RICH MATHEMATICAL TASK BOOKLET

MEASUREMENT

YEAR 5/6
EVEN YEARS

Teacher Booklet

Task 1

Cooper has broken his ruler but believes you can use it to accurately measure. Do you agree or disagree?

Using the broken rulers, measure the perimeter for each of these rectangles.
(see copy masters for this resource)
Can the rectangles have the same perimeter?

A) Record the estimate and measurement in centimetres. Estimate the perimeter first. Use the broken ruler to find the perimeter and record the measurement:
Estimate –
Perimeter –

B) Record the estimate and measurement in centimetres. Estimate the perimeter first. Use the broken ruler to find the perimeter and record the measurement:
Estimate –
Perimeter –

C) Record the estimate and measurement in centimetres. Estimate the perimeter first. Use the broken ruler to find the perimeter and record the measurement:
Estimate –
Perimeter –

Teacher Notes

During the launch, introduce students to the term perimeter and explain that the distance around the edge of a flat object is called its perimeter. Have a range of flat objects (pictures, books, cards) and trace your finger around the perimeter and ask students to do the same.

Have a copy of the broken rulers.

Notice whether the students realise that the broken ruler does not begin from zero so they cannot read from the last number for the measurement and use this to add up the lengths for the perimeter.

Notice whether the students are beginning the measurement by aligning a line against the edge of the book that they are measuring and then counting the gaps between the lines as the centimetre measurement units.

Expect students to use measurement language including perimeter and to record the estimate and measurement using the cm abbreviation.

Big Ideas

There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these.

Conceptual understanding of measurement requires understanding of conservation and transitivity. Conservation requires understanding that when moved or subdivided, an object will retain its size. Transitivity involves understanding that the measures of two objects can be compared to a third object. For example, if object A weighs more than object B, and object B weighs more than object C, then object A will weigh more than object C.

There are key principles related to measurement including that the size of the measurement unit remains the same (including identical units or subdivisions), units are repeated with no gaps or overlaps (iteration), the unit is part of a whole and the measurement is expressed as the total number of units used.

For the independent task, have objects that the students can use to measure (e.g., centi-cube, multilink, ones cube). Provide them with a single or two objects.

Shareback

Ask students to come up with a list of steps that Tiana could follow to successfully measure with a broken ruler.

Connect

If I ran 1 kilometre, how many metres would I have run? How many centimetres would that be? How many millimetres?

Suggested Learning Outcomes

Estimate length in centimetres.

Measure length in centimetres.

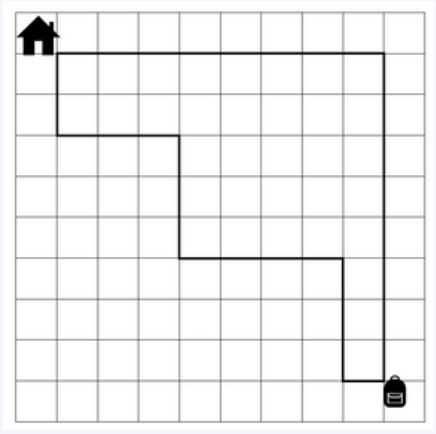
Find the perimeter of a flat object.

Use measurement language to describe how to measure perimeter.

Independent Tasks

Frankie walks different routes to school each day. She believes they are the same distance. Do you agree or disagree with Frankie?

Use materials to measure and check.



Curriculum Links

During Year 5/6

Estimate and then accurately measure length, mass (weight), capacity, temperature, and duration, using appropriate metric or time-based units or a combination of units

Select and use an appropriate tool for a measurement and the appropriate unit for the attributes being measured.

Mathematical Language

Perimeter, centimetre, length, unit of measure, measurement count, ruler.

Anticipations

Solutions, Misconceptions

Task 2

Estimate how long the _____ is and record the estimate and measurement unit.
Estimate -

Use a measuring tool to measure the length and record the measurement count and measurement unit.
Measurement –
Convert the measurement to a different unit.
Measurement conversion –

Teacher Notes

During the launch, give the students different measurement tools (metric rulers and tape measures) to look at and discuss. Ask them to look at the metre ruler or tape measure and the markings. What do the numbers represent? What are the extra markings between the centimetre? Elicit that millimetres are centimetres divided into ten parts and written as mm. How many millimetres are in a centimetre? What happens if you measure in different units? Facilitate them to notice that the smaller the unit the larger the measurement count and vice versa.

