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 early primary we used informal units to measure how much a container holds (e.g. how many mugs of water fill a bucket), then comparing the capacity of up to 5 containers and ordering them from the smallest to the largest. 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:

- We use millilitres and litres to measure the capacity of a container.
- 1 millilitre is the same size a 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.

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

Teacher Overview

Students will begin using millilitres and litres to measure capacity. Families will be encouraged to use any measuring instruments for capacity that they have at home.

Ideally, we would use the following sequence of thinking to develop the concept of capacity from Year 1 to Year 4:
1. Use smaller measuring objects and count them as a measure of capacity. Realise that you have to use the same object (uniform units), fill them, fill the container completely, and have no gaps if you want to compare size (Year 1).
2. Realise that a bigger measuring object gives a smaller count for capacity and a smaller measuring object gives a larger count.
3. Realise that smaller measuring objects allow for greater accuracy as there are smaller gaps/overruns when filling a container (Year 2).
4. Realise that if we are going to communicate with anyone else, we need a standard way of measuring capacity with units: therefore, develop the need for mL and L (Year 2-3).
5. Use millilitres and litres to measure. Work out that there are 1000mL in each L (Year 3).
6. Work out that $1cm^3$ = 1mL. That means a 1000MAB is the same space as 1L. Volume (solid) and capacity (filling a container e.g. with a liquid or gas) are both used for measuring 3D space and are linked.

What to emphasise

If you have time online with a webcam
Ask students questions that emphasise the "students need to work out" section from the previous page, such as asking them to explain how they used their measuring instruments. Ask them to explain what they found difficult in the At-Home Investigation.

Check that the parents understand how the number tasks for the week work and make sure that you ask the student if they have used them yet.

If you have only email or phone contact
Check that parents have read the "What you need to know this week" section. Check that they understand the importance of using the number tasks so that students retain what they have learned and think regularly about place value.

Tracking student achievement
Has the student accurately measured each item using metric units?
- If so, tick **M4C** on the tracking sheet.
- Can they also compare capacity of multiple objects? Tick **M4B**.
- Can they also order multiple objects according to their capacity? Tick **M4A**.

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.

Please note: to receive a B your child will need to accurately measure, compare and order the capacities of 5 containers. You may wish to increase the number of containers today if your child is finding this task easy. To receive an A, your child also needs to be able to identify issues with inaccurate measurements.

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.

Teacher Overview

This is a *Problem Solving and Reasoning* task.

The emphasis is on *designing* an investigation, *developing* a plan, *testing* it out, *verifying* that the plan worked, changing it as needed and *communicating* the procedure. There is also an emphasis on *generalising* an appropriate process that can be replicated when measuring the capacity of other containers.

If you are at school: ask families to bring in one large container (ice cream, yoghurt, bucket…). Take students to the sandpit if it is open and use cups of sand to measure. You might also want to consider running this activity over a few days with smaller groups of students while others work on the number focus or interleaved lessons. NB this is also a good opportunity to practise counting and tallying. You could easily turn this into a picture graph by using one post-it note for each cupful.

Watch out for:
- Using a measuring object rather than just making the decision by sight.
- Taller = holds more.
- Filling the cups all the way.
- Using different measuring objects rather than uniform objects.
- Heaped spoonfuls or cupfuls if using sand

Good questions to prompt thinking:
- How will we know how much the bucket will hold? How can we measure it?
- Which measuring instruments might work to measure it?
- What might happen if we don't fill the cup up all the way?
- If we are going to compare the containers, do we need to use the same measuring instruments? Is it ok if we use different instruments if they have the same scale so we can compare them?

Students requiring support:
- Use measuring objects first (see the Year 1 and 2 version of this problem).
- Identify the largest/smallest rather than attempting to order.
- Use one large and one small container to compare.

Extension:
- Compare and order capacities for multiple containers.
- Link the scale on a measuring cup with a number line.

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 a litre should be viable. Check casserole dishes and mixing bowls to identify one with litre markings as needed.

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.

