Work Program for B2FMaths@Home Week 5 Year 6

Contents – click on the link below

How to use this work program

Accessing the online resources

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

Running the program each week

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

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

Getting help

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

What you need to know this week

Week overview

This week we are teaching the concept of area. The reason to teach area now is that it is basically an extension of the array concept that we have worked on for the previous two weeks.

Area is a measure of flat space. For example: how many tiles cover the floor in your bathroom. We measure land area in square metres or hectares. We measure smaller areas in square centimetres or square millimetres.

If you imagine one square metre, you can overlay a grid made up of square centimetres. Each side of our metre square would be equal to 100 cm. That means that in our square metre we have 100x100 square centimetres, or 10 000cm^2. The same kind of thinking applies to hectares. One hectare is the same as a square that is 100m long and 100m wide. That means that there are 10 000m^2 in a hectare. If a house and backyard in a city has an area of roughly 500m^2, you would need 20 of these to be the same one hectare – it is a large amount of land!

Students need to work out:

- Area is a measure of flat space, it is not a distance.
- We calculate area by covering flat space with a grid or an array.
- Area is two-dimensional. That means that we need to measure it in 2D units (e.g. square metres or square centimetres).
- An array is the same as area of a rectangle.
- Please note: students need to use formulas for area of rectangles in years 6/7

You will need:

- Copies of the grid paper

Teacher Overview

Students will be thinking about area, and its link with arrays. We are teaching area now as we have just spent two weeks on arrays. This should mean that it is easier to connect the concept to what students already know.

Students need experience covering areas with arrays and grids, comparing areas by counting, and looking for patterns in how the areas compare. See the information in "What you need to know this week" for more detail.

What to emphasise

If you have time online with a webcam
Discuss the at-home investigation with children. The idea is to compare flat space by covering it with appropriate units for measurement. We are deliberately trying to compare furniture that has a flat surface, but also furniture that is not in the same room so that direct comparison is not possible.

Check that the parents have understood and completed the number tasks for the week. You may also need to reinforce with parents that by the end of Year 4 students are expected to recall division and multiplication facts.

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 and interleaving sheet so that students retain what they have learned and think regularly about number.

Tracking student achievement

This week we are focusing on applying what we have learned about arrays to area:

- Can the student solve problems involving length and area (**M4C**)?
- Can the student also solve problems using multiple rectangles put together (**M4B**)?
- Can the student also solve problems using the area of shapes that are not rectangles (**M4A**)?

This week's activities also reinforce the multiplication and division that we have been working on previously.

Monday: At-Home Investigation

You will need:

- A copy of the grid paper from the next few pages.
- Multiple pieces of A4 paper. Please note: these do not need to be new sheets. Copies of old worksheets or this page with instructions will be just fine.

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 first problem. Encourage them to plan how to measure the number of pages it would take to cover the bed or table first, and to guess at roughly how many it will take.
3. Make sure that your child draws the answers rather than just writing the numbers. They need to show their working. The grid paper is a good way to do this.
4. Watch out for situations where your child will need to cut the paper to make it fit. This should be recorded on the grid.
5. Watch out for using the long side of the paper to measure the length and then the same long side to measure the width. The paper is not square, so one side should be measured with the shorter side of the paper (look at the grid provided to get the idea).
6. If you have time, ask your child to work out how many square metres or square centimetres the furniture would take up. This will be reinforced later this week.
7. 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.

At-Home Investigation

Area is a measure of flat space. Today you will compare the area of the top of your dining table or desk with the area of the mattress on your bed.

Does your mattress or your table have more area?
How many pieces of paper would it take to cover the top of your dining table?
How many pieces of paper would it take to cover the mattress on your bed?
Explain your plan for working it out.

Carry out your plan and explain your findings:
Draw what you found out on the next page. The boxes are scaled to represent A4 pieces of paper. Each piece of A4 paper is around 623cm^2. This means that close to 16 pieces of A4 paper is the same as 1m^2. Which one has the greatest area? How do you know?

Account for difficulties:
How did you account for partial pieces of paper? How did you make sure that your measurements were accurate?

NB: 16 pieces of paper $\cong 1m^2$ Each box below is scaled to be similar to A4.

Teacher Overview

This is a ***Problem Solving and Reasoning*** task.

The emphasis is on *modelling* sharing and discussing the *similarities*, *differences* and *patterns* or *characteristics*. We want students to explore area as flat space. There is also an emphasis on *generalising*. Try to make sure that children use the grid paper for recording their findings.

Watch out for:

- Using the long side of the A4 paper to measure both the length and the width rather than covering the space
- Measuring perimeter rather than area

Good questions to prompt thinking:

- Have you completely covered the space?
- Did you have any overlapping pieces of paper? How about any gaps?
- What did you do when you only needed part of a piece of paper to cover a remaining space?
- Which was bigger? How do you know?
- How could you use arrays to help you work this out?

