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 **2D shape**. In early primary, this means considering how shapes are similar and different. It is important that students have experience with non-standard shapes (for example, triangles with different length sides) to develop skills in generalising.

Students need to work out:
- 2D shapes are flat. A round ball is not a circle, it would be a sphere. A pyramid is a pyramid, not a triangle, even though its faces are triangular.
- 2D shapes are generally classified by the number of sides and angles that they have, not by "pointiness" or the orientation (if it is straight or on an angle). That means that a triangle that has the point at the bottom is not "upside down". It is just a triangle. Likewise, a square that is angled is not a "diamond". It is still a square.
- Triangles can have different length sides. They don't have to be the same.
- A square is a special type of rectangle (*see the video on the website*). A rectangle has opposite sides that are equal (same length) and parallel (run in the same direction), with right angles (square corners). It actually doesn't have to have 2 long and 2 short sides – that's just how we tend to see it.
- Squares and rectangles have right angles (square corners)

We are also hoping that students will learn over the next few years:
- "Shapes" refers to 2D shapes such as drawings or patterns. They don't have any depth. "Objects" is used for 3D things such as cubes or spheres.
- "Regular" shapes have sides and angles that are equal. For example, a regular 4-sided shape is a square. A regular octagon looks like a stop sign.
- When naming shapes, the prefix tends to refer to the number of sides or angles.
  - Tri = 3: a tricycle has 3 wheels, a triceratops has 3 horns, a triangle has 3 angles or 3 straight sides (tri = 3, angle = angles)
  - Quad = 4: a quad-bike has 4 wheels, a quadrilateral has 4 sides (quad = 4, lateral = refers to lengths or sides). Squares, rectangles, parallelograms and trapeziums are some types of quadrilaterals.
  - Pent = 5: a pentagon has 5 sides, a pentagram is a 5-pointed star. The sides do not have to be the same length.
  - Hex = 6: a hexagon has 6 sides. The sides do not have to be the same length.
  - Oct = 8: an octagon has 8 sides, an octopus has 8 legs. The sides of an octagon do not have to be the same length.
- For all straight-sided 2D shapes, the angles will add up to be the same amount of degrees. The angles of a triangle add to 180° because if you tear the triangle apart and line up the corners, it makes a straight line (see the video).

You will need the following objects:
- For Friday: the page with the shapes on it.
- A loop of string or wool that is big enough to stretch into shapes using your hands and your child's hands

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Monday: At-Home Investigation

You will need:

- A loop of string to form triangles and quadrilaterals (4 sides, like squares and rectangles) out of

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 problems. Encourage them to come up with triangles that have different length sides for the first question. If they don't, take the string and make a triangle with different length sides. Ask them, "Is this still a triangle? How would we know? Does it have 3 straight sides and 3 angles?"
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, but please don't do the drawings.
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. Make sure that you talk about the "Think about it" question. The shape is a square, but most kids think it is a diamond because it is on an angle. If you need to, cut the shape out and rotate it. Ask your child if it is still a square if you turn it. This will probably lead to a lot of discussion. Focus on the sides being the same length and the angles/corners being square/right.

At-Home Investigation

Use your loop of string to make the following shapes. Draw what you have made. Try to find each shape somewhere in your house and take a photo of it or draw it.

Make these shapes from your loop: Triangles
- Make a triangle using your loop of string. Make 2 other triangles using the same loop of string. Draw each triangle here:

- Try turning one of your triangles onto a different angle and drawing it again.

Make these shapes from your loop: Shapes with 4 sides
- Make 5 different shapes with 4 sides from your loop. Draw them here and name them if you can. Only one can be a square and only one can be a rectangle. What is the same and what is different about your shapes?

Think about it:
Try combining a rectangle and a square to make another shape. Draw it here. How many sides does it have? What would it be called?

Tuesday: Connecting Lesson

Number game for 10-15 minutes: *Hide and seek partitioning* __This is the same game as last week__
You will need: an opaque bowl or cup and 16 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 you child cannot work out that there are 16 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.

Worksheet task: 15-20 minutes
This lesson is following on from what your child learned yesterday about **shapes**. The purpose of the lesson is to discuss and evaluate the **similarities** and **differences** between shapes using mathematical language. To be able to meet the requirements for your year level your child has to do the drawing task.

Side – discuss how many sides each shape has and if any sides have to be the same **length**, and if the lines are **straight or curved**.
**Equal** – meaning the same as, not "the answer is coming". For example, the sides on a square are equal in length.
Angle or **corner** – discuss how many angles or corners each side has. Do they have to be the same? Do they have to be right angles or square angles? NB. If your child does not know what a right angle is, show them by folding any piece of paper, then folding again along the line you have made. This makes a right angle, like the corner of a square or rectangle, and like most corners in your house. You can also use the paper to test any angles to see if they are bigger, smaller or equal to a right angle.