Have centimetre rulers, metre rulers, and tape measures.

Ask the students to measure a variety of objects around the classroom that are under a metre, between 2 – 5 m and over 5 m long.

Expect students to record using the correct measurement notation and to measure accurately using mixed units (e.g., metres and centimetres).

Facilitate students to convert between the different metric units and connect this to understanding of base ten.

For the independent task, have sets of objects for the students to measure using different measuring tools.

Big Ideas

There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these.

Conceptual understanding of measurement requires understanding of conservation and transitivity. Conservation requires understanding that when moved or subdivided, an object will retain its size. Transitivity involves understanding that the measures of two objects can be compared to a third object. For example, if object A weighs more than object B, and object B weighs more than object C, then object A will weigh more than object C.

There are key principles related to measurement including that the size of the measurement unit remains the same (including identical units or subdivisions), units are repeated with no gaps or overlaps (iteration), the unit is part of a whole and the measurement is expressed as the total number of units used.

Shareback

Select students to share who are able to accurately measure objects using the measurement tools and to convert between whole number units.

Connect

If I ran 1 kilometre, how many metres would I have run? How many centimetres would that be? How many millimetres?

Suggested Learning Outcomes

Estimate length in a range of measurement units (mm, cm, m).

Measure length in a range of measurement units (mm, cm, m).

Identify the relationship between centimetres and a metres.

Identify the relationship between millimetres and centimetres.

Identify the relationship between millimetres and a metre.

Independent Tasks

Estimate the length of each object. Check your estimation with a measuring tool. Make sure you record the measurement unit.

Estimate –
Measurement –

Estimate –
Measurement –

Estimate –
Measurement –

Estimate –
Measurement –

Estimate –
Measurement –

Curriculum Links

During Year 5/6

Estimate and then accurately measure length, mass (weight), capacity, temperature, and duration, using appropriate metric or time-based units or a combination of units

Select and use an appropriate tool for a measurement and the appropriate unit for the attributes being measured.

Mathematical Language

Metre, centimetre, millimetre, length, unit of measure, measurement count, ruler.

Anticipations

Solutions, Misconceptions

Task 3

The local council is designing a pop up modular building for an art show. They are asking for help and suggestions for designs. It will be constructed using square modules. It will be built using square modules. The squares are scaled so that 1 cm represents 1 metre. (see Copy masters for the squares)

Use the squares to make different designs for the pop up building. Draw around the outline and record the perimeter.

What is the smallest perimeter you can make?

The venue needs to maximise on wall space to ensure the most art can be put on display.

What is the longest perimeter you can make?

Teacher Notes

Before you launch this task, ask students to each draw a ruler from memory. Ask them to compare the drawings and discuss what is the same and different in their drawings.

To launch the task, revisit the concept of perimeter and ask students to identify where the perimeter of a building would be. As the task is launched, show them the squares and highlight that each side is 3 cm in length so equivalent to 3 m when scaled.

Provide the students with 6 squares to use.

Facilitate students to use grouping and multiplication to combine their measurements of each side to find the total length of the perimeter.

Expect students to record their perimeter measurement using the correct unit abbreviation (cm for design or m when scaled).

For the independent task, have 8 squares available for students to use if needed.

Shareback

Select students to share who have created the different polygons with the same perimeter. Ask them to discuss how different shaped polygons can have the same perimeter. Select students to share who have created the longest perimeter and can explain how to find the perimeter.

Big Ideas

There are a range of attributes that we can measure including length, mass, time, area, angle, and volume.

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Curriculum Links

During Year 5

Visualise, estimate, and calculate:
– the perimeter of regular polygons (in m, cm, and mm)
– the area of shapes covered with squares or partial squares
– the volume of rectangular prisms filled with centicubes, taking note of layers and stacking.

During Year 6

Visualise, estimate, and calculate the area of rectangles and right-angled triangles (in cm2 and m2) and the volume of rectangular prisms (in cm3), by applying multiplication.

Connect

How many different designs can you make for the library with the same perimeter using four squares?

If you change the design of your building what happens to the perimeter?

Suggested Learning Outcomes

Create different polygons and find the perimeter of different polygons.

Identify that different polygons can have the same perimeter.

Use measurement language to describe how to measure perimeter.

Mathematical Language

Metre, centimetre, length, unit of measure, measurement count, ruler, millimetre.

Independent Tasks

The local council is designing a pop up modular building for an art show. They are asking for help and suggestions for designs. It will be constructed using square modules. It will be built using square modules. The squares are scaled so that 1 cm represents 1 metre.
(see Copy masters for the squares)

Use the squares to make different designs for the pop up building.
Draw around the outline and record the perimeter.

What is the smallest perimeter you can make?

The venue needs to maximise on wall space to ensure the most art can be put on display.

What is the longest perimeter you can make?

Anticipations

Solutions, Misconceptions

Task 4

Mereana is making a tivaevae ta'orei for her Aunty. She needs to measure the bed so that she can get the right amount of fabric. Here is the outline of a scaled model of the bed for the tivaevae ta'orei. (see copy masters)

For the material, she would pay $25 for 100 of the smaller patches and $45 for 100 of the larger patches.

How much would she pay for each option?

Teacher Notes

For the task, give students one large square and one small square. If students need more squares than give them two squares so they can place one and then the next one to measure the area.

Facilitate the students to notice that they need to place the squares carefully with no gaps or overlaps and starting at the beginning of each row. Support them to notice that they can develop an array to represent the area.
Notice whether students measure the entire paper with the square or whether they begin to realise that each row or column would be the same measurement count and this can be recorded instead.

Expect students to use measurement language including area.

For the independent task give the students different coloured squares cut out from the 1 cm^2 template and a piece of blank paper.

Shareback

Select students to share who have multiplication and developed an array to find the area rather than counting every square individually. Support students to see that you would not need to count every square individually.

Connect

What happened to the area measurement when the patchwork square was larger? Why is that true? What is the relationship between the small patchwork squares and the larger patchwork squares?

Ask the students to develop a rule for how to find the area of a rectangle that will always work. Test the rules and develop a shared explanation and justification.

Big Ideas

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Suggested Learning Outcomes

Use non-standard units (squares) to measure area.

Find the area by using grouping or multiplication.

Use measurement language to describe how to measure area.

Independent Tasks

Mereana made some patterns with the smaller squares for the tivaevae ta'orei.

With the squares you can make a pattern for the tivaevae.
Make a pattern that has an area of 30 squares by connecting the square tiles.

Make a different pattern that also has an area of 30 squares by connecting the square tiles.

Curriculum Links

During Year 5

Visualise, estimate, and calculate:
– the perimeter of regular polygons (in m, cm, and mm)
– the area of shapes covered with squares or partial squares
– the volume of rectangular prisms filled with centicubes, taking note of layers and stacking.

During Year 6

Visualise, estimate, and calculate the area of rectangles and right-angled triangles (in cm2 and m2) and the volume of rectangular prisms (in cm3), by applying multiplication.

Mathematical Language

Area, square, unit of measure, measurement count.

Anticipations

Solutions, Misconceptions

Task 5

Here are the footprint for new buildings for a school.
(see Copy Masters)
Each square represents 1 $m^{2.}$

Find the area and perimeter for each footprint.

What do you think each space could be used for?

Teacher Notes

During the launch, remind the students of the term perimeter and ask them to identify where the perimeter would be on a 2D shape and discuss the difference between the perimeter and area.

Notice whether students use grouping or multiplication to find the perimeter and area of each composite shape. Facilitate the students to record the measurement units correctly for each using the abbreviation.

Expect students to use measurement language including area and perimeter and to draw on real world knowledge to think about the potential use of the footprint space within the school.

For the independent task, have 1 cm grid paper available for students to use.

Shareback

Select students to share who have divided the composite shapes and then used multiplication to find the area of each part and added them together. Select students who have drawn on real world knowledge to explain the specific area in the school that the footprint could represent.

Big Ideas

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Connect

Draw a variety of shapes for which the area is numerically equal to the perimeter e.g 4x4 and 3x6...

Encourage the students to come up with their own shapes that have an equal perimeter and area (use squared paper).

Suggested Learning Outcomes

Find the perimeter of a shape.

Find the area of a rectangle by using multiplication.

Use measurement language to describe how to measure area.

Solve multiplication and division problems.