Students requiring support:

- Use smaller spaces (e.g. coffee table) and ensure that multiple pieces of paper are used rather than one repeated

Extension:

- What if you only had one piece of paper? How could you work it out? What would you need to do? What operations are involved?
- How many tiles are there in your bathroom/kitchen?

Tuesday: Connecting Lesson

Multiplication and division practice: 10-20 mins
Have your child complete one of the multiplication or division practice grids provided on the following pages each day this week. The division grids are more difficult as they require students to work backwards. This means looking in a row or column to identify what factor the numbers have in common, then using each factor to figure out the missing numbers.

Please note: the numbers in the division grid are not in order from 2-10.

Worksheet task: 20-25 minutes

You will need:

- A loop of string or paper that is 40cm long
- A copy of the cm grid paper provided

In this task your child will experiment with different shapes to determine which has the biggest area. If they struggle to start, try pulling the loop to flatten it out. The loop now contains no area. Next, make it into a circle to demonstrate having a much greater area.

Please make sure that you discuss your child's ideas with them as discussing ideas helps children to retain them for longer periods. Make sure that you ask your child to look for patterns in how many rectangles or triangles are used. Point out the arrays if your child does not refer to them. Focus on the patterns of multiplying.

For your reference:
For the area to be at its maximum you want a shape that is "fat". A square that is 10x10cm will have a perimeter of 40cm (same as your loop), but will have a much greater area than a longer and skinnier rectangle (e.g. one that is 15cm long and 5 wide). A circle has the most area for perimeter of any shape.

Problem 21: Comparing Area and Perimeter

TR p93

Use a loop of string that is 40cm long. What shape can you create with the string that will enclose the largest area? Show how you did it using the grid below.

My shape:
Draw or attach a photograph of the shape that you came up with in the space below.

Calculate the area of your shape:
How many square centimetres does your shape take up? How do you know that this is the largest?

Look for patterns:
When deciding on which shape to use, what did you find about different shapes and the area that they enclose? Fill in the spaces below to explain.

I found that:

Long skinny shapes…

Short fat shapes…

Pointy shapes…

Square shapes…

Round shapes…

So I decided to choose _____ because…

Communicating:
How did you come up with your solution?

Understanding:
Explain why you chose the shape that you did:

Manipulation problem:
If you wanted a shape with the smallest enclosed area and biggest perimeter, what would you choose? Why?

Teacher initials:

Date:

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

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

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

- Student not observed

Multiplication and division practice grids:

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

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

÷									
		16					6		
			21		15				
						8		40	
	20			30					
			42						54
					35		21		
		64		48					
	36								81
						20		100	

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

Teacher Overview

This is a ***Problem Solving and Reasoning*** task.

The purpose of this lesson is to *experiment* with ideas of area, *model* a problem involving both area and perimeter, and *connect* the work we have been doing on arrays with area. For Year 6, students need to know to use cm^2 for area, and be able to apply what they know about area and length to solve problems. This lesson gives a great example of combining both area and perimeter for problem solving. The lessons on Wednesday and Friday will emphasise formal units and rectangles, whereas this lesson is better for problem solving.

To help students retain the information, make sure that they have *explained their reasons* for drawing to their parents. If you have time online with families, emphasise the importance of connecting arrays for multiplication and division with area.

Please note: the division grids require students to find common factors. This is important for upcoming work on fractions.

