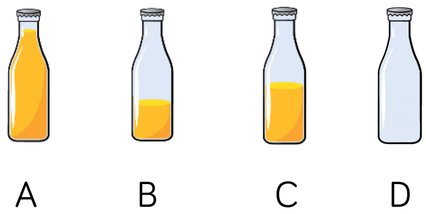
Reasoning and Problem Solving

Milly measures the capacity of the bottle. She says the bottle has a capacity of four cups. Do you agree?



Milly is wrong. She hasn't filled the cups to the top so her measuring is inaccurate.

Match the statement to the correct bottle.



- The volume of orange is 0 cups.
- The volume of orange is the same as the capacity of the bottle.
- The volume of orange is about 2 cups.
- The volume of orange is more than 2 cups.

- D
- A
- B
- C

Millilitres

Notes and Guidance

Children are introduced to standard units for the first time. They use measuring containers to measure capacity and volume in millilitres.

Once children are secure in using and understanding millilitres as a standard unit they move on to solve problems involving capacity and volume.

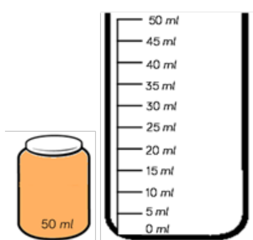
Mathematical Talk

Which container has the largest/smallest capacity? Can we order them from largest to smallest?
Look at the scale on my cylinder, what do we notice? Is this the same for this cylinder?
If we pour the liquid from this jar/glass into the cylinder, how much does each container hold?
Can we identify the volume in each cylinder? Which container had more/less liquid in than this?

Varied Fluency

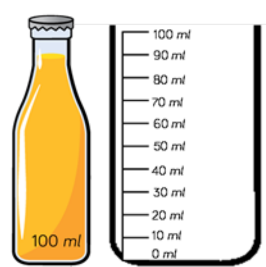
1. Use a variety of different containers with *ml* clearly labelled e.g. measuring spoon, water bottle, liquid soap, vinegar etc. Introduce that liquid can be measured in millilitres. Show 5 *ml* using a medicine spoon. Discuss is 5 *ml* a large or small amount? Look at the containers and identify how many *ml* each container holds.

2. Show on the measuring jug where the liquid would go to from each container.



The container's capacity is ___ *ml*

The container's capacity is ___ *ml*



The container's capacity is ___ *ml*

3. Use different containers e.g. mug, bowl, pan, tea cup. Fill them with water or rice. Pour them into a measuring cylinder and measure the volume of liquid or rice in the measuring cylinder.

Millilitres

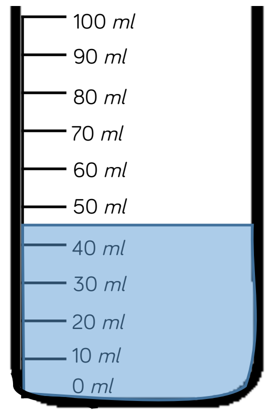
Reasoning and Problem Solving

Gather different sized containers in width and height. Estimate how much is in each container. Record your results in the table:

Container	Estimate	Amount

Glass A has the least juice in and Glass B has more juice in. Bottle A has more juice left over which means it has less juice poured out.

The water in this container does not reach a line exactly.
What is a good approximation?



Explain why.

The water is between 40 *ml* and 50 *ml*
It is approximately 45 *ml*

Compare Capacity

Notes and Guidance

Children compare the capacity of different containers using non standard units of measure.

They use 'more', 'less' and 'equal' to compare volume and can use the symbols <, > and = once they are confident using the correct language.

Mathematical Talk

Which container has the largest/smallest capacity?
Can we order them from largest to smallest?

Which container has the most or least volume?

Look at these two containers, can we compare them?

Can we show A has more than B but less than C?

Varied Fluency

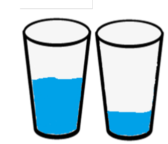
1. Take three different containers.
Fill each container with liquid or rice using the same unit of measure e.g. cup.
Which container holds the most? Which container holds the least?
Order the containers from largest to smallest capacity.

2. Use the words 'more' or 'less' to compare the containers.

A B

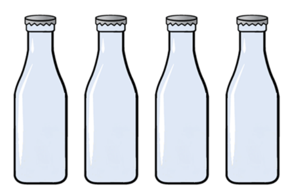
A has _____ than B.

A has _____ than B.



A B

3. Colour in the bottles to show:



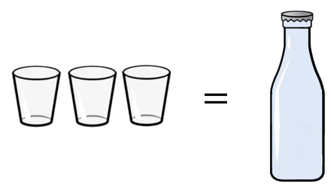
A B C D

- A has more volume than B but less than C.
- C has the same volume as. D.

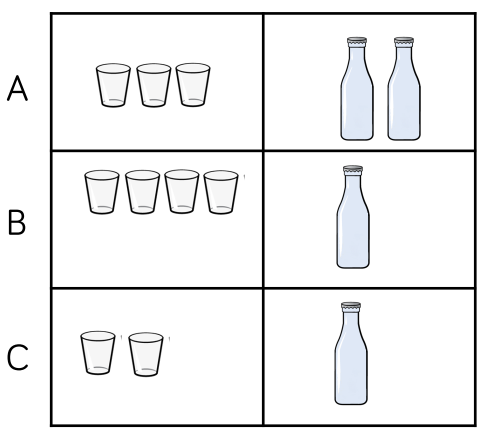
Compare Capacity

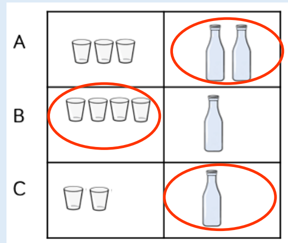
Reasoning and Problem Solving

If

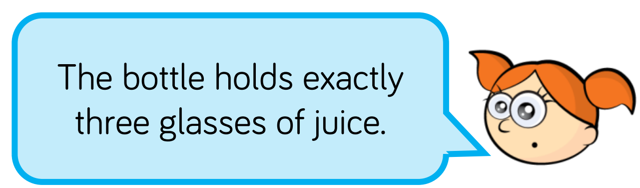


Circle whether the glasses or bottles hold more in each row:





Jan has a bottle of juice. There is some juice left in the bottle.



Do you agree? Explain why.

I disagree. Jan has filled three glasses exactly but there is still juice left so she could have filled more than 3.

Litres

Notes and Guidance

Children are introduced to litres as a standard unit for the first time. They use measuring containers to measure capacity and volume in litres.

Children recognise the difference between measuring in millilitres and litres and when you would use litres to measure liquid opposed to millilitres.

Mathematical Talk

Would you measure in litres or millilitres? Why?

How many litres of water do you think it would take to fill the bath?

How many litres of water do you drink a day?

Varied Fluency

1. Use a variety of different containers with litres clearly labelled e.g. cola bottle, paint bottle, milk etc.
Can we measure these in *ml*?
Introduce litres and discuss how these are the same but different to millilitres. Identify how many litres fill each container.

2. Show the volume of liquid that is in each cylinder.
   - Pour 3 *l* of water into the cylinder.
   - Leave 1 *l* of cola in the bottle.
   - Half of the juice is in the cylinder.

3. Use different containers e.g. bucket, large pan etc.
Estimate the capacity of each one.
Measure the capacity in litres.

Litres

Reasoning and Problem Solving

Jed has a bucket which has 5 *l* of water in. He pours 3 and a half *l* into another bucket. Which sentence is correct? • There is more in bucket A. • There is less in bucket A. • There are equal amounts in each bucket. Explain why.	There is less in bucket A because there will be 2 and half litres in A but in B there is 3 and half litres.
3 bowls each have more than 20 *l* of water in but less than 50 *l*. The green bowl has 5 *l* more than the red bowl. The blue bowl has 10 *l* more than the green bowl. How much could each bowl have in? 	The red bowl could have between 20 *l* and 35 *l* The green bowl could have between 25 *l* and 40 *l* The blue bowl could have between 35 *l* and 50 *l*

Temperature

Notes and Guidance

Children are introduced to temperature, thermometers and the units °c for the first time.
They apply their counting in 2s, 5s and 10s skills when reading different thermometers.

