Work Program for B2FMaths@Home Week 6 Year 6

Contents – click on the link below

How to use this work program

Accessing the online resources

To access the online resources, please go to: https://www.backtofrontmaths.com.au/b2fmathshome

Running the program each week

Each week is designed with five maths lessons so that you can do it each day. Different days have different types of lessons to make sure that students experience the kind of thinking that they need to continue growing in maths. The types of lessons include:

- **At-home investigation:** This is a hands-on task where students explore a new idea before they are taught that skill. They need to come up with an idea to try to solve the problem, try out their idea, decide if it worked or not, try again if needed, and explain what they did. If your child has time with your teacher with a webcam, the teacher will generally be doing this lesson with your child. This is the lesson that will require the heaviest input from you to help your child think through an idea and generally requires the use of some hands-on materials that are listed in the information page.
- **Connecting lesson:** This type of lesson has questions that lead students to develop their ideas and learn a new skill. It should be fairly easy for a student to do, but you will need to be available to read the question to your child as needed, encourage them to think further, and make sure that they complete the work. Most of these lessons will include 10 minutes of practising number operations or concepts through activities or games.
- **Interleaved practise lesson:** This type of lesson provides 8-10 questions from different areas of maths so that students practise remembering what they have previously been taught. Some of the questions may not be easy for your child, so feel free to help whenever you see them struggling.
- **Number practice:** This lesson contains games and number tasks to do regularly with your child. Number is the most important concept to establish in Foundation, so we will be using similar activities each week to help your child develop a very firm understanding of "how many", to be able to picture that amount in their head, and to be able to add and subtract small amounts very flexibly. **These sessions will not focus heavily on counting, as counting is far less important than making amounts, drawing those amounts and recognising that the amount is still the same when the objects move.**

Getting help

The website above will have answers to frequently asked questions as well as videos to help you successfully teach your child at home. If you have further questions or need support, please contact your child's teacher directly using the contact details that they have provided to you. If they can't answer your questions, they will contact the B2FMaths@Home team directly to get an answer within 3 days.

What you need to know this week

Week overview

This week we are teaching the concept of capacity. Capacity is used to measure how much a container holds (for example, how much water there is in a jug). We use millilitres and litres to measure capacity, including making use of measuring instruments that you would commonly have in your home.

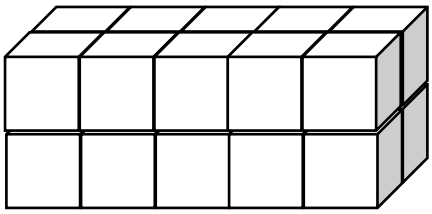
For your information: we often use the words capacity and volume interchangeably. Technically, volume is referring to the amount of 3D space an object takes up (it is used for solids). Capacity refers to how much a container will hold and is generally used for measuring liquids and gases. At this stage it really doesn't matter which term you use, so don't be concerned about getting it wrong.

Students need to work out:

- 1 millilitre is the same size as 1 cubic centimetre. 1000mL = 1L. To help children retain this idea, it may help to point out that 1MAB cube is the same as 1 cubic centimetre. So a 1000 block is 1L.
- The measuring instruments should be used accurately so that the measurement is fair for comparison (e.g. if you used partial cups then you can't count them in the same way as full cups)
- In the same way, you should completely fill the container that you are measuring.
- When measuring small amounts, we use smaller measuring instruments to get a more accurate measurement (e.g. using syringes or small measuring cylinders for medication).

Please note:

- 1 cup = 250mL. That means 4 of them are the same as 1L. Half a cup is 125mL.
- 1 teaspoon = 5mL.
- 1 tablespoon (Australian) = 20mL. That means you will need 50 of them to fill 1L. American tablespoons are often 15mL.
- $1cm^3$ or 1 cubic centimetre is the same amount of space as 1mL. Children use MAB blocks in most schools which are $1cm^3$, so most are able to visualise this relatively easily.
- As 1 tbs = 20mL, this means that 20 MAB blocks, or 2 tens blocks, takes up the same amount of space. It is easier to visualise as this shape:



You will need the following objects:

- Any measuring instruments that you have to measure volume/capacity. This could include a measuring cup or jug, teaspoon (5mL), tablespoon (20mL), litre jug or marking on a casserole dish, medicine cylinder or medicine syringe.
- If you have access to small cubes to use (e.g. MAB) then that would be ideal.