Tuesday: Connecting lesson

E7. Measure and estimate volumes

📋 Sometimes we need to guess the volume of a container so that we know if our measurement is about right. Discuss these questions with a friend and then make the measurements using cups and litres.

1. How many cups does it take to fill up a one litre jug? Measure them carefully and find out:

2. How did you do it?

For measuring the volume of a glass of milk:
   1. Would you measure it in cups or litres or both? Why?

   _____

   _____

   2. Have a guess: what do you think the volume will be?

   3. Choose an instrument and measure it. What did you get? How good was your guess?

   _____

   _____

For measuring the volume of water needed to fill up a bucket:
   1. Would you measure it in cups or litres or both? Why?

   _____

   _____

   2. Have a guess: what do you think the volume will be?

   3. Choose an instrument and measure it. What did you get? How good was your guess?

   _____

   _____

BACKWARDS QUESTION:
Your team had a two litre drinks cooler for the team to use. If there are 10 players on the team, will everyone get one cup full? Explain:

Teacher Overview

This is an **Understanding and Reasoning** task. The purpose of this lesson is to spend time practising measuring capacity using whatever measuring instruments are at home.

If you have time online with students, ask them to show you how they use their (empty) measuring instruments. Have them explain what to look for (e.g. place the cup flat on the bench instead of holding it which might create an angle).

You may also want to review the time concept that students were working on last week to build retention.

Wednesday: Application and Connection lesson

This lesson allows your child to examine any measuring objects that you have in your kitchen or medicine cabinet for measuring with and try using one to measure the capacity of a bowl or mug.

You will need:

- A tablespoon or teaspoon, a 250mL measuring cup (or a way of making that amount), a 2L empty milk carton

Steps:

1. Read the sheet to your child. Ask your child to gather the required measuring equipment.
2. Allow time for your child to measure the capacity of the measuring cup in tablespoons. They should find that they will need 12 and a half. That is because 20 x 12.5 = 250.
3. Repeat the process with measuring the milk bottle or ice-cream container using a 250mL measuring cup (NB you could substitute with two half-cup measures or similar).
4. Encourage your child to draw or write answers to the questions on the page.
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. Make sure that they have explained their process out loud, including discussing any difficulties or inaccuracies.
6. If you have extra time: consider including your child in the measuring part of any cooking that you do this week, or make the playdough recipe below together.

Playdough recipe: *If you can find flour and this much salt!*

Ingredients:
1.5 cups of flour
1/2 cup of salt
2 tbs of cream of tartar (skip if you don't have it)
1 tbs of oil
Food colouring
1 cup of boiling water

Steps:

1. Mix all dry ingredients in a bowl with the oil. Your child can do the measuring.
2. Mix the water and food colouring together (not for children to do due to the boiling water).
3. Combine everything and roll out the dough. Store in a bag in your fridge.
4. Why not measure the amount of playdough you have made? You could get a similar number by adding up the capacity of each of the ingredients.

Investigating measuring instruments

How many tablespoons will it take to fill one measuring cup (250mL)?
Find a tablespoon, or substitute by using 4 teaspoonfuls.
How many tablespoonfuls will it take to fill a measuring cup to 250mL?

How many measuring cupfuls (250mL) will it take to fill a 2L milk bottle or ice-cream container?
Work it out using the numbers or measure it to see.
Explain what you found and how you know that you are correct.

How many tablespoons would it take to fill a 1 litre container?
Work it out using the numbers or measure it to see.
Explain what you found and how you know that you are correct.

Teacher Overview

This is an **Application and Connection** lesson. It gives students an opportunity to look for measuring instruments for capacity in their home and to explore how they are used. It also gives students another opportunity to compare and order 3 objects by capacity.

This lesson should also encourage families to consider cooking or using the measuring instruments with their children, including making the playdough. Playdough is great for considering volume so if you are at school it might be worth trying to use it. Many children think that flattening out a ball of dough means you have made more dough. They are surprised to see it "shrink" back to the size of the original ball. This is a good opportunity to bring in mass if you have time. You can make 2 identical sized balls, weigh them, flatten one and weigh them again.

