Work Program for B2FMaths@Home Week 1 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.
- **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 upper primary, this means measuring accurately in centimetres and metres, as well as millimetres where appropriate. It also means calculating the perimeter (length around the outside of a shape). Finally, students move on to converting between metres, centimetres, millimetres and kilometres. Please note, there is a video on the webpage to help you understand this concept.

Students need to work out:

- A metre is the base unit for length measurement. We know this because there is not a prefix in front of the word metre (e.g. *centi*metre, *milli*metre).
- All of our measurements involve using multiples of ten.
- Cent means 100th (there are 100c in $1). That means that 100cm = 1m.
- Milli means 1000th. That means that 1000mm = 1m. It also means that 10mm = 1cm.
- Perimeter is a measure of length. It is the distance around the outside of a 2D shape or 3D object.

We are also hoping that students will learn:

- One length can be written in different units (e.g. a wall length of 2.4m would be recorded as 2400mm by a builder as they work in millimetres)
- To compare lengths, we need to make sure that we are using the same units.

You will need the following objects:

- A ruler or measuring tape

Teacher Overview

Students will consolidate understanding of cm and m, introduce the units mm and km, then learn to convert between the units.

Ideally, we would use the following sequence of thinking to develop the concept of length from Year 3 to Year 6:

1. Work out that there are 100cm in each metre (Year 3).
2. Measure length accurately using cm and m (Year 4).
3. Work out that perimeter is obtained when all length measurements are added together (Year 5).
4. Understand the relationship between m, cm, mm and km, and link this with an understanding of place value including decimal numbers (Year 6).

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 have completed the number tasks with their students to ensure that they are emphasising place value and operations.

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 completing the number task so that students retain what they have learned and think regularly about place value and operations.

Tracking student achievement

Check the parent's comment on the At-Home Investigation. Check Friday's lesson. Has the student connected decimal representations?

- If so, tick **M1C** on the tracking sheet. For an A: students need to also convert between units including decimals. Tick **M1A**.
- Can they calculate perimeter of a range of shapes? Tick **M4C**. For an A: students need to also calculate perimeter of shapes made up by combining different shapes. Tick **M4A**.

Monday: At-Home Investigation

You will need:

- A measuring tape or ruler
- 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.
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. We will be coming back to measuring perimeter again later in this program, so don't worry too much if today didn't quite work.
8. If your child found this task easy, ask them to convert the perimeter to centimetres or millimetres. There is a video on the website to demonstrate converting between units of measurement.

At-Home Investigation

Come up with a plan to measure the perimeter of your lounge room and your bedroom

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 wall 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 and calculate the perimeter. Explain how you did it in the space below and give the final measurement for each.

Extend your learning: follow this step and answer the question

How would you write the perimeter of each room in centimetres? How about millimetres?

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:

- Accounting for furniture – maintaining a straight path
- Measuring accurately using both cm and m
- Adding accurately

Good questions to prompt thinking:

- 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 perimeter of each room, how do we keep track of what we are doing and how long each wall is?

Students requiring support:

- Start by just asking students to measure the length of one room.
- Next, ask students to compare the lengths of two rooms rather than calculate the perimeter.
- Next, try asking students just to calculate the perimeter of their table.

Extension:

- Encourage students to convert between units of length.
- Encourage students to draw their room to scale.

Tuesday: Connecting lesson

You will need:

- A ruler that shows centimetres.

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. Encourage them to examine the shape in question two and work out how 47m relates to the other measurements written on the shape.
3. Ask for their ideas about what perimeter means.
4. Encourage your child to think about how they can calculate the perimeter of the shapes when they are not given all of the measurements for some sides.
5. Encourage your child to work on the backwards questions. They may need to think about the properties of squares to understand the first question. Drawing or making a paper model of the squares may help. Note that the second question has more than one answer.
6. Revisit the thinking that you did yesterday with your child. Now that they have a better understanding of perimeter, what would they change?

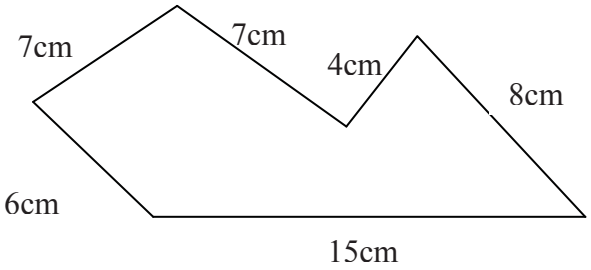
E2. Find the perimeter and adding length measurements

TR p106

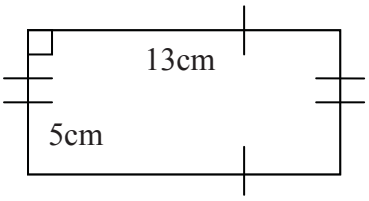
Last time that you were examining perimeter, you worked out how to find the perimeter of a variety of shapes. Use the example below to remind you how to calculate the perimeter of any straight-sided shape, and answer the questions.

