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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.
- **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 **2D shape** and number. 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.

We are also hoping that students will learn the following aspects of number:

- Quantity: The idea of "how many" each number represents. This is very different to counting. We will be focusing on three different elements of quantity:
  - Collecting or making a quantity: Try asking your child to collect a certain number of objects (6 spoons, 8 pencils, 12 cards…). Do this as often as you can, in as many circumstances as you can (e.g. setting out the cups for dinner).
  - Drawing a quantity in a structured arrangement: try asking your child to draw a square made out of 4 smaller squares, or a rectangle with 6 squares in it. You might want to use cube-shaped blocks to model this first.
  - Conserving a quantity: try putting out 8 objects, then moving them around. Ask your child how many there are. Do they need to keep counting to work out that the amount stays the same?
- Partitioning: This is when we break a quantity into two smaller quantities. For example, we could break a group of 8 objects into a group with 3 and another group with 5. If we put those groups back together again, we would have 8.

You will need the following objects:

- A loop of string or wool that is big enough to stretch into shapes using your hands and your child's hands
- For the number tasks: an opaque bowl or cup and up to 12 items that fit under the bowl (e.g. spoons, toy cars, buttons, balls of paper, toothpicks)

Teacher Overview

Students will be thinking about 2D shapes, including lines and angles. We are also placing a heavy emphasis on Quantity and Partitioning rather than counting.

Students need experience in sorting shapes into conventional categories. In the early years, students need to have a well-developed understanding of the criteria being applied in order to successfully sort shapes.
- Students need to develop an appropriate vocabulary to describe what they see. Spatial words such as straight, curved, round, pointy, flat, as well as conventional descriptions like rectangular, triangular, are used by students to sort and describe shapes.
- Construction and deconstruction of models provides experiences that help young students to build perceptive understanding of shape. As students construct models of shapes, they attend to the component parts of the original shape they are modelling. They come to understand that their model must contain all of the component parts in the right size (can be enlarged or reduced) and shape, with the correct relationship to each other.
- Some important vocabulary:
  - Shape: Two-dimensional
  - Object: Three-dimensional
  - Equi = equal, so an equilateral triangle has equal (equi) lengths (lateral)
  - Regular = equal angles and equal sides

What to emphasise

If you have time online with a webcam
Work on the partitioning games and asking students to collect and draw specific quantities.

Check that the parents understand how the number 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 tasks and interleaving sheet so that students retain what they have learned and think regularly about number.

Tracking student achievement
Has the student sorted shapes?
- If so, tick **M2C** on the tracking sheet.
- Have they used some characteristics to do so (sides, lines, angles, corners)? Tick **M2B**.
- Have they considered the similarities and differences between shapes when sorting (e.g. squares and rectangles both have 4 straight sides and 4 right/square angles, but a square also has sides the same length)? Tick **M2A**.

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. Focus on the number of sides and angles, if the sides or angles are the same size, and if the angles or corners are "square".

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:

- Find triangles in your house. Hint: look for shapes in wall paper, or symbols on a remote control. Take a photo or draw them here. Find as many as you can.

Make these shapes from your loop: Shapes with 4 sides

- Make 3 different shapes with 4 sides from your loop. Draw them here and name them if you can.

Think about it:
What is the same about your shapes? What is different?

Teacher Overview

This is a *Problem Solving and Reasoning* task.

The emphasis is *modelling* shapes and discussing the *similarities*, *differences* and *patterns* or *characteristics*. We want students to explore irregular shapes as well as regular shapes. There is also an emphasis on *generalising* – such as realising that the orientation of a shape does not change its name.

This task is easy to do online with the loop of string and having students hold their drawings up to the webcam. Try to emphasise making triangles with different length sides and thinking about the "diamond" as a square.

Watch out for:
- Thinking the orientation changes the shape (e.g. a triangle must be pointing up, a square must have the base at the bottom)
- Overemphasis on shapes with regular sides (e.g. equilateral triangle, regular hexagon)

Good questions to prompt thinking:
- Show me a triangle with the string. Is there another triangle you could make?
- Is this a triangle? (NB you would make a scalene triangle, or "upside down" triangle)

Students requiring support:
- Stick with squares, rectangles and triangles
- Emphasise "tri" as three: tricycle, triceratops, triathlon
- Feel free to stick with number as needed.

Extension:
- Take a square piece of paper and turn it sideways. Is it still a square? How come? Did the shape actually change, or are you just looking at it differently? Is it still a square if I turn it?
- What makes a square a square?