Monday: At-Home Investigation

Ideally, we would have 60 cubes to use for today's lesson to build and examine different rectangular prisms. Using the isometric dot paper provided to draw possible prisms is probably as close as we can get.

You will need:

- A copy of the isometric paper for drawing the prisms.
- Access to cubes to use for building if you can. Otherwise, your child can just imagine what they would look like or you can skip this lesson and go onto the lessons for the rest of this week.

Steps:

1. Make sure you have read "What you need to know this week" so that you know what to emphasise with your child.
2. Read the sheet to your child. Ask for their ideas on how to solve the problem. Don't give your opinion just yet on their ideas, even if they are clearly wrong.
3. Make sure that you try out their ideas first before you try to help them come up with a better plan. This is important because then they will know *why* their idea didn't work.
4. Help your child think about how many cubes are in each layer, then how many layers there are. Also, help your child to think about what each object might look like if it was rotated. This is important as your child may well have 3D drawings of the same prism, just with a different face as the base etc.
5. Discuss what your child found out with them. Keep in mind the ideas from the "What you need to know this week" section so that you can ask questions that are appropriate to the issues identified.
6. We will be checking volume and capacity again later this year, so don't worry too much if today didn't quite work.

At-Home Investigation

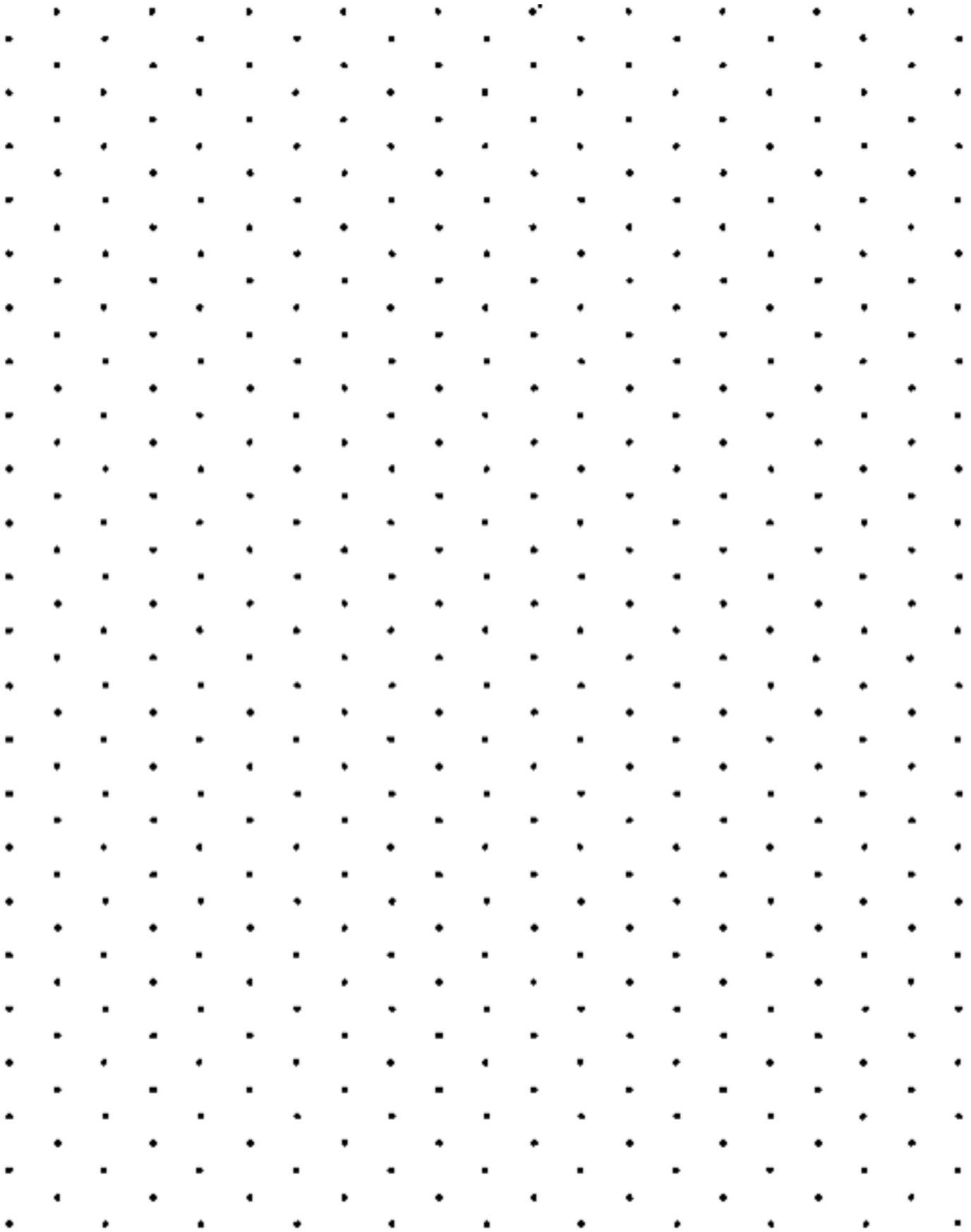
Brainstorm: what different prisms could you build with 60 cubes?