Wednesday: Connecting Lesson

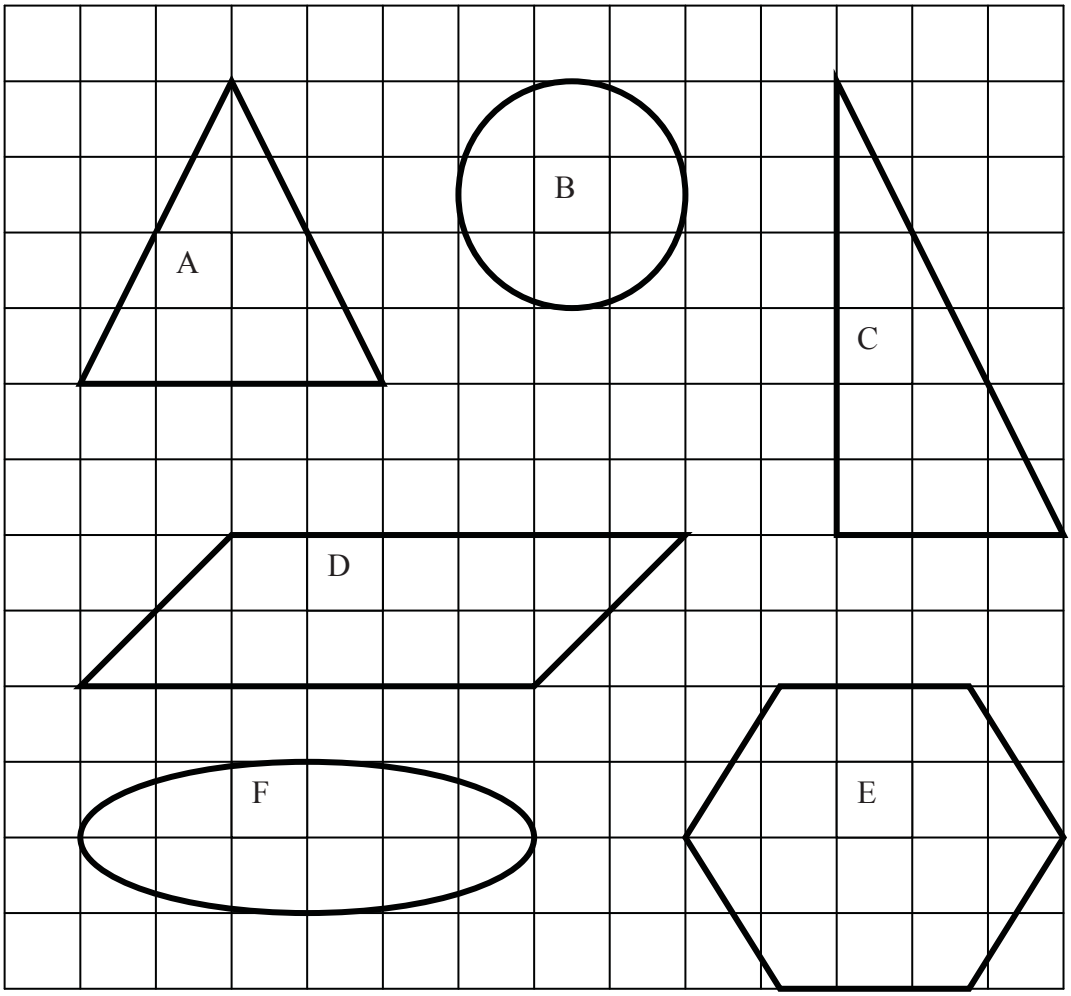
This lesson allows your child to measure area using square centimetres. The grid provided should allow your child to count the area. Please note: where a square is only partially covered, consider which two part-squares could be combined to form one whole square.

Please also complete one of the grids on multiplication/division facts from the previous lesson.

E4. Estimating and measuring area in cm^2

TR p107

Estimate the area of these shapes in square cm then calculate the area by counting the squares. Count any two parts of squares as equal to one whole square. Write the estimates and counted areas on the shapes.



Do you think that this is an accurate way to calculate area? Why or why not?

CHALLENGE: how many different shapes can you draw with an area of $6cm^2$? Draw them:

Teacher Overview

This lesson is very similar to Tuesday's. If students can use the grid and compare the area of the shapes in cm^2, they are achieving part of the C standard.

The last question is provided as an extension. It is a good way of demonstrating solving problems with length and area as per the Achievement 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.

Please also complete another multiplication/division grid.

Interleaved practise

Year 6, week 5

Number:

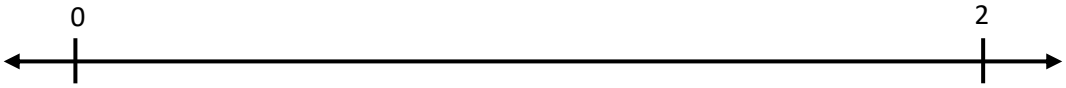
1. Write these numbers in ascending order (smallest to largest)

   74.103, 73.41, 73.140, 74.31

2. Find the answer and show how you worked it out.

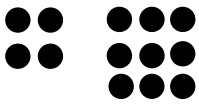
   4 (623 – 147) = ☐

3. Show where these fractions would go on the number line: ⅓ 1⅔ 3/2 ⅔



4. 105 ÷ 6 = ☐ Show your answer in two different ways.

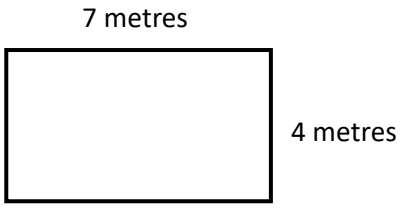
5. 4 and 9 are both square numbers. Find 2 more numbers that are square and 2 that are not square.



Measurement/Geometry:

6. I have 12 metres of fabric to use to make 4 curtains and cushions for my bedroom. Each curtain requires 2.25 metres of fabric. How much fabric will I have left for my cushions?