Tuesday: Connecting Lesson

Number game for 10-15 minutes: *Hide and seek partitioning*
You will need: an opaque bowl or cup and 6 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 6 objects, reduce the number to 5 or 4 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 increasing the number of objects to 8, then 12, or using 2 bowls instead of 1 bowl and hiding the same amount of items beneath each bowl.

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. Please aim for multiple examples, not just one shape for each question. Please try to use the following terms if you can:

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?

💬 Make a picture of a circle in your mind.

✏️ Draw a circle here.

Think of all the things you have found out about these shapes.

💬 Make a picture of a triangle in your mind.

✏️ Draw a triangle here.

💬 Make a picture of a rectangle in your mind.

✏️ Draw a rectangle here.

💬 Make a picture of a square in your mind.

✏️ Draw a square here.

Problem solving:

Teacher initials:
Date:

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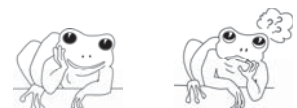○ Minimal help
○ Some prompting
○ Solved after explanation
○ Did not work out a solution by themself
○ N/A – not a novel problem

💬 How is your circle different to your triangle?

💬 Tell a friend about your ideas.

Peer Assessment

Name:

Teacher Overview

This is a **Reasoning** task.

The purpose of this lesson is to *discuss, analyse* and *evaluate* the *similarities* and *differences* between shapes. Make sure to find similarities and differences in characteristics such as the number of sides and angles.

To help students retain the information, make sure that they have *explained their reasons* for drawing or classifying each shape to their parents. If you have time online with students, ask them to come up with multiple shapes and talk about what they have in common.

Wednesday: Number focus

This lesson allows your child to develop pictures in their minds for different amounts. This skill at Foundation is strongly linked with understanding of maths in Year 4.

Collecting amounts and drawing them in a structure

You will need: Up to 10 items from yesterday (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. Ask your child to collect 6 spoons. Check to see if they collect the right amount then:
   a. **If they collect 6**: ask them to leave the spoons with you, then collect "the extra spoons so you will have 8". Do not ask them to collect 2 more. Check it with them. If needed, you can increase this to 12 but do not go further.
   b. **If they do not collect 6**: ask "how many did I ask you to collect?" Remind them of the amount if needed. If they say, "six", then ask, "Can you check that you have six please?" and watch them count the spoons. Hopefully this will help them realise that they have the wrong amount. If they self-correct, stick with six. If their counting is not correct or they can't collect 6 spoons, reduce the number of spoons to 4 and try again.

2. Once your child has successfully collected a given amount, cover the spoons with a tea towel or piece of paper, and ask your child to draw the right number of spoons. You might need to tell them to just draw a line for the handle and an oval for the top. We are not worried about how beautiful the spoons look – just the quantity that they draw.
   a. Once they think they are done, use the spoons that they collected and place one spoon over each drawing of a spoon so that they "check" that they have the right amount. If incorrect, ask them to fix their drawing: "Do you need to draw some more spoons or cross some off?" Make sure to offer both ideas of drawing more and crossing off, rather than leading them too much.

3. Next, take the spoons and arrange them into 2 lines. Show the arrangement to your child and allow them to count the spoons and think about the arrangement. Put the towel or paper over the spoons so that your child can't see them anymore and ask them to draw the arrangement. Please note: most children will need to try multiple times, checking each time, to get this correct. It is a very important skill because it helps them to "hold" a quantity in their head and build a mental image of that amount.

4. Extension if working with 12: ask your child to work out how to arrange the spoons into lines with the same amount in each and draw them. Can they use 3 lines? 4 lines? 6 lines? What numbers won't work?

Important information:
Please try to help your child to think about what they have done when they are wrong, by asking them to check how many they have. Try to get them to adjust what they have made/drawn, rather than starting from scratch. E.g. "I have 7 instead of 6! I will have to cross one off to make it 6." This emphasises the connections between numbers which makes adding and taking away much easier, as well as developing the skill of "balance" which is really important in algebra.

Number focus worksheet

Draw your spoons:

Draw your spoons in 2 lines:

For free use in 2020 during the virus pandemic www.backtofrontmaths.com.au

Teacher Overview

This is a **Quantity** lesson. It gives students an opportunity to develop the concept of "how many". Please read the important information for the week to understand why quantity is important. There is also a free webinar to watch on important number concepts in the article on the website called, "When kids get stuck and never catch up". It will take you through the first 3 number concepts that are most important for children to understