RICH MATHEMATICAL TASK BOOKLET

MEASUREMENT

YEAR 5/6
ODD YEARS

Teacher Booklet

© Bobbie and Jodie Hunter

Task 1

Tiana has made some pictures for her family and would like to buy frames for them.

Unfortunately, she has broken her ruler so you will need to use this broken ruler to find out the perimeter of the pictures for the frames. (see copy masters for this resource)
Can the pictures 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.

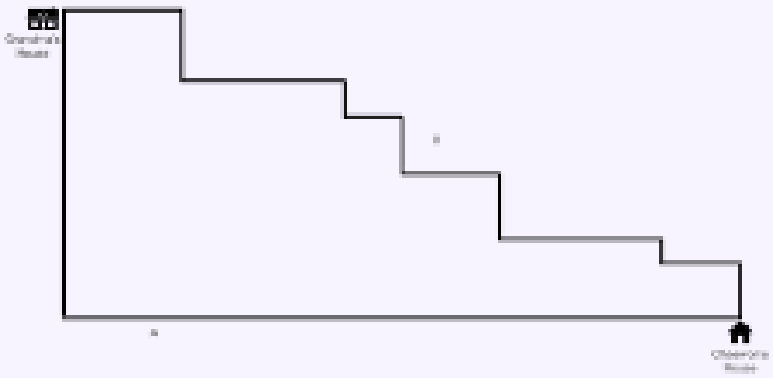
Measure length in centimetres.

Find the perimeter of a flat object.

Use measurement language to describe how to measure perimeter.

Independent Tasks

Chaewon takes an Uber to visit her grandmother each weekend. The Uber driver usually takes the same route (marked A) and this costs $10. The Uber driver took a different route (marked B) one weekend.
Do you think the different route will cost Chaewon more than $10 because the driver went a longer distance?
Write your prediction down and then use the equipment 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

Auckland City Council is asking for help and suggestions for designs for a new library building. 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 library. Draw around the outline and record the perimeter.

What is the smallest perimeter you can make?

The council decides to put the books lining the walls so to fit the most books, they would like to have a building with the longest perimeter.

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.

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 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.

Independent Tasks

Auckland City Council is asking for help and suggestions for designs for a new library building. It will be built using square modules. The squares are scaled so that 1 cm represents 1 metre.

The council would like a library building with a perimeter of 36 m.

Use the squares to make different designs for the library.

Mathematical Language

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

Anticipations

Solutions, Misconceptions

Task 4

Ashok was helping his Mum work out how many tiles they needed for the bathroom walls and floor. He got distracted and didn't finish.

Can you help by working out a quick way to find the area and number of tiles that would be needed for each space?

(see images in Copy Masters)

Teacher Notes

Have rulers available if students need these to draw in the missing line segments to make a complete grid or array.

Notice whether students draw in and count all of the squares individually or if they use repeated addition, or multiplication. Also notice whether there are students who can visualise using the partially completed segments.

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 used multiplication to find the area and visualised the array. If no students have visualised the array using what is already there, then introduce this as a solution that students have used in previous years.

Connect

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

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.

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

Ashok was helping his Mum work out how many tiles they needed for the bathroom wall. He got distracted and didn't finish. Can you help by working out a quick way to find the area and number of tiles that would be needed for each space?
(see copy masters)

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.

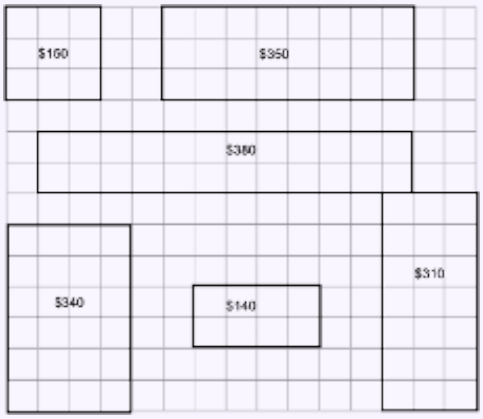
Anticipations

Solutions, Misconceptions

Task 5

Aotearoa Building supplies sells windows and calculates the price of these by using the area of glass needed and the perimeter of the frame needed.