Independent Tasks

Draw a shape for which the perimeter equals twice the number of the area.
Draw a shape for which the area equals twice the number of the perimeter.
Draw some shapes which have the same area but different perimeters.

Curriculum Links

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During Year 6

Visualise, estimate, and calculate the area of rectangles and right-angled triangles (in cm2 and m2) and the volume of rectangular prisms (in cm3), by applying multiplication.

Mathematical Language

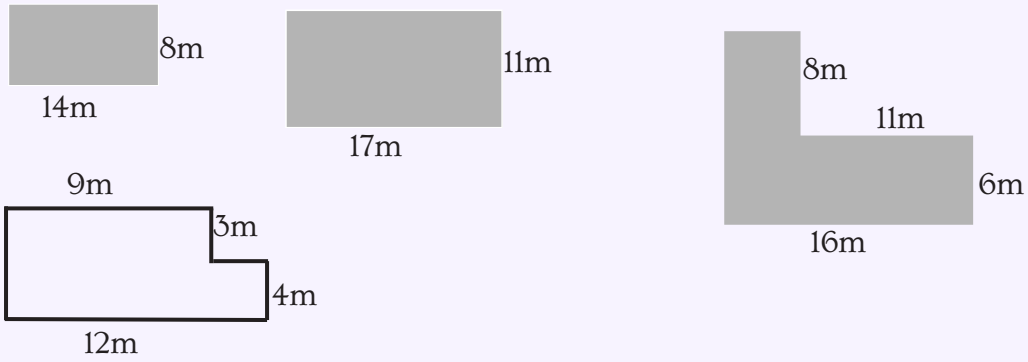
Perimeter, centimetre, length, unit of measure, measurement count, ruler.

Anticipations

Solutions, Misconceptions

Task 6

Find the perimeter and area of these building designs.



Teacher Notes

Notice whether students use grouping or multiplication to find the perimeter and area of each composite shape.

Facilitate the students to record the measurement units correctly for each using the abbreviation.

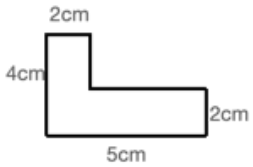
Expect students to use measurement language including area and perimeter.

Shareback

Select students to share who have divided the composite shapes and then used multiplication to find the area of each part and added them together.

Connect

Timo thought that to find the area of this shape, he could multiply 5 by 4. Do you agree or disagree with Timo? Explain why.



Suggested Learning Outcomes

Find the perimeter of a shape using the side lengths.

Find the area of composite shapes.

Big Ideas

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Independent Tasks

Draw and label these shapes then calculate the area and perimeter for these buildings:

Building A (Rectangle)
- Length = 18 m
- Width = 10 m

This shape is made from two rectangles:
- Bottom rectangle: 14 m × 4 m
- Left vertical rectangle: 5 m × 8 m
- The total height is 8 m
- The total bottom length is 14 m

Building D (Step shape)
- Bottom width = 12 m
- Right vertical side = 7 m
- Top right horizontal = 5 m
- Middle vertical = 3 m
- Top left horizontal = 7m
- Left vertical side = 10 m

(All edges are horizontal or vertical.)

Curriculum Links

During Year 5

Visualise, estimate, and calculate:
– the perimeter of regular polygons (in m, cm, and mm)
– the area of shapes covered with squares or partial squares
– the volume of rectangular prisms filled with centicubes, taking note of layers and stacking.

During Year 6

Visualise, estimate, and calculate the area of rectangles and right-angled triangles (in cm2 and m2) and the volume of rectangular prisms (in cm3), by applying multiplication.

Mathematical Language

Square metre, area, perimeter, unit of measure, measurement count.

Anticipations

Solutions, Misconceptions

Task 7

Use the 60 cubes to build as many different box-shaped (cuboid) buildings as possible.
Draw each building as a 3-D representation and label this to show how you find the volume.

Teacher Notes

To launch the task, facilitate students to explore the volume of variety of boxes using informal units of measure (e.g., blocks, lego pieces). Revisit the concept that the volume of an object is the amount of space it takes up.

To launch the task, facilitate students to describe a 3-D cube and its attributes. Make links to the differences between cubes and cuboids (length, breadth, height). Emphasise that a cube is a special case of a square prism, and a square prism is a special case of a rectangular prism and that they are all cuboids.