Use the space below to sketch any unique prisms (including single layer prisms) that you could build using 60 MAB cubes. How many can you find altogether? Isometric dot paper is included for you if that makes it easier.

Beware: if one of your prisms can be rotated to make another one, that only counts as a single prism. Think about whether you already have each prism before you draw it.

Apply your learning:

Look at the factors on the sides of each of your prisms. Multiply the length, width and height for each prism. What do you find? Explain any patterns.



Tuesday: Connecting lesson

Measurement worksheet:

The worksheet provided should be fairly easy after yesterday's experiment with 60 cubes. In this lesson students are counting the cubes that they can see and recording this as cubic centimetres or cm^3.

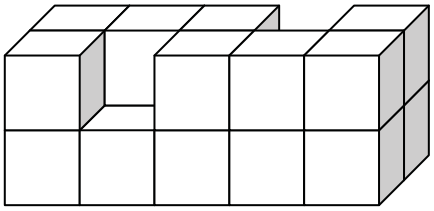
Please also complete one of the multiplication and division grids provided.

E8. Measuring volume in cubic centimetres

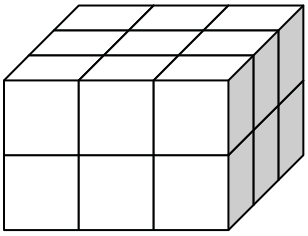
TR p108

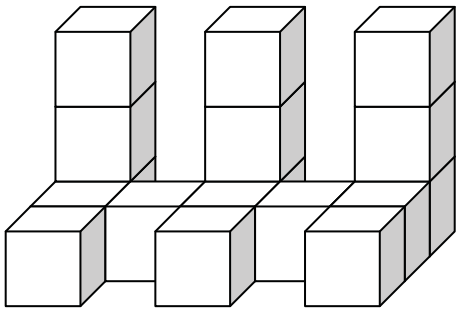
Using the shape diagrams below:

1. Estimate the number of cubes in each shape. Write the estimate beside the shape.
2. Make each shape from MAB or multilinks cubes. Count the number of cubes in each shape and write the number beside the shape.

A  Estimate = Actual number =

B Estimate = Actual number =





C Estimate = Actual number =

1. Which shapes above have the largest volume?
2. Which shape above has the smallest volume?
3. Which shapes above have the same volume? Write the letters of the shape and the volume in cubic centimetres.
4. If I made a cube with dimensions of 2cm x 2cm x 2cm what would the volume be in cubic centimetres? Draw it in the space below.

How did you work out the volume?

Backwards Question:

If you doubled the size of your cube sides, would the volume double? Explain:

Multiplication and division practice grids:

x	2	6	4	3	9	7	8	5	10
2									
3									
4									
5									
6									
7									
8									
9									
10									

x	4	8	7	2	3	9	10	6	5
9									
3									
6									
5									
2									
7									
4									
8									
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÷									
		16					6		
			21		15				
						8		40	
	20			30					
			42						54
					35		21		
		64		48					
	36								81
						20		100	

÷									
		27							30
			6				4		
	40							25	
				24		36			
	56			28					
					63			45	
						60			100
		36					8		
			48		56				

Wednesday: Application and Connection lesson

This lesson will help your child to connect the learning that they have done over the past 3 weeks on arrays with volume. In this lesson, children work out how many blocks would be in each of the prisms pictured. If you have blocks, it would be great to use them. Hopefully though children will be able to visualise the layers that are not shown without the use of blocks. To help your child, ask them to think about the top layer (visible), then imagine the layer that sits just beneath it. The blocks will be in the exact same arrangement. Repeat with each layer, then ask how they would work out the total number of blocks.