Work out how they arrived at the prices of the windows below:



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 rectangle.

Facilitate the students to record the measurement for each window in a table to help them notice the relationship between the cost of the perimeter frame and the area of the glass. Notice when two windows have the same area but different perimeters. Facilitate the students to calculate the difference in cost to determine the cost per m for the perimeter. Note the frame/perimeter is $5 per metre with the glass $10m^2$.

Expect students to use measurement language including area and perimeter.

Shareback

Select students to share who have used multiplication to find the area and grouping to find the perimeter and solved the task by identifying the relationship between the cost of each segment of the perimeter and each area measurement.

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.

Connect

Draw two rectangles on the board (4 by 4 and 8 by 2) write in the measurements for two sides. Ask students to find the perimeter, area, and cost for those windows.

Suggested Learning Outcomes

Find the perimeter of a rectangle.

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

Sione is creating a togalaau with his Tama. They have fencing for a perimeter of 36 m. Create as many designs as you can and record these in a table with the measurement units:

What patterns do you notice?
What togalaau design is the best? Explain why.

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

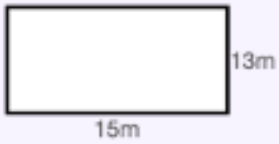
Perimeter, centimetre, length, unit of measure, measurement count, ruler.

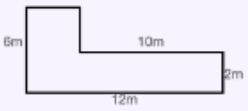
Anticipations

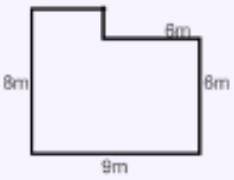
Solutions, Misconceptions

Task 6

Find the area and perimeter 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.

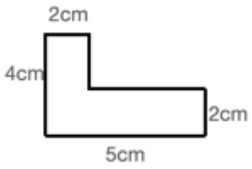
Expect students to use measurement language including area and perimeter.

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

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.

Independent Tasks

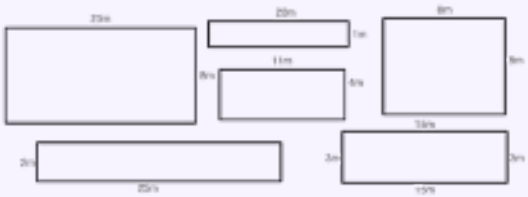
Are these statements sometimes, never, or always true:

1) To find the perimeter of a square you can multiple the length of one side by four.
2) To find the area of a shape, you multiple the length by the width.
3) When you cut a piece off a 2D shape, you reduce the area and perimeter.

Justify your responses.

These are the possible designs for a new community swimming pool. Can you find the perimeter and area for each design?

Select which design is the best and explain why.



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

Ta'ase is sending a parcel to her family overseas. She needs a box with a volume of 10 000 cm^3.

Find the volume of the boxes to see if they are big enough.

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.

For the task, have a variety of different sized and shaped small boxes. Provide students with centi-cubes (1 cm^3) and 1000 cm^3 cubes to measure the volume.

Facilitate the students to notice that an object is measured by the number of unit volumes that fit into it. Additionally, for accuracy of measurement, there should be no gaps or spaces between the 1 cm^3.

Students should begin to construct the formula naturally without it being taught or reinforced. For the connect, there are multiple possibilities that could be given.

For the independent task, have a variety of boxes and centi-cubes available.

Shareback

Select students to share who measure the volume of the boxes by finding the dimensions and using multiplication. Alternatively select students to share who have layered the bottom first and then multiplied the bottom layer to find the volume.

Connect

Describe how you can find the volume of any box.

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:
– 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.

Suggested Learning Outcomes

Explain volume as the space inside an object/container.

Use standard units to measure volume.

