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Week overview

Students need to work out:

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## 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.
- **Generalising lesson:** This lesson contains some extension material for use if your child found the week's lessons too easy. *If you would prefer*, you can spend this lesson playing more of the number games that are included in the connecting lesson or giving your child time to complete any of the lessons that they have not yet done.

### 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 Length. In early primary, this means measuring using **measuring objects** such as shoes, hand prints, blocks or pens rather than using a ruler or measuring tape. This week we are introducing the concept of metres and centimetres for measuring.

### Students need to work out:

- Measuring needs to go from the start of an object to the end – you can't start part way along or miss out a bit (e.g. start from the head of the bed and go to the foot rather than half way along)
- We measure straight objects along a straight edge and curved objects along a curved edge
- We use metres and centimetres so that everyone can communicate the length of an object
- 100 centimetres are in one metre

### We are also hoping that students will learn:

- Sometimes measuring in centimetres will end up with a gap, so we will need to break the centimetres into even smaller units
- If we measure in centimetres, we will end up with a number one hundred times larger than if we measure in metres
- Sometimes it can be hard to directly measure the length of an object (e.g. measuring your bedroom if there is furniture in the way), so we have to think about what distances might be the same and measure those instead. For example: we might measure from one wall to the centre of the room, then move sideways and measure from the centre to the other wall, then add these measurements together.

### You will need the following objects:

- A ruler, measuring tape, a 1m long strip of paper to make into a measuring tape
- For the number games: an opaque bowl or cup and 20 items that fit under the bowl (e.g. spoons, toy cars, buttons, balls of paper, toothpicks)

## Teacher Overview

Students will be introduced to using centimetres and metres for measuring.

Ideally, we would use the following sequence of thinking to develop the concept of length from Year 1 to Year 4:

1. Use smaller measuring objects and count them as a measure of length. Realise that you have to use the same object (uniform units), align them, go straight, and have no gaps or overlaps if you want to compare lengths (Year 1).
2. Realise that a bigger measuring object gives a smaller count for length and a smaller measuring object gives a larger count for length.
3. Realise that smaller measuring objects allow for greater accuracy as there are smaller gaps/overruns at the end (Year 2).
4. Realise that if we are going to communicate with anyone else, we need a standard way of measuring length with units: therefore, develop the need for metres and centimetres (Year 2-3).
5. Use centimetres and metres to measure. Work out that there are 100cm in each metre (Year 3).
6. Work out that we can add different lengths together to calculate perimeter (Year 4-5).

## 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 metre strip to measure the floor. Watch them measuring their desk or a piece of paper to check for gaps, overlaps etc. Ask them to explain what they found difficult in the At-Home Investigation.

Check that the parents understand how the Partitioning games for the week work and make sure that you ask the student if they have played 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 games so that students retain what they have learned and think regularly about adding and subtracting.

## Tracking student achievement

Check the parent’s comment on the At-Home Investigation. Check the table in Wednesday’s lesson. Has the student measured each item using the same measuring objects, compared it to the metre string or similar, then ordered them from longest to shortest or vice versa?

- If so, tick **M4C** on the tracking sheet.

Can they also estimate length? Tick **M4A**.

## Monday: At-Home Investigation

*In this lesson, you will make a metre measuring strip with your child.*

### **Number game for 10-15 minutes: *Hide and seek partitioning***

You will need: an opaque bowl or cup and 18 items that fit under the bowl (e.g. spoons, toy cars, buttons, balls of paper, toothpicks). You should also have some paper and a pen or pencil for drawing the amounts.

1. Show your child the items and ask them how many there are.
  - a. If your child cannot work out that there are 18 objects, reduce the number to 12 and try again.
2. Ask your child to look away or close their eyes. "Hide" more than half of the objects under the bowl.
3. Ask your child to look at how many are left then ask them how many are hiding under the bowl. Allow time for your child to work this out, including needing to use your fingers and their own fingers or draw the amounts.
  - a. If your child is consistently wrong, or takes more than 2 minutes to work it out each time, reduce the number of objects and try again.
4. Take it in turns hiding different amounts with your child.
  - a. If this is too easy, try using 2 bowls instead of 1 bowl and hiding the same amount of items beneath each bowl.
  - b. You can increase the number of items to 16 if needed.

### **Investigation task**

Give your child a strip of paper that is exactly one metre in length. To do this you may need to cut up a sheet of A4 paper lengthways into strips and sticky tape them together.

Next, explain to your child that the length is one metre, which is the same as 100 centimetres. Ask your child to find where 50cm would be. Hopefully they will do this by folding the strip in half. Mark on the 50cm. Repeat, finding where 25cm and 75cm would be.

Next, supply your child with a ruler or measuring tape and ask them to make marks to show each centimetre on your metre strip.