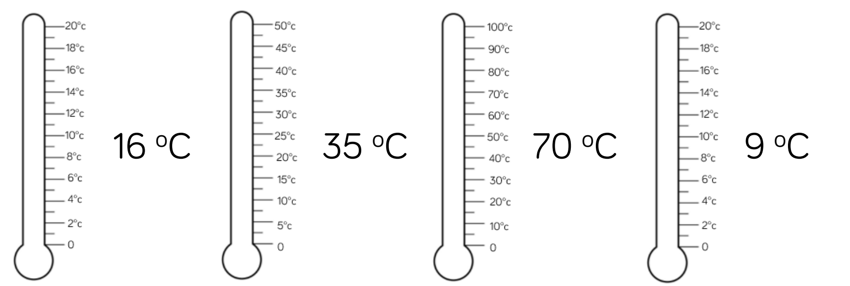
Mathematical Talk

What unit can we use to measure temperature?
What is the scale going up in? How do you know?
If the temperature increases what happens to the number?
If the temperature decreases what happens to the number?
Can we compare temperatures using vocabulary such as increased, decreased, warmer, colder and difference?

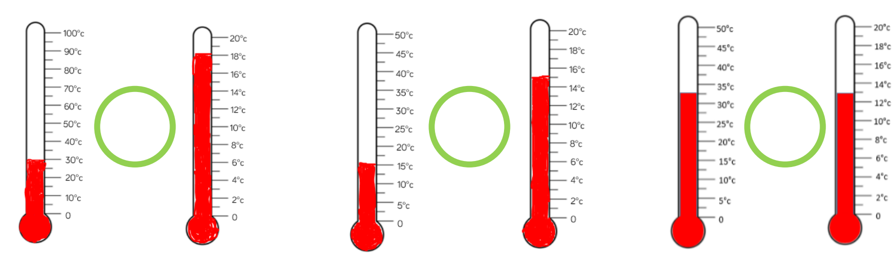
Varied Fluency

1. Take temperatures around the school and complete the following stem sentences.
The temperature in the classroom is ______
The classroom is ______ than the playground.
The difference in temperature between the ______ and the ______ is ______ degrees Celsius.

2. Complete the thermometers to show the temperatures.



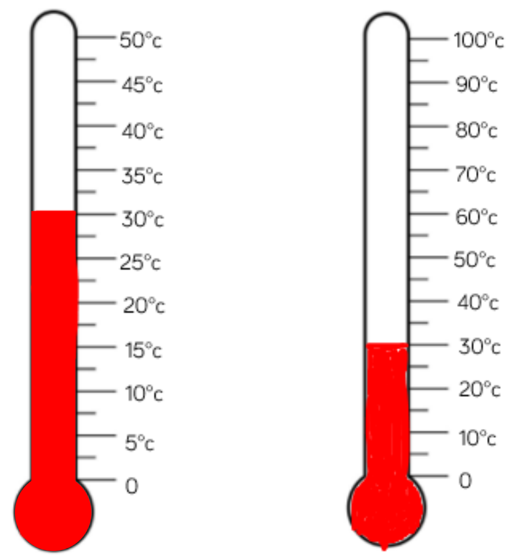
3. Compare the temperatures using <, > or =



Temperature

Reasoning and Problem Solving

Mollie took the temperature at 12 pm and again at 5 pm There was a difference of 7°C What could the temperatures be?	Children may give any temperatures that have a difference of 7 Some children may realise that it starts to get cooler in the evening and therefore make sure there 12pm temperature is always warmer than the 5pm temperature.

What is the same and what is different about the thermometers/temperatures? 	Both thermometers are showing 30°C The scale on the first thermometer is 5°c. The scale on the second thermometer is 10°C The liquid in the thermometers shows different heights.