Have 48 x 1cm^3 cubes to build the cuboids.

Facilitate the students to notice that the volume of an object stays the same (does not change) when cut up and rearranged.

Expect students to represent using 3-D drawings and label these.

For the independent task, have centi-cubes available.

Shareback

Select students to share who have found multiple possible solution strategies and represent how to find the volume using multiplication.

If no student uses multiplication, then model this for the students and record (1 x 60 x 1).

Connect

If the volume of your cuboid is 24 cm^3 what are the possible dimensions?

Big Ideas

There are a range of attributes that we can measure including length, mass, time, area, angle, and volume.

When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these.

Curriculum Links

During Year 5

Visualise, estimate, and calculate:
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During Year 6

Visualise, estimate, and calculate the area of rectangles and right-angled triangles (in cm2 and m2) and the volume of rectangular prisms (in cm3), by applying multiplication.

Suggested Learning Outcomes

Identify the attributes of a cuboid.

Demonstrate how to find the volume of a cuboid.

Recognise that the volume of an object stays the same when rearranged.

Mathematical Language

Volume, cubic centimetres, cubes, cuboids, units of measure, measurement count.

Independent Tasks

Use 36 x 1 cm^3 cubes to build different cuboid.

Draw each building as a 3-D representation and label this to show how you find the volume.

Anticipations

Solutions, Misconceptions

Task 8

Here are two towers of starburst lollies.
You can choose to keep one of them.
Which one would you choose to keep?
Represent your solution in a variety of ways and be prepared to justify your reasoning.

Teacher Notes

During the launch, establish that there is four starbursts towards the back.

Note, that the measurement for the first tower is 4 x 4 x 14 and the second tower is 4 x 8 x 7.

The aim of the connect is for the students to be able to see each explanation and work at refining all explanations to an agreed on-one explanation that would be generalisable to all tasks.

For the independent task, have multilink cubes available if needed.

Shareback

Select students to share who have developed different explanations to find the total number of starbursts.

Connect

Discuss, explore, and refine the explanations until a generalised rule emerges.

Big Ideas

There are a range of attributes that we can measure including length, mass, time, area, angle, and volume.

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During Year 6

Visualise, estimate, and calculate the area of rectangles and right-angled triangles (in cm2 and m2) and the volume of rectangular prisms (in cm3), by applying multiplication.

Suggested Learning Outcomes

Compare volume of objects using whole number units.

Use appropriate units/whole numbers to measure volume.

Use multiplicative reasoning to find volume of cuboids.

Use side or edge lengths to find volume of cuboids.

Develop a generalised for finding the volume of a cuboid.

Mathematical Language

Cube, cuboid, face, vertex, vertices, length, breadth, height, surface, centimetre, cubic centimetres, 3-dimensional, 2-dimensional.

Independent Tasks

What cuboids can you build with these dimensions?
What would be the volume for the cuboid?

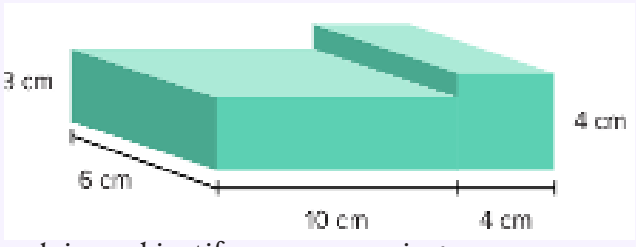
1. Length is 7 cubes; width is 2 cubes; height is 1 cubes?
2. Length is 6 cubes; width is 5 cubes; height is 4 cubes?
3. Length is 3 cubes; width is 3 cubes; height is 3 cubes?
4. Length is 9 cubes; width is 5 cubes; height is 3 cubes?
5. Length is 7 cubes; width is 8 cubes; height is 9 cube?
6. Length is 7 cubes; width is 3 cubes; height is 3 cubes?

Anticipations

Solutions, Misconceptions

Task 9

The figure below is made of 2 rectangular prisms. What is the volume of the figure?



Be ready to explain and justify your reasoning.

Teacher Notes

Facilitate students to notice that volume is the space inside a unit.

Expect students to use multiplication to find the volume and use 3-D representations to explain and justify.

Shareback

Select students to share who have split the composite cuboids into two cuboids and found the volume of each.