### At-Home Investigation

*Come up with a plan to divide your metre strip into smaller sections. You will eventually need to show each centimetre, but start by thinking about the line as representing 100 centimetres. Where might 50cm go? How about 25cm and 75cm?*

**My plan:** answer these questions

- What could I do to accurately mark the 50, 25 and 75cm positions without using a ruler or measuring tape?

- How will I make sure that my numbers are accurate?

**Carry out my plan:** follow these steps and answer the questions

- Try out your idea. Did it work? Is it accurate enough?

- Use a ruler or measuring tape to check how close you were. Mark on the correct position (you might need to use the other side of the paper strip). How many 50s make up 100? How many 25s make up 100? How does this relate to your folding?

**Apply your learning:** follow this step

Check where 23cm is on your ruler and compare it with your strip. Add in numbers for each 10cm and lines for each centimetre to make sure that you can accurately use your strip as a measuring tool for tomorrow.

## Teacher Overview

This is an ***Understanding*** task.

The purpose of this lesson is to *make connections* between folding the strip into half and working out that 50 is half of 100. We want students to explore folding and dividing so that we emphasise the base-ten nature of measurement.

## Tuesday: At-Home Investigation (2)

### You will need:

- Your metre strip from yesterday
- Clear space along the floor wherever possible

### 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 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: write a comment on the page in the appropriate section to say what went well or what you are concerned about.
8. We will be coming back to measuring length again later in this program, so don’t worry too much if today didn’t quite work.



### At-Home Investigation

*Come up with a plan to compare the length of your bedroom, lounge room and kitchen, then order them from the shortest to the longest room.*

**My plan:** answer these questions

- Look at the lengths that you will have to measure for each room. What problems can you see? Come up with a plan for measuring the length of each room without having to move your furniture.
  
- How will I make sure that I am measuring accurately when there is furniture in the way? What would happen if I didn't measure straight along?

**Carry out my plan:** follow these steps and answer the questions

- Measure each room. Explain how you did it in the space below and give the final measurement for each.

**Apply your learning:** follow this step and answer the question

Write the rooms in order from the shortest to the longest.

- How much longer is the longest room than the shortest room? How do you know?

*Parent comment:*

## Teacher Overview

This is a **Problem Solving** 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 length of other objects.

This task will be tricky to run via a webcam, but you can probably talk to kids about what they did and what they found AFTER they have tried the investigation. Try to stick to the ideas in the section on “What you need to know about this week”.

### Watch out for:

- Starting measuring at the start of an item
- Accounting for furniture – maintaining a straight path

### Good questions to prompt thinking:

- Show me the part that is the length. Use your hand to run along the length.
- Which part of room will we have to measure?
- What will we do if there is a couch in the way? Can we just bend the line and measure the whole way around the couch?
- If we are going to compare the length of each room, how do we keep track of what we are doing and how long each room is?

### Students requiring support:

- Provide students with opportunities to identify the attributes of objects that can be measured. Use non-standard units first such as measuring with shoes.
- Give students further opportunities to choose suitable units to measure with and ensure they can accurately use the chosen unit.

### Extension:

- Ask students to determine “how much longer” the rooms are.
- Encourage students to work out the total distance from their kitchen to their bed.

## Wednesday: Connecting Lesson

This lesson allows your child to practise what they have learned about measuring over the past two days and introduces the idea of measuring around curves.

### Number game for 10-15 minutes: *Making to twenty*

You will need: 20 items from yesterday (e.g. spoons, toy cars, buttons, balls of paper, toothpicks) and the opaque bowl. You should also have some paper and a pen or pencil for drawing the amounts.

1. Show your child the items and ask them how many there are.
  - a. If your child cannot work out that there are 20 objects, reduce the number to 10 and try again.
2. Ask your child to look away or close their eyes. "Hide" 10 of the objects under the bowl.
3. Ask your child to look at how many are left then ask them how many are hiding under the bowl. Allow time for your child to work this out, including needing to use your fingers and their own fingers or draw the amounts.
  - a. If your child is consistently wrong, or takes more than 2 minutes to work it out each time, reduce the number of objects and try again.
4. Once your child knows there are 10, reveal the objects so that they are arranged into 2 groups of 10. Ask your child write down the numbers in each group as an addition sum ( $10+10=20$ ).
5. Move one object to the other group, so that you have groups of 9 and 11. Ask how many are in each group now, then write the sum. Emphasise what changed, "this has one more and this has one less".
6. Ask your child, "What would happen if we moved one of these things from the 9 to the 11? What would we have now?". Repeat, working out the amounts and writing the pairs of numbers until you get to 0 and 20.
7. Display the sums and drawings somewhere so that you can refer to it in later lessons (e.g. stick it on the fridge or their door).