Use multiplication or grouping to find the volume.

Mathematical Language

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

Independent Tasks

Measure the volume of each box.

Represent how you found the volume for each box.

Anticipations

Solutions, Misconceptions

Task 8

Use the 48 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 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.

Have multilink cubes avaliable if needed for the independent activity.

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 48 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:
– 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.

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

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

Length is 7 cubes; width is 3 cubes; height is 3 cubes?

Anticipations

Solutions, Misconceptions

Task 9

What is the volume of your classroom?

As part of your explanation, draw a representation to use to explain and justify your solution.

Teacher Notes

To launch the task, show students pictures of large spaces (shipping container, refrigerated truck) and facilitate discussion with the students of the need to have larger measures of volume than the use of centimetres cubed (cm^3).

Have a cubic metre prepared (use metre rulers and card and newspaper to make or use pre-prepared ones).

Use the term cubic metre and record as 1 m^3.

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

Expect students to use multiplicative relationships to consider the volume and justify this with a 3-D representation.

For the independent task, have a variety of pictures of different sized cuboid spaces (e.g., shipping container, warehouse, classroom, lounge, aquarium).

Shareback

Select student to share who has used a 3-D representation and cubic metre benchmark to justify the volume measure.

Connect

Ask students to make a prediction about the volume of another school space using cubic metres and draw a 3-D representation to use to explain and justify their reasoning.

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:
– 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.

Suggested Learning Outcomes

Estimate the volume in cubic metres using benchmarks.

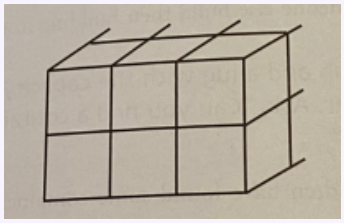
Use multiplicative reasoning to find volume of space.

Mathematical Language

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

Independent Tasks

Melania has this picture of the front end of a rectangular box.



What might the volume of the box be?
Is there only one possible answer or more?
Explain and justify your answer.

Anticipations

Solutions, Misconceptions

Task 10

Find two containers that have the same capacity, will hold more than 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

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 5/6

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: Volume, capacity, mass

The amount of matter that makes up a sheep.
The amount of liquid medicine given to a human
The amount of space inside a shipping container
The space inside a tent
The water inside a pool
The amount of matter that makes up a milk tanker
The amount of matter that makes up a packet of rice

Anticipations

Solutions, Misconceptions

Task 11

Find three things which would have a total mass of 1.5 kilograms.

Draw a number line to represent the mass measure of each item and show how altogether their estimated mass is 1.5 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 1.5 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 500 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 1.5 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 1.5 kilograms.

1 kg and 49 g or 1490 g
1.511 kg or 1490 g
1500 g or 1 1/2 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

Independent Tasks

Solve the first multiple choice questions and then write 10 more of your own.

A marble will have a mass of about
1 g 50 mg 5 g

A man could have a mass of about
80 kg 8 kg 8 g

A truck could have a mass of about
500 kg 5 t 500 g

A large whale will have a mass of about
20 g 50 kg 50 t
A teaspoon will have a capacity of about
300 ml 5 ml 5 l

A cup of water will have a capacity of about
350 ml 5 ml 1 l

Mathematical Language

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

Anticipations

Solutions, Misconceptions

Task 12

For Maia's birthday party her family ordered small bottles of mixed soft drinks. Each bottle contained 635 ml of drink.

They bought 60 bottles but only 47 bottles were used.

How much in litres and millilitres was used?
How much in litres and millilitres was left?

Teacher Notes

To launch the task, explore different shaped containers (drink bottles) that hold millilitres and litres.

Expect students to represent using equations.

Facilitate students to make connections in relation to converting between millilitres and litres.

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

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.

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 multiplication problems that involve capacity including millilitres and litres.

Convert between millilitres and litres.

Mathematical Language

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

Independent Tasks

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

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?