Work Program for B2FMaths@Home Week 6 Year 4

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). In middle primary we use millilitres and litres to measure capacity, including making use of measuring instruments that you would commonly have in your home.

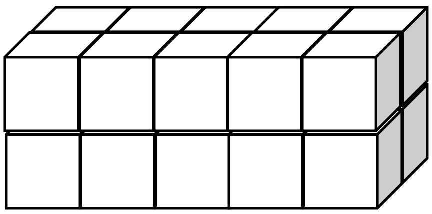
For your information: we often use the words capacity and volume interchangeably. Technically, volume is referring to the amount of 3D space an object takes up (it is used for solids). Capacity refers to how much a container will hold and is generally used for measuring liquids and gases. At this stage 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 large and small containers that you can fill with water (bucket, ice-cream container, sauce pan, mixing bowl, mug, glass, cereal bowl…)
- 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.
- A 2L empty milk carton or ice-cream container for Wednesday

Monday: At-Home Investigation

Today could be quite messy. You might want to do the investigation during bath time and record what happens. A sandpit would work very well too.

You will need:

- Any 3 large containers that you can fill with water or sand (bucket, ice-cream or yoghurt container, sauce pan, mixing bowl, plastic jug, drink bottle…)
- Any measuring instruments that you have access to that measure in millilitres or cups.

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.

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. Make sure that you do point out that they are not allowed to simply pour from one large container into another or judge by sight. That is the challenging part of the question – they need to work out to use smaller measuring objects to fill up a larger one and keep count.
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 what worked and what didn't, then come up with a new plan if needed.
5. Encourage your child to draw or write answers to the questions on the page. Scribe for them if you need to.
6. 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.
7. At the end: consider writing a comment on the page to say what went well or what you are concerned about.
8. We will be checking capacity again later this year, so don't worry too much if today didn't quite work.

At-Home Investigation

Find 3 large containers. *How could you find the capacity of each container?*

Make your plan:

What instruments could I use to measure with?
Find any that you have at home and draw the one you are choosing to use for measurement.
Explain why you chose that one.

How will I make sure that I am measuring accurately?

Carry out your plan:

Measure your three containers. **How much does each one hold?**
Show what you did. Include any number sentences.

Apply your learning:

Compare the containers. Put them in order by how much they hold. Explain how you did it.

Tuesday: Connecting lesson

Measurement worksheet:

The worksheet provided should be fairly self-explanatory. Feel free to substitute any of the implements on the sheet for objects that you have at home. A glass, a bucket and an eye dropper or medication measuring cylinder should be viable.

As noted previously:

- 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.

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

E6. Measure and estimate volumes

TR p101

Sometimes we need to guess the volume of a container so that we know if our measurement is about right. Answer these questions using L and mL.

For measuring the volume of a glass of milk:

1. What instruments could you use to measure it?
2. Would you measure it in litres or millilitres or both? Why?
3. Have a guess: what do you think the volume will be? Why?
4. Choose an instrument and measure it. What did you get?
5. How good was your guess?

For measuring the volume of water needed to fill up a bucket:

1. What instruments could you use to measure it?
2. Would you measure it in millilitres or litres or both? Why?
3. Have a guess: what do you think the volume will be? Why?
4. Choose an instrument and measure it. What did you get?
5. How good was your guess?

For measuring the volume medicine in a dropper:

1. How could you use instruments to measure it?
2. What units would you use to measure it? Why?
3. Have a guess: what do you think the volume will be? Why?
4. Choose an instrument and measure it. What did you get?
5. How good was your guess?

How did you decide whether to use litres or millilitres or both?

How did you measure things that would not fit into cup measures?

Backwards Question:

Your soccer team had a drinks cooler for the team to use. How could you work out if the cooler holds enough water for everyone to have 2 cups full?

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
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					35		21		
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		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. If this proves too difficult, just skip the lesson.

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

Problem 17: Which is the Biggest?

You have been given 4 shapes to make out of MAB. Your job is to work out which one is the biggest, using the different criteria stated below.

Shape 1: Base length: 4 MAB, Base width: 2 MAB, Height: 5 MAB

Shape 2: Base length: 5 MAB, Base width: 2 MAB, Height: 4 MAB

Shape 3: Base length: 3 MAB, Base width: 2 MAB, Height: 6 MAB

Shape 4: Base length: 4 MAB, Base width: 3 MAB, Height: 3 MAB

1. Which of the shapes is the biggest?
   - Which is the tallest?
   - Which is the widest?
   - Which is the longest?
   - Which are the same?
   - So which is the biggest?

2. Is there a way that you could work out the answers to the four questions above without having to make the shapes out of MAB first? Explain how:
   - Which is the tallest?
   - Which is the widest?
   - Which are the same?
   - Which is the biggest?

3. If a doll was going on a plane and had a choice of taking four different suitcases with the same dimensions as the shapes above, which suitcase would you recommend? Why?

Simple manipulation problems:

4. If you made each of the shapes twice as high, how would the number of blocks change?

5. If you made each of the shapes twice as wide, how would the number of blocks change?

Communication:

How did you come up with your solution? What did you do to solve the problem?

Understanding:

What pattern or strategy did you find? How do you know that this is the right way to work out the solution?

Complex manipulation problem:

Level 1: If you made all of your shapes twice as long, twice as wide and twice as high, how many blocks would you need for each shape? Is there a way that you can work it out by using the calculations that you have already done?

Teacher initials:

Date:

Problem solving / T&R:
- o Problem solved with minimal or non-mathematical prompting
- o Some leading questions were used to prompt thinking
- o Solved after explanation
- o Did not work out solution
- o N/A- not a novel problem

Reasoning / Comm.:
(verbal, written, working and equations, or visual representations)
- o Clearly and logically reasoned
- o Easily understood
- o Understood with some interpretation needed
- o Some gaps but on topic
- o Minimal or off topic

Understanding / Reflect:
- o Connected manipulation problems to previous questions and answered easily
- o Connected manipulation problems to previous questions with some prompting, and answered correctly
- o Answered once the similarities to previous questions had been pointed out
- o Had some problems in answers but was on the right track
- o Did not answer appropriately

- o Student not observed

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 4, week 6

Number:

1. Write the pattern that matches this description: write the multiples of 6 beginning with 6 until you get to 6 x 10.

2. Write a 3-digit odd number here Write a 3-digit even number here
If you added them together, would the answer be odd or even? Explain the reason for your answer.

3. Write this number on the place value chart: **Fourteen thousand and fifty**

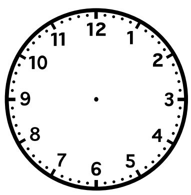
Ten-Thousands	Thousands	Hundreds	Tens	Ones

4. Draw an array for 4 x 9. Show how you worked out how many there are.

5. This rectangle shows a quarter of a chocolate bar. Draw what the whole chocolate bar would look like. Find 2 different ways to do it.

Measurement/Geometry:

6. It's now 23 minutes past 2. Draw the hands on the clock to show what time it will be in 15 minutes.



7. List 3 things you would measure in metres:

List 3 things you would measure in centimetres:

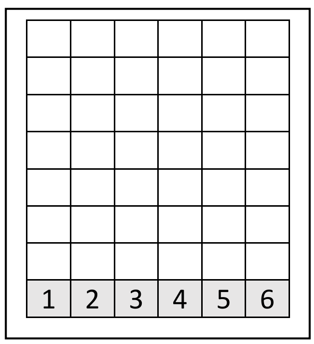
8. How long is your foot? Estimate first and then measure.

My estimate _________ My measure _________

Chance/Data:

9. I rolled a 6-sided dice 25 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

Use the blank graph to show the results of my experiment.



Friday: Extending Lesson

In this lesson your child will extend what they know about capacity to a real-life situation involving ratios. It should involve a fair amount of thinking but will hopefully also be fun to think about. If this lesson is a step too far, you can instead practise thinking about volume of prisms. Some isometric dot paper is included in the resources for the Shape week of the at-home program. This paper is a fun way to practise drawing 3D prisms.

Problem 20: Measuring Volumes

TR p95

A recipe is written below for 'Grade 4 Cordial Concoction'. Your job is to mix the cordial and answer the questions that follow.

Grade 4 Cordial Concoction Recipe:
5mL each of lemon cordial and lime cordial
10mL each of raspberry cordial and black currant cordial
220mL cold water

Questions:

1. How many millilitres of cordial will there be in the final mixture? Write a number sentence to show how to work it out.

2. How close is your measurement to what your answer should be? Explain:

Communication:
Describe how to make sure that your measurements are exact:

<u>Understanding</u>: Manipulation problems

Level 1: If you wanted to make 500mL of Cordial Concoction, how much would you need of each of the ingredients?

Level 2: If you used 20mL of lemon cordial, and made everything else bigger by the same ratio, how much Cordial Concoction would you make altogether? Explain:

<u>Teacher initials</u>:

Date:

Problem solving / T&R:
- o Problem solved with minimal or non-mathematical prompting
- o Some leading questions were used to prompt thinking
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