DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES

Level 3 (Year 5, Year 6) Copy Masters, Measurement: Mass, volume, and capacity

Task 1

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.

Task 1 – Independent Tasks

Measure the volume of each box.

Represent how you found the volume for each box.

Task 2

Use the 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.

Task 2 - Independent Tasks

Use 36 x 1cm³ cubes to build different cuboids.

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

Task 3

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.

Task 3 - Independent Tasks

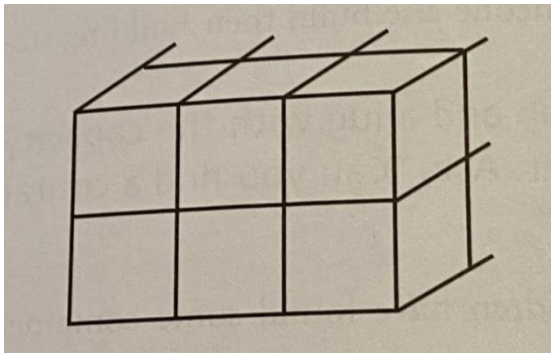
What cuboids can you build with these dimensions?

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

Task 4

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.

Task 4 - Independent Tasks

Draw the front end of a box which would have a total volume that will be a multiple of 5 and make the cuboid.

Draw the front end of a box which would have a total volume that will be a multiple of 9 and make the cuboid.

Draw the front end of a box which would have a total volume that will be a multiple of 12 and make the cuboid.

Task 5

Given global warming and Covid-19, schools need air conditioners with air filters which match the volume the classroom.

What is the volume of your classroom?

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

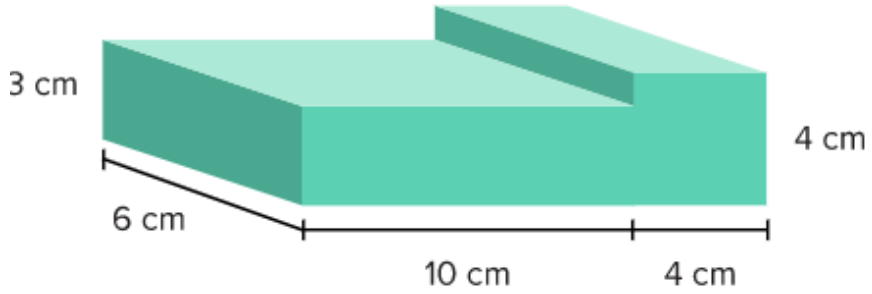
Task 5 - Independent Tasks

Predict the volume in cubic metres for each space and record this as m^3. Draw a 3-D representation to justify your prediction.

Choose 5-10 spaces from your home or community. Predict the volume in cubic metres for each space and record this as m^3. Draw a 3-D representation to justify your prediction.

Task 6

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



Be ready to explain and justify your reasoning.

Task 6 - 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. $60cm^3$
2. $12cm^3$
3. $99cm^3$
4. $45cm^3$
5. $13cm^3$
6. $150\ cm^3$

Task 7

Cereal packets are packed in larger boxes and delivered in a container to shops.

Each packet of cereal has a length of 40 cm, a width of 10 cm, and a height of 15 cm.

Each large box holds ten packets of Weetbix.

The inside dimension of the container has a length of 6 metres, a width of 2 metres, and a height of 3 metres.

How many of the large boxes will fit in the container?

Use a representation to justify your explanation.

Task 7 - Independent Tasks

Draw a 3-D representation of each of the boxes and mark their dimensions and then solve the problem:

1. How many smaller boxes with the dimensions of:

length 1cm, width 1cm, height 1cm will fit inside a larger box with the dimensions of: length 4cm, width 2cm, height 2cm?

2. How many smaller boxes with the dimensions of:

length 4cm, width 1cm, height 1cm will fit inside a larger box with the dimensions of: length 4cm, width 2cm, height 2cm?

3. How many smaller boxes with the dimensions of:

length 5cm, width 2cm, height 2cm will fit inside a larger box with the dimensions of: length 4cm, width 10cm, height 25cm?

4. How many smaller boxes with the dimensions of:

length 7cm, width 3cm, height 7cm will fit inside a larger box with the dimensions of: length 30cm, width 10cm, height 2cm?

Task 8

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.

Task 8 - Independent Tasks

Kilogram (kg), gram (g), milligram (mg), kilometre (km), metre (m), centimetre (cm), millimetre (mm), litre (l), millilitre (mL)

Write the unit that would be used to measure:

1. Quantity of water used in a bath
2. The mass of a bee
3. The length of the classroom
4. Coffee in a jar
5. Your pencil
6. Coffee in a cup
7. The water in your drink bottle
8. The mass of a large bag of apples
9. A spoonful of medicine
10. The mass of a feather

Write ten more things and the unit you would use to measure them.

Task 9

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?

Task 9 - Independent Tasks

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

A marble will have a mass of about

1g 50mg 5g

A man could have a mass of about

80kg 8kg 8g

A truck could have a mass of about

500kg 5t 500g

A large whale will have a mass of about

20g 50kg 50t

A teaspoon will have a capacity of about

300ml 5ml 5l

A cup of water will have a capacity of about

350ml 5ml 1l

Task 10

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

Task 10 - Independent Tasks

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

Area of a football field	26	Metres
Capacity of a bath	50000	Seconds
Height of a 3-year-old	5	m^2
Length of a finger	60	Kg
Mass of a ship	7000	kilometres
Time for a sprinter to run 100m	1	Litres
Your walking speed	300	Mm
Temperature of a glacier	80	℃
Snail's speed	37	m^3
Temperature of the human body	2600000	Tonnes
Area of a stamp	3.5	mm/second
Volume of Egypt's Great Pyramid	10	℃
Mass of a baby	1	mm^2
Length of a marathon	-20	km/h

Task 11

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 2l orange to 3l water

Recipe 2: Mix 3l orange to 5l water

Which recipe did they use?

Task 11 - 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

Task 12

You and your cousin are making recipes for lemon drink.

Recipe 1: 200ml of lemon juice and 300ml of water.

Recipe 2: 100ml of lemon juice and 200ml of water.

You want to make the one with the least lemon taste. Your cousin wants to make the one with the strongest lemon taste.

Which one do you each make?

Task 12 - Independent Tasks

Select one or more of the following assessment tasks (attached at the end of the document) as the independent activity:

M45: Volume of Rubik cube

M13: Volume: Design a chocolate box

M3D: Mass: Find a collection of objects with a mass of 2.5kg