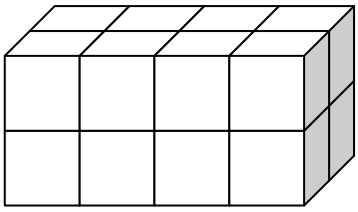
Please complete one of the multiplication/division grids from Tuesday.

Eg. Volume of a rectangular prism

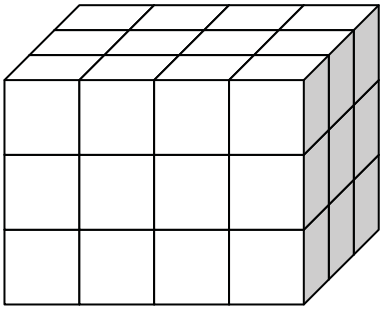
TR p109

Build the following shapes out of cubic centimetre blocks (eg MAB units) and count the blocks to calculate the volume. Use the table below to help you find a pattern between the number of blocks in each layer, the number of layers and the volume.

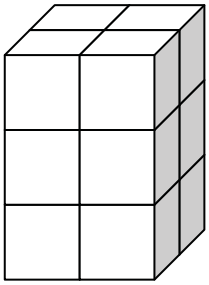
A



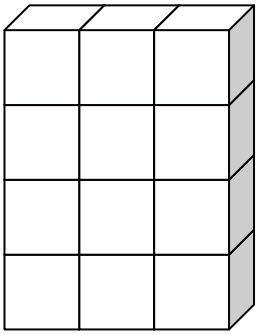
B



C



D



Rectangular prism	No. blocks in the bottom layer	No. layers in the shape	Volume (cu cm)	Is there a pattern?
A				
B				
C				
D				

What is the rule for finding the volume of a rectangular prism?

Backwards Question:

If the volume of a rectangular prism was $100cm^3$, what could its sides be?

Thursday: Interleaved Practice Questions

Why we are using mixed up questions:
In this lesson your child will be reviewing a range of skills that they have learned previously. Each question is unrelated to the previous question, because we want your child to have to *think hard* about what to do. Mixing up questions like this, rather than just practising related questions, has been shown in research to improve student retention of concepts by 60% over a 4 month period.

What to expect:
Your child will probably have forgotten how to complete quite a few of the questions. If needed, change the numbers in each question to make them easier because this will still require your child to think hard and remember a process. If they still can't work it out, feel free to show them, but try using different numbers rather than the exact same question. There are answers to each question on the website in case you get stuck.

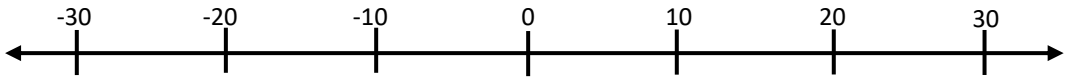
Interleaved practise

Year 6, week 6

Number:

1. Write 0.35 as a fraction and a percentage.

2. Show where these numbers would go on the number line: -6, 12, -24, 9, -15



3. How many pizzas will I need to buy if my friend eats ¾ of a pizza and I eat $^{5}/_{8}$ of a pizza? How much pizza will I have left over?

4. 36 ÷10 = ☐ 36 ÷ 100 = ☐

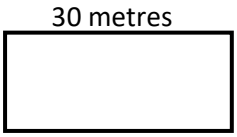
5. 8^2 = ☐ Show how you worked it out.

Measurement/Geometry:

6. What units of measurement would you use to measure the following:
   Water left in a bucket _____ Length of rope needed to tie up your dog _____
   Butter for a cake recipe _____ The amount of carpet needed for a room _____

7. Name the 3D objects that have the following faces:
   Six square faces _____
   Two square faces and four rectangular faces _____
   One square face and four triangular faces _____

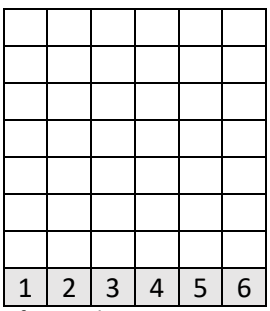
8. This rectangle has a perimeter of 86 metres and a length of 30 metres. What is its area?