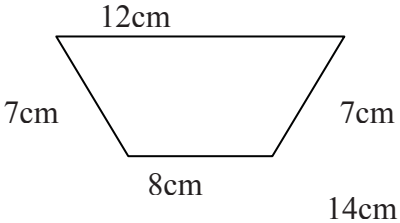
1. What does "perimeter" mean?

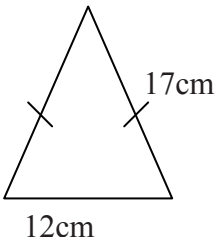
2. In the shape below, the perimeter is 47cm. How did we work it out?

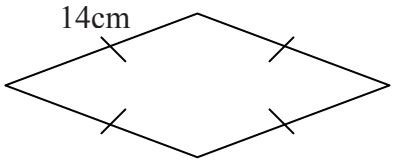


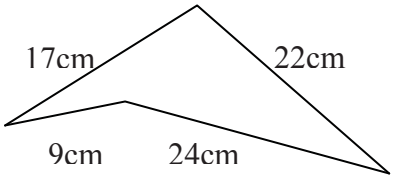
3. Use this to calculate the perimeters of the shapes below:

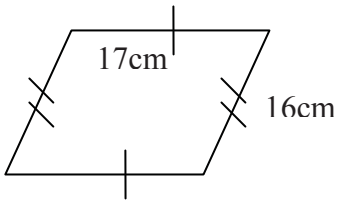












BACKWARDS QUESTION:

If the perimeter of two squares side-by-side was 60m, what was the side length of one square?

If the perimeter of a rectangle was 20cm, how long could its sides be?

Teacher Overview

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

The emphasis is on *connecting* the idea adding the length of the sides with perimeter. Students may generals this idea to develop a formula. However, it is important for them to understand when the formula works and when it doesn't.

This task will be relatively easy to run via a webcam. Focus on the connections and try to have students link the idea of multiple measurements that are the same length (e.g. they might have used 5 lengths, so multiply by 5).

Watch out for:

- Leaving out measurements that aren't given in the diagram
- Applying a routine formula to irregular shapes

Extension:

- Encourage students to develop a formula for regular shapes and to adjust it for irregular shapes.

Wednesday: Connecting Lesson

This lesson allows your child to practise and consolidate what they have learned about length and introduce the connection between different units of length.

Number practice: *Multiplication facts*
Ask your child to complete one of the multiplication grids at the bottom of this page. Be aware that this might take a considerable period of time the first time around. Hopefully in a few weeks you will find that the time taken is much shorter.

Worksheet task: 15-20 minutes
You will need a ruler. This lesson encourages your child to think about measuring curves.

Make sure that your child **explains out loud** how they calculated the lengths as this means that they will be more likely to remember it later.

Multiplication Practise:

X	3	4	5	6	7	8	9
3							
4							
5							
6							
7							
8							
9							

Record your time here for the 49 questions:

Mark your answers using a calculator or with an adult. Circle any that are wrong.

E1. Measure and estimate length

TR p106

Sometimes we need to guess how long something is so that we know if our measurement is about right. Answer these questions using cm and m.

For measuring your hat size:

1. What instruments could you use to measure it?

2. How accurate does your measurement need to be? Is there a situation in which a high level of accuracy would be required for this measurement?

3. Would you measure it in millimetres or centimetres or both? Why?

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

5. Choose an instrument and measure it. What did you get?

6. How good was your guess?

For measuring the distance of your 400m running track:

1. What instruments could you use to measure it?

2. How accurate does your measurement need to be? Is there a situation in which a high level of accuracy would be required for this measurement?

3. Would you measure it in metres or centimetres or both? Why?

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

5. Choose an instrument and measure it. What did you get?

6. How good was your guess?

How did you decide which unit to use?

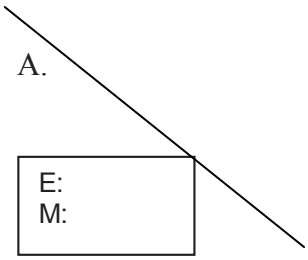
How did you decide on the accuracy required?