Connect

How would you find the volume of these stairs? Use a representation and mark in the measurements you would need to find the volume.

Suggested Learning Outcomes

Use multiplicative reasoning to find volume.

Find the volume of a composite cuboid.

Independent Tasks

Here is the volume of some blocks of wood.
Draw the outline of the block of wood and mark the dimensions in cm which could match the volume.
There may be more than one solution so make sure that you have all possible solutions.

1. 60 cm^3
2. 12 cm^3
3. 99 cm^3
4. 45 cm^3
5. 13 cm^3
6. 150 cm^3

Big Ideas

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During Year 6

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Mathematical Language

Cubic metre, cuboids, cubes, volume, length, width, height.

Anticipations

Solutions, Misconceptions

Task 10

Find two containers that have the same capacity, will hold more than a half a litre but are a different shape.

Prove that they have the same or almost the same capacity. Record the capacity of each container using mL and l.

Make sure that you explain and justify your reasoning using a range of representations including a number-line.

Teacher Notes

To launch the task, show students a jug with milli-litre markings and ask them to stretch a number-line to match the scale.

Facilitate the students to notice that the marks on the number line should be equally spaced because the spaces between them represent slices of equal capacity/volume.

Have a range of measuring tools (jugs, cups, measuring spoons) with different marked measures and closely watch for students who choose inappropriate measures.

Facilitate the students to recognise that one litre is 1000mL. Press them to go above 1 litre including using fractional language. Make links to the terms, millilitre, and millimetre, and that the term milli represents one thousand.

Shareback

Select students to share who have used a variety of representations including a number line with equally spaced marks to represent equal volume between measurements. Encourage and model the use of standard unit measurement language (e.g., millilitres, litres, 500 mL is halfway to 1L).

Connect

Have a number line which is marked from 50 mL to 1000 mL with a scale but no other numbers. Ask students to identify how many millilitres would be represented at certain points.

Have a number line which is marked from 50 mL to 2 litres with a scale but no other numbers. Ask students to identify how many litres and millilitres would be represented at certain points

Big Ideas

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When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these.

Curriculum Links

During Year 5/6

Estimate and then accurately measure length, mass (weight), capacity, temperature, and duration, using appropriate metric or time-based units or a combination of units.

Convert between common metric units for length, mass (weight), and capacity, and use decimals to express parts of wholes in measurements

Suggested Learning Outcomes

Use standard units (millilitres and litres) to describe and measure capacity.

Calculate the numbers of units to describe the measurement.

Convert metric units of millilitres (ml) to litres (l).

Mathematical Language

Capacity, millilitres, litres, measurement markings, scale.

Independent Tasks

Identify the attribute being measured:

- The amount of water in a drink bottle
- The amount of air inside a balloon
- The amount of matter that makes up a bicycle
- The amount of petrol in a car's fuel tank
- The amount of space inside a classroom
- The amount of matter that makes up a loaf of bread
- The amount of soup in a bowl
- The amount of space inside a refrigerator
- The amount of matter that makes up a mountain
- The amount of juice in a juice box
- The amount of space inside a suitcase

Anticipations

Solutions, Misconceptions

Task 11

Find three things which would have a total mass of 1.75 kilograms.

Draw a number line to represent the mass measure of each item and show how altogether their estimated mass is 1.75 kilograms.

Now use the scales to check the mass of each object against your estimation.

Draw another number line to represent the mass measure of each item from the scale and show the individual and combined mass.

How close to 1.75 kilograms was your estimation?

Teacher Notes

To launch the task, ask students if they have heard the word 'gram' and 'kilogram' and what they think it means. Have centi-cube (1 gm) and bags of objects which have a mass equivalent to 750 grams and 1 kg. Let the students lift and hold them. Discuss the use of g for grams and kg for kilograms to record the measures of mass.

Have analogue/digital scales and a selection of objects.

Use the term finding the mass and not weighing. Facilitate the students to use the terms more massive or less massive rather than heavier or lighter. or so on. Discuss the use of mg, g and kg, and decimals and fractions to describe and record measures of mass.

Note, the mass of an object is the amount of matter in it. The mass of the object is measured by the number of unit masses that balance it. A kilogram is a national and international agreed unit (metric standard) for measuring mass and is recorded as kg and gram is recorded as g.
Scales find the weight of an object. This is the force of gravity by which it is attracted to the Earth (gravitational pull). However, because gravity is almost the same everywhere on Earth an object's weight provides a good estimate of its mass.