### Worksheet task: 15-20 minutes

You will need to your metre-long strip from Monday. This lesson is following on from what your child learned yesterday about with centimetres and metres and apply their thinking to measure a curve like the distance around their head.

Make sure that your child **explains out loud** how they measured each object as this means that they will be more likely to remember it later. Please ask your child to compare the head circumference and table measurements then order them from smallest to longest.

### At the end of this lesson:

Your child has now had 3 opportunities to try measuring length. You will need to decide if they have mastered this concept or not, by seeing if they can correctly measure then order multiple lengths using metres and centimetres. If they can, then on Friday do the extension task. If they are having some trouble or forgetting the process, use the time on Friday to practise measuring again.

## E5. Measure and estimate length in centimetres

Sometimes we need to guess how long something is so that we know if our measurement is about right. Discuss these questions with a friend and then make the measurements using centimetres.

For measuring the distance around your head:

1. What instruments could you use to measure it? How could you use the instrument to measure it?

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

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

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For measuring the length, width and height of your desk:

1. What instruments could you use to measure it? How could you use the instrument to measure it?

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

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

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Did you measure curved things differently to straight things? Explain how:

### **BACKWARDS QUESTION:**

If the distance around a square measured 40cm, how long would one of the sides be? Explain your answer:

## Teacher Overview

This is an **Application** lesson. It gives students another chance to develop appropriate measuring using centimetres. At the end of this lesson students need to be able to measure objects accurately using metres and centimetres to meet the Achievement Standard. They should also start to estimate length in metres in order to move on to the lesson for Friday.

### Other considerations:

- Check that the student has played the number game and remind parents that it is important if they haven't played it with their child.
- If the student can correctly measure each length, try estimating as this is an A standard.

## 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

Number:

1. Starting at 103, count in 2s until you get past 120.
2.  $426 + \underline{\quad} = 483$
3. Read this number and say it: 3 748. Write it in words. How many thousands, hundreds, tens and ones does it have?
4. Find two ways that you can make \$2.00 using coins and draw them here.
5. Share 24 counters equally to show halves, then quarters, then eighths. Draw it.

Measurement/Geometry:

6. Find 4 objects. Order them from lightest to heaviest. Write them here.
7. What time is it?
8. Draw three different triangles. One of them has to have three different length sides.

Chance/Data:

9. What could the weather be like tomorrow? List as many possibilities as you can. Which is most likely?

## 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 the B2FMaths@Home so that parents can find them if needed.

### **Support for struggling students:**

You might like to try the interleaved questions from a lower year level, or simply 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.

### **Extension:**

Change the starting numbers, the amounts counted by or added, or the number of coins/counters. Ask students to discuss the likelihood of rain in more depth with their parents, including looking up the BOM predictions and discussing how the likelihood is calculated.



## Friday: Extension Lesson

**You will need to decide between the following options:**

- Child found the measuring work easy: Try the worksheet which emphasises estimation skills. Make sure that your child is doing the thinking rather than waiting for you to explain. This task emphasises the idea that sometimes we need a mix of large and small items to accurately measure to account for gaps and overlaps.
- Child found the measuring work hard: Use this time to practise measuring other items in your house, then ordering the objects from smallest to largest. Try to make sure that you include objects that are not in the same room as each other (e.g. couch vs your bed), so that your child cannot simply compare them by sight.

### E3. Estimating length, mass, area, volume

Many years ago, people used to measure things with their bodies and familiar objects. Examine the examples to see how you can use objects to estimate.

#### Length estimations:

1. About how long is your arm span with both arms stretched out horizontally, finger tip to finger tip?
  - When might you use this for estimating?
  
2. About how wide is your hand span when stretched out from thumb to little finger?
  - When might you use this for estimating?
  
3. About how wide is one of your fingers?
  - When might you use this for estimating?
  
4. About how wide is your hand when your fingers are not spread out?
  - When might you use this for estimating?
  
5. About how long is your foot?
  - When might you use this for estimating?
  
6. About how long is your stride? (Average step that you take)
  - When might you use this for estimating?
  
7. About how long is the distance from your elbow to finger tip?
  - When might you use this for estimating?

## Teacher Overview

This is a **Conceptual Understanding** and **Reasoning** lesson. It is designed to extend student understanding further and promote generalising.

The purpose of the lesson is to develop skills of estimation rather than simply measuring. This requires a student to develop a visual model for specific lengths (e.g. most of us can visualise a 30cm ruler) and compare it to the item that they are measuring.

### To extend student thinking further:

- Ask students to estimate the length of the room they are in, their bedroom, the hallway or the bathroom. Ask them to explain what they are thinking about and any visual models that they are using.