Backwards Question:

If the distance around a square measured 50cm, how long would one of the sides be?

Estimate the length of the following lines using millimetres then measure them with your ruler. Record your results in the box next to each line.

A.

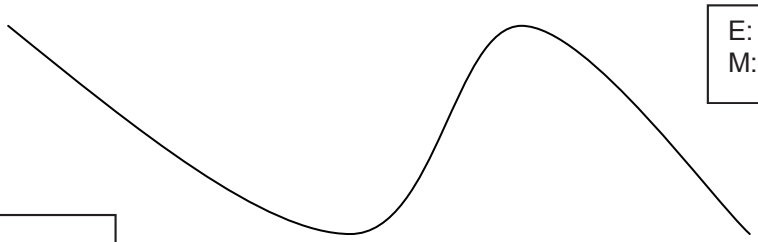


E:
M:

B.

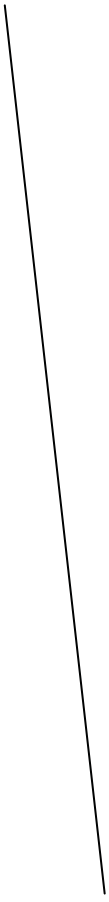
E:
M:

D.



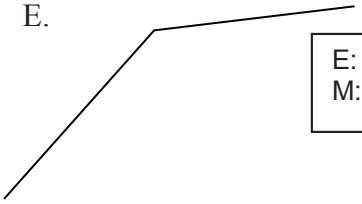
E:
M:

C.



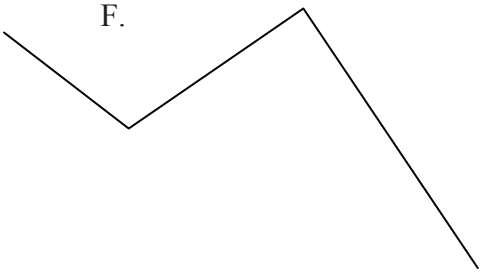
E:
M:

E.



E:
M:

F.



E:
M:

Reflecting Question:

What did you find difficult when attempting to estimate and measure the lengths above?

Draw a line in this space with a length of 22cm:

Teacher Overview

This is an ***Application*** lesson. It gives students a chance to develop appropriate measuring of length and encourages connection between m, cm and mm before the new learning on Friday. At the end of this lesson students need to be able to connect units of length, including decimal representations to meet the Achievement Standard. They should also start to convert units of length in order to move on to the lesson for Friday.

Other considerations:

- Check that the student has completed the number task and remind parents that it is important.
- If the student can correctly calculate perimeter of rectangles, try shapes formed from multiple rectangles 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. Complete the following number sequence: 2 , 4 , 7 , ___ , 16 , ___ , ___ , 37
   Describe the number pattern.

2. 12 478 + ____ = 13 603

3. Read this number and say it: 12 403 048. Write it in words. How many millions, thousands, hundreds, tens and ones does it have?

4. If you purchased a t-shirt for $27.80 and a cap for $12.25? What coins and notes could you use to pay for them? Show two different combinations you might use.

5. What is one third of 42? Show how you could work it out using counters. Draw what you did.

Measurement/Geometry:

6. Find 3 items in your pantry that are measured in kilograms. List them from lightest to heaviest and write their mass in grams.

7. What time is it? You want to watch a television show at 16:30. How long do you have to wait for it to start?

8. Describe what happened to shape 1 to make it look like shape 2.

1.  2. 

Chance/Data:

9. What is the weather most likely to be like tomorrow if there is a 25% chance of rain? How else could the chance of rain have been described?

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.

Friday: Connecting Lesson

You will need a calculator for this lesson. Expect this lesson to take longer than average.

This lesson is designed to help students connect different units for measuring length to the place value and decimal number systems. It is a very difficult concept for most students to understand and often takes considerable time to master. We will be practising this concept again for most weeks from now on in the Interleaved Practice lessons to develop a strong understanding.

You might want to watch the video on the website. This is also suitable for sharing with your child IF they can't work out the patterns after trying the worksheet. Try the questions on the worksheet first, then use the video if you get stuck.

Work through the questions systematically with your child. Focus on identifying the patterns and connecting the different units of measurement. Ask your child to say their answer out loud each time to better build their retention.

If you end up stuck with this lesson, ask your child's teacher for help.