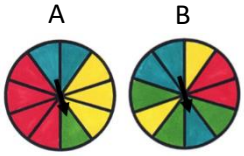
7. I want to plant my rectangular garden with shrubs that need a space that is $1m^2$. How many shrubs could I plant? Show where each one would be planted.



8. How much garden edging will I need to enclose the garden (from question 7)? If the edging is sold in 5 metre lengths, how many lengths will I need to buy?

Chance/Data:

9. I can choose to use either one of these two spinners for my next turn in a game.
   a. Which spinner gives me the greatest chance of spinning yellow?
   b. Using this spinner, what percentage chance do I have of spinning a colour other than yellow?



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: Generalising Lesson

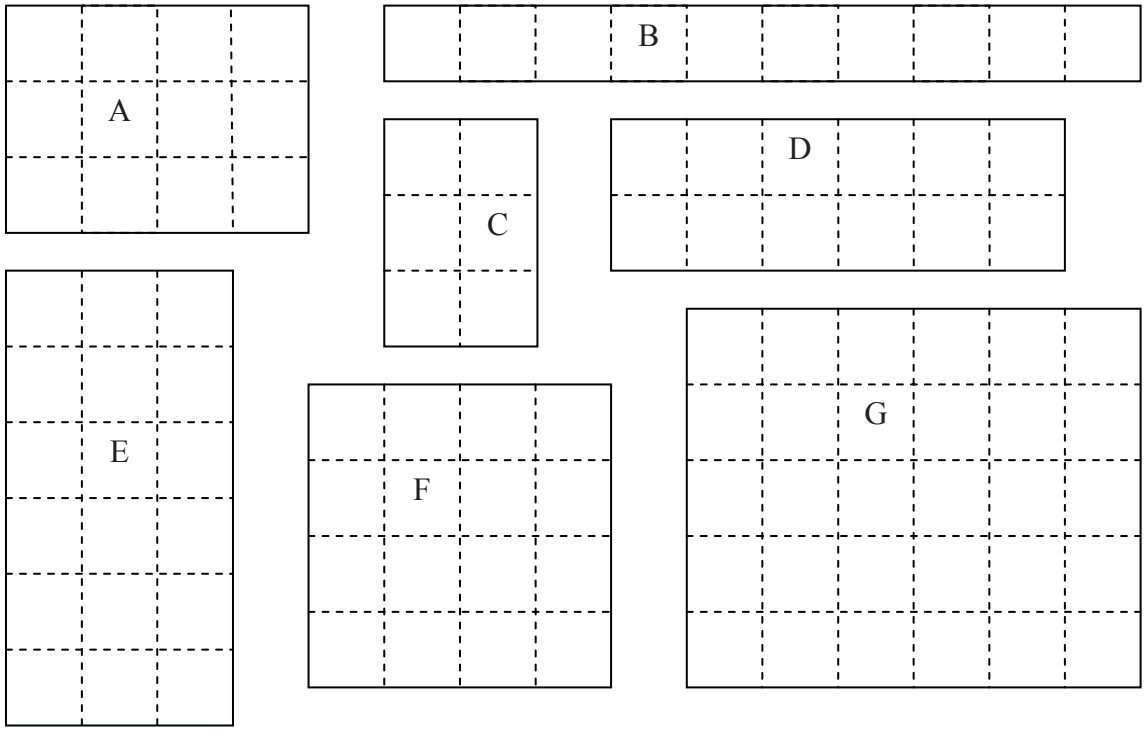
The worksheet provided puts together the ideas for the week to find a pattern for area of a rectangle. The idea for this lesson is to find the pattern for calculating area of a rectangle rather than just memorising a formula. Students should find that if they multiply the length of the rectangle by the width then they can calculate the area.

Please complete the final multiplication/division grid.

E6. Area of a rectangle

TR p99

Use the following examples to help you to work out a rule for finding the area of a rectangle.



Rectangle	Base measurement	Height	Area	**What is the rule?**
A				
B				
C				
D				
E				
F				
G				

What is the rule for finding the area of a rectangle?

Backwards Question:

If the area of a rectangle was 12, what could its perimeter be?

Teacher Overview

This is a ***Generalising*** lesson, designed to help students connect area with multiplication. It promotes ***Reasoning***, by asking students to show and explain how they have worked out the answers. It also provides an opportunity to demonstrate calculating area of rectangles, which is part of the Achievement Standard.

To extend student thinking further:

- Have the children find arrays around their home and see if their formulas work for that as well.
- Use a rectangle (e.g. A4 paper), then cut it diagonally into two triangles. Ask children how the area of each triangle might compare to the rectangle.