Fold
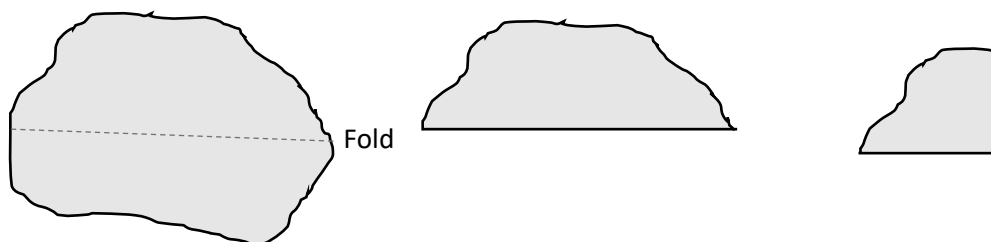
In which groups do these shapes belong? Some shapes will belong to more than one group. Use the blank squares to make up some groups of your own.
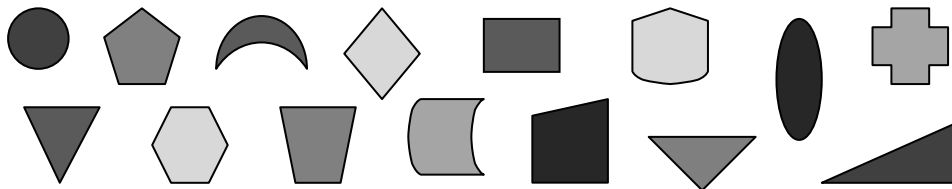
✏ Shapes with more than 3 sides.

✏ Shapes with all straight sides.

✏ Shapes with one or more square corners.

✏ Shapes with . . .

✏ Shapes with . . .

Make a picture in your mind and then draw these shapes.

✏ Draw a circle on top of a triangle that has one corner facing upwards.

✏ Draw a rectangle between a small circle and a square.

Problem solving:

Teacher initials:
Date:

Student solved the problem with:
○ Minimal help
○ Some prompting
○ Solved after explanation
○ Did not work out a solution by themself
○ N/A – not a novel problem

Peer Assessment

Name:

💬 Tell a friend about your drawings.

Wednesday: Application Lesson

This lesson allows your child to think further about the characteristics of shapes.

Number game for 10-15 minutes: *Making to twenty*   <u>**This game is the same as last week**</u>
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 you 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
This lesson is following on from what your child learned yesterday about **describing shapes**. The purpose of the lesson is to think about what it looks like to put shapes together so that they are touching. Which shapes will be able to line up without any gaps? Which shapes are a similar size or angle?

Make sure that your child **explains out loud** their reasons as this means that they will be more likely to remember it later.

If your child can identify characteristics, ask them to try drawing shapes that are combinations of other shapes (e.g. putting a triangle and a rectangle together in different ways). This is an A/B standard rather than just a C.

At the end of this lesson:
Your child has now had 3 opportunities to craw shapes according to characteristics. You will need to decide if they have mastered this concept or not, by seeing if they can correctly name, describe and sort shapes according to their characteristics. If they are having some trouble or forgetting the process, use the time on Friday to practise.

Application question

Madeline is using circles, rectangles, triangles, and squares to make a picture.

Add at least 5 more shapes to finish the picture.
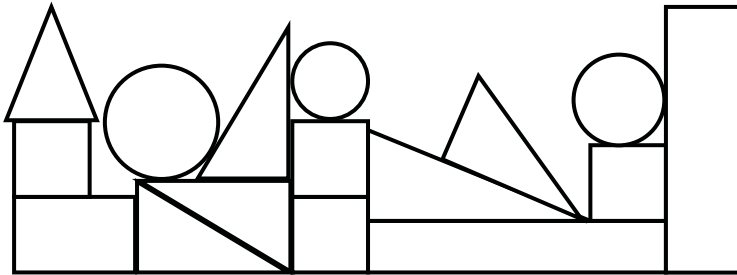
How many circles can you see in the picture now?

How many triangles can you see in the picture now?

How many rectangles are there in the picture now?

How many squares are there in the picture now?

Which shapes can be drawn side-by-side without any gaps?

✍ or ✏ Show how they fit together and explain why.

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 practice

Number:

1. Starting at 64, count back in 5s until you get past 30.

2. 28 + ____ = 52

3. What groups can you make with 30 counters?

4. What number comes after 209?

5. Find two different ways to make $2.00 without using any gold coins.

Measurement/Geometry:

6. Order three objects by their length from shortest to longest.

7. What time will it be in one hour?

8. Flip this shape across the line and draw what happens.
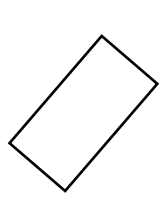
Chance/Data:
9. Use tally marks to count up how many teddies or cars you have.