E13. Converting between units

TR p110

Converting between different units for length, mass, area and volume is very similar to multiplying and dividing by 10s, 100s and 1000s using place value. In this activity you will use a place value chart to work out how the different units are related.

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	**Ones** (then decimal	tenths	hundredths	thousandths	ten thousandths	hundred thousandths	Millionths

Instructions:

1. The standard unit for length is called a metre. Write the symbol for metres in the ones column because it is the unit on which all other length measurements are based.
2. How many centimetres are there in one metre? Use this to work out which column is the centimetres column. Write the symbol for centimetres in this column. *Check: if you put a one in this column and then fill in the relevant zeroes and decimal points does it show how one centimetre converts to one metre?*
3. How many millimetres are there in one metre? Use this to work out which column is the millimetres column. Write the symbol for millimetres in this column. *Check: if you put a one in this column and then fill in the relevant zeroes and decimal points does it show how one millimetre converts to one metre?*
4. How many kilometres are there in one metre? Use this to work out which column is the kilometres column. Write the symbol for kilometres in this column. *Check: if you put a one in this column and then fill in the relevant zeroes and decimal points does it show how one kilometre converts to one metre?*

To work out how many of one unit there are in a second unit:

1. Place the number of units that you have in the relevant column (e.g. if you want to change 5cm to something else, put a 5 in the cm column). Pay attention to place value, and only put one digit in each column (e.g. if you want to change 125cm to something else, put the 5 in the cm, the 2 in the column to its left, and the 1 in the next column to the left).
2. Place a decimal point at the end of the number in the column that you want to convert the measurement into (e.g. if you are converting into metres, place a decimal point just after the number in the metres column). If there isn't a number in that column already, place a zero in the column and then put the decimal.
3. Fill in any zeroes that are missing between the numbers then read off your answer.

Try these:

5cm = _____m 5mm = _____m 5m = _____cm 5m = _____mm

5cm = _____km 5km = _____mm 5cm = _____mm 5km = _____cm

72cm = _____mm 72km = _____cm 72mm = _____m 72m = _____km

Operations:
When changing between the different units, you are actually performing an operation of multiplication or division. The number of places between the two units that you are converting tells you whether you are multiplying or dividing by 10, 100, 1000 or more. To work out the patterns in this change answer the following questions:

1. When you were converting between cm and m, how many places did the decimal point move? e.g. 5cm = _____m.

2. Why do you think it moved this many places? What does multiplying and dividing by 10, 100, 1000 or more have to do with this?

3. What is the pattern between how many cm there are in one m and the number of places that the decimal point moved?

4. Are cm bigger or smaller than m? And is your answer bigger or smaller than your starting number? What is the pattern?

So therefore to convert from one unit to another I need to work out:
1. How many of the one unit there are in the second unit. This should tell us the factor (10, 100, 1000 or more) that we are multiplying or dividing by.
2. Whether the answer should be bigger or smaller. This should tell us whether we are multiplying or dividing by that factor.

Try it out:
1. Change 35m to cm:
    a. How many cm in one m?
    b. Should the answer be bigger or smaller?
    c. So the operation is: _____
2. Change 35mm to cm:
    a. How many cm in one m?
    b. Should the answer be bigger or smaller?
    c. So the operation is: _____
3. Change 35km to m:
    a. How many cm in one m?
    b. Should the answer be bigger or smaller?
    c. So the operation is: _____
4. Change 35cm to km:
    a. How many cm in one m?
    b. Should the answer be bigger or smaller?
    c. So the operation is: _____

Summarise what you have learned about changing between different units of length here:

Your job now is to work out how to change between the different units for mass, volume and area using the same process. When you have worked it out, write some steps for yourself to remember here then answer the questions that follow.

To convert between tonne, kg and g:

To convert between kL, L and mL:

Challenge Question:

To convert between hectares, m^2 and cm^2:

Try these:

Change:	into:	and also into:	How I did it:
35kg	g	t	
35g	kg	t	
214mL	L	kL	
214L	mL	kL	

Backwards Questions:

$103m^2$	cm^2	Ha	
23.4cm	mm	m	
0.7cm	m	km	

Teacher Overview

This is a ***Conceptual Understanding*** and ***Reasoning*** lesson. It is designed to extend student understanding further and encourage students to connect and convert between units of length.

A video is provided about this concept on the website. Watch it to build your own understanding of the link between place value and length conversion.

Connecting different representations is a C standard. Converting between different representations is an A standard.