Chance/Data:

9. I rolled a 6-sided dice 40 times and these are the numbers that I rolled:
   1 , 3 , 2 , 5 , 6 , 3 , 5 , 3 , 4 , 1 , 2 , 1 , 2 , 3 , 6 , 4 , 1 , 6 , 3 , 5 ,
   5 , 1 , 2 , 4 , 4 , 4 , 3 , 3 , 4 , 2 , 6 , 3 , 4 , 3 , 2 , 3 , 3 , 3 , 1 , 2

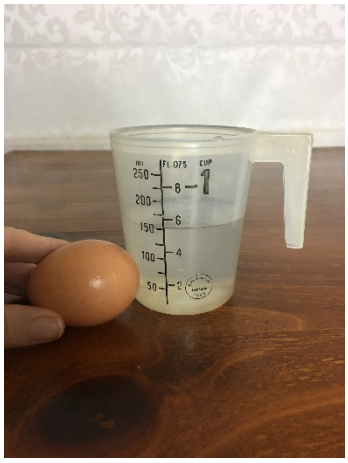
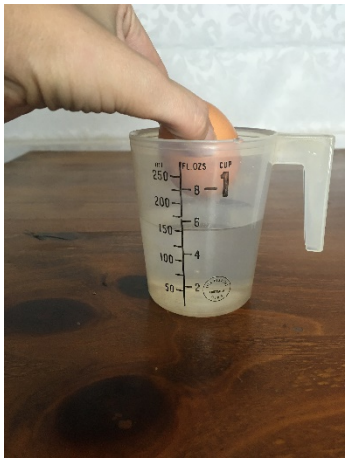
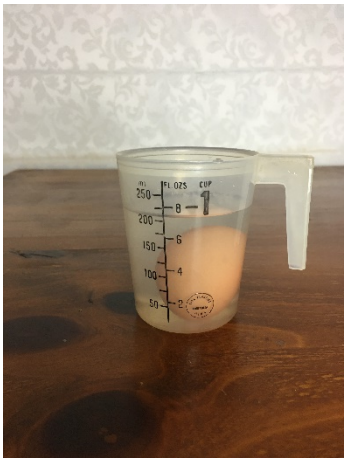
   Use the blank graph to show the results of my experiment. Each square represents 2 rolls of the dice.



Friday: Extending Lesson

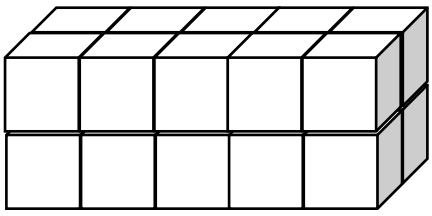
In this lesson your child will form connections between what they know about volume (cm^3) to what they know about capacity (mL).

Give your child a solid item to measure the volume of, rather than a container to measure the capacity of (e.g. use an egg, a ball or a plastic toy rather than a drink bottle, an empty bottle of pasta sauce). They can measure the volume of the solid object by submerging it in water. They can measure the water before putting the object in, then push it under water in a measuring cup, and calculate how much the capacity measurement increases by. The increase in capacity when the object is submerged is the same as the volume of the object in cubic cm.

Please note:

- $1cm^3$ or 1 cubic centimetre is the same amount of space as 1mL. Children use MAB blocks in most schools which are $1cm^3$, so most are able to visualise this relatively easily.
- As 1 tab = 20mL, this means that 20 MAB blocks, or 2 tens blocks, is the same amount of space. It is easier to visualise as this shape as a tablespoon:



Connecting Volume and Capacity

This week we have been working on calculating the volume of rectangular prisms. This is fairly easy, as you have already worked out. Some objects are much more difficult to calculate by length, width or height, so we need to think about connections between volume (solids) and capacity (liquids) to determine how to measure them. The image below shows an egg. How could we use the cup with water in to determine the volume of the egg? Come up with a plan, carry out your plan, and explain what you found.

My Plan:

What happened:
Carry out your plan. Draw and describe what happened.

My Findings:
What did you find, and how can you use that to determine the volume of the item in cubic centimetres?