Friday: Generalising and Extending Lesson

You will need to decide between the following options:

- Child found the shapes work hard: Try the worksheet which is designed for extension. Make sure that your child is doing the thinking rather than waiting for you to explain.
- Child found the shape work easy: Ask your child to use the shapes on this page to create a new shape that has more sides. Draw the new shape and describe it. Name it according to the number of sides it has.
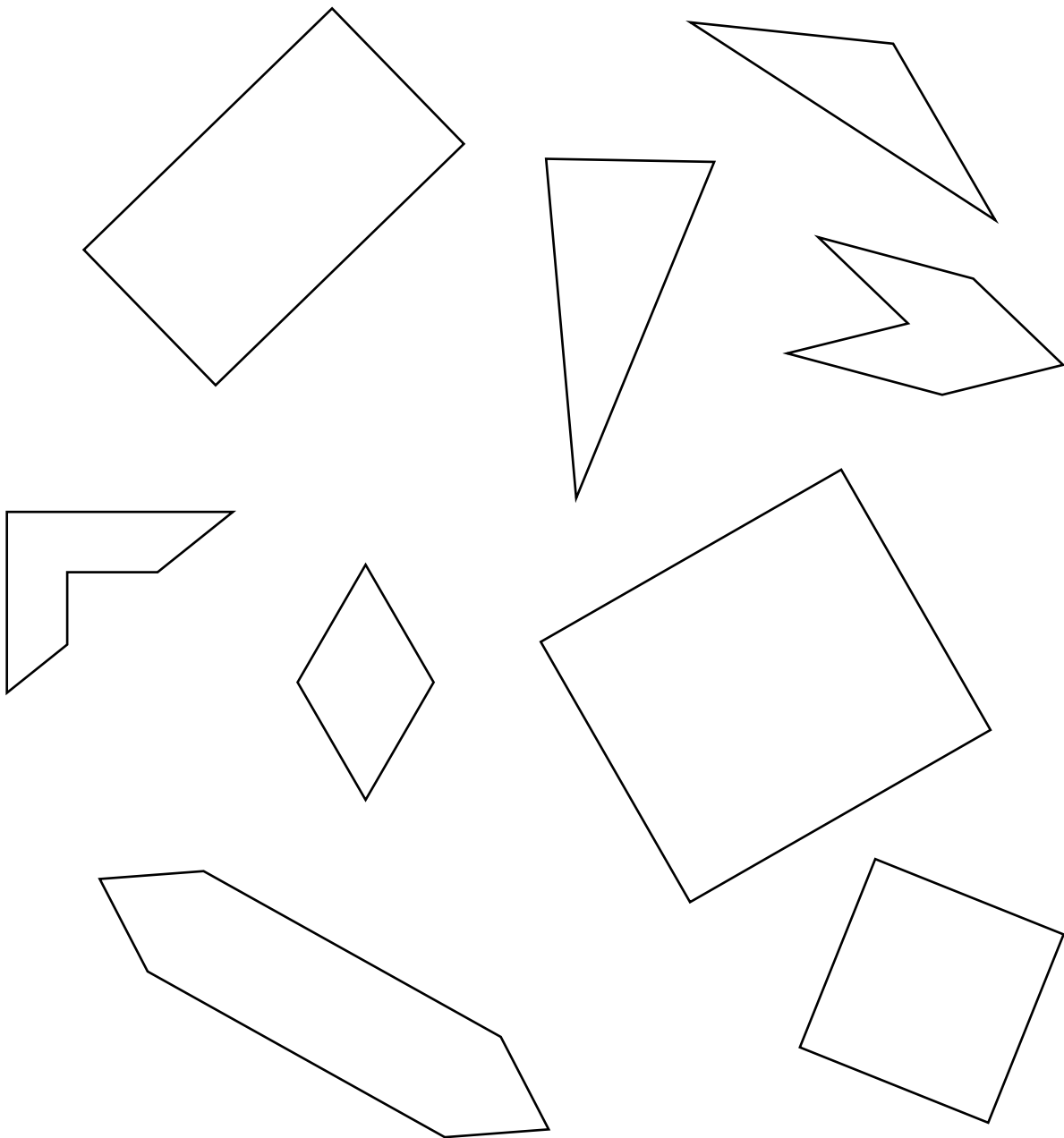
Further application problem
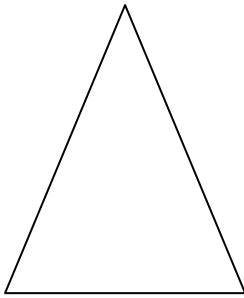
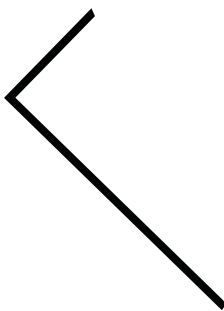This triangle has 2 sides that are the same length. Change the shape to make all of the sides into different lengths.

✏ Draw the new shape over the old one to show how it changed.

What shape is it now?

☞ [   ]

Backwards question

These shapes have one or more sides missing. Finish the drawing so that they have the correct number of sides.

✏ This shape has 3 sides and 3 corners. It is a

☞ [   ]

✏ This shape has 4 sides and 4 square corners. There are 2 pairs of sides. Each pair of sides are the same length. It is a

☞ [   ]