Shareback

Select students to share who have closely approximated a total mass of 1.75 kg (including slightly below and above).

Big Ideas

There are key principles related to measurement including that the size of the measurement unit remains the same (including identical units or subdivisions), units are repeated with no gaps or overlaps (iteration), the unit is part of a whole and the measurement is expressed as the total number of units used.

Curriculum Links

During Year 5/6

Estimate and then accurately measure length, mass (weight), capacity, temperature, and duration, using appropriate metric or time-based units or a combination of units.

Convert between common metric units for length, mass (weight), and capacity, and use decimals to express parts of wholes in measurements

Connect

Ask students to explain and justify which measure is closest to 1.750 kilograms.

1 kg and 74 g or 1740 g
1.711 kg or 1890 g
1750 g or 1 3/4 kg

Suggested Learning Outcomes

Estimate the mass of objects in grams and kilograms.

Find the mass of objects in grams and kilograms using a scale.

Convert grams to kilograms.

Use measurement language to describe the measurement of mass.

Use linear scales to represent mass

Mathematical Language

Mass, massive, massive, equal, kilogram, gram, scale.

Independent Tasks

These measurements have got all in a jumble. Sort them so they match correctly.

Area of a football field	300	m2
Capacity of a bath	60	tonnes
Height of a 3 year old	5	metre
Length of a finger	-20	litres
Mass of a ship	45	mm/second
Walking Speed	3.5	km
Temperature of a glacier	7000	degrees celsius
Snails speed	26000000	mm
Temperature of human body	1	km/h
Length of a marathon	37	degrees celsius

Anticipations

Solutions, Misconceptions

Task 12

This weekend our church had a special children's celebration for White Sunday. TJ and his friends had to mix the orange juice for lunch. He had two recipes for mixing the orange juice. They were told to make the one with the most orange taste because most children preferred that.

Recipe 1: Mix 2 l orange to 3 l water
Recipe 2: Mix 3 l orange to 5 l water

Which recipe did they use?

Teacher Notes

Before you launch: Discuss and explore the use of decimals to record in litres and millilitres. Model how you would record 1400 millilitres as 1.4 litres. Ask students to convert the following:
1800 millilitres to litres
2.5 litres to millilitres
900 millilitres to litres
1.25 litres to millilitres
75 millilitres to litres.

Expect students to use representations to represent the ratio and relationship.

Facilitate students to notice that the numbers can be adjusted using equivalent relationships.

Monitor for students using measurement language and conversions between litres and millilitres.

Shareback

Select students to share who use the distributive property or equivalence and compensation and have recognised that 1000 mL equals a litre and converted between the two units of measure.

Connect

Ask the students to provide different recipes that would make the drink have a stronger or weaker orange taste.

Big Ideas

There are a range of attributes that we can measure including length, mass, time, area, angle, and volume.

When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these.

There are key principles related to measurement including that the size of the measurement unit remains the same (including identical units or subdivisions), units are repeated with no gaps or overlaps (iteration), the unit is part of a whole and the measurement is expressed as the total number of units used.

Curriculum Links

During Year 4

Measure body parts (e.g., the arm) or familiar objects and use these as benchmarks to estimate and then measure length, mass (weight), capacity, and duration, using appropriate metric or time-based units.

Use the metric measurement system to explore relationships between units.

Suggested Learning Outcomes

Solve ratio problems involving litres and millilitres by using equivalent relationships.

Solve ratio problems involving litres and millilitres by using a representation.

Convert between litres and millilitres.

Independent Tasks

Assessment Task 1: Area and Perimeter
Assessment Task 2: Volume Task

Mathematical Language

Mass, less massive, more massive, equal mass, kilogram, gram, scales.

Anticipations

Solutions, Misconceptions

Assessment Task 2 - Year 5/6 Odd Years

Draw different shapes that have a perimeter of 24 cm. Which shape would have the largest area? Show how you worked out the area.

Assessment Task 2 - Year 5-6

Cadbury wants to make a new box for their chocolates. Each chocolate is a cube that measures 2 cm3
They would like to fit 24 chocolates in the box. Can you design some different options for them to choose from and include the measurements and volume of the boxes?