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 3, week 6

Number:

1. Write the pattern that matches this description: Begin with the number 143. Take away 5 to find each number in the pattern until you have done it 6 times.

2. Place the numbers from 1 to 20 on this chart

Odd	Even

3. Write this number on the place value chart: **7 x 1000 + 3 x 100 + 1 x 10 + 8 x 1**

| Thousands	Hundreds	Tens	Ones

4. Draw an array for 4 x 8. Show how you worked out how many there are.

5. This rectangle shows half of a chocolate bar. Draw what the whole chocolate bar would look like?

Measurement/Geometry:

6. This shape is symmetrical because one half can fit exactly over the other half. Draw lines to show that these shapes are symmetrical.

7. Draw the hands on the clock to show a quarter past 7.
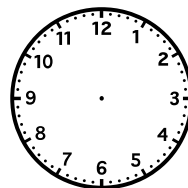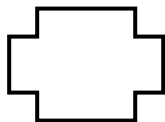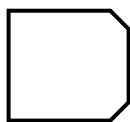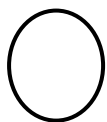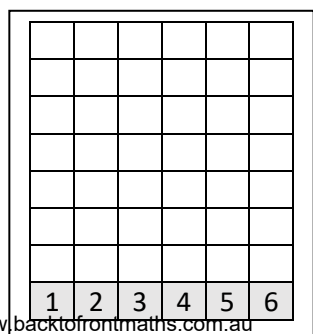
8. How long is your foot? Estimate first and then measure using centimetres.

    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.

Teacher Overview

The questions on this worksheet are drawn from the "C standard" of the Achievement Standard. See your tracking sheet for more detail. Each week the interleaved questions will get a little harder, and more concepts will be reviewed throughout the program as we teach that concept. We have included answers to these questions on B2FMaths@Home so that parents can find them if needed.

**Support for struggling students:**
You might like to reduce the numbers in the questions. You might also give the student the answer, then ask them to work out how the answer was obtained.

Friday: Connecting Lesson

In this lesson your child will build connections to 1 litre and estimate the volume of containers by looking at what one cup looks like. They will also find clear bottles in your home and draw what they look like with 1 cup of water in them. Once they have drawn the bottle, they will use the cupful to estimate the volume of the bottle. The important part of this problem is to explain the steps rather than to calculate or measure perfectly.

Estimating capacity by sight

Each of these containers has exactly one cup of liquid in them. Use this information to estimate how much liquid each container will hold in either millilitres or litres.
Show how you did it.
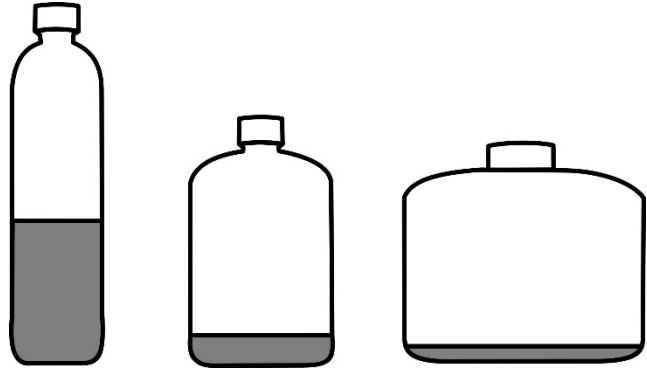
Find two clear bottles in your house. Add exactly 1 cup of water (250mL) to each bottle.
Draw what they look like with the water in them:

Using this information, how could you work out roughly how much they hold? What steps would you need to take? Please note: you do not need to give the capacity, just explain how you would estimate it.

Teacher Overview

This is a **Reasoning** lesson. It is designed to help students estimate capacity based on a visual cue. Estimation is an important part of the Content Descriptors even though it is not in the Achievement Standard, so this lesson forms an important link for returning to school. This lesson would be a good one to discuss with students if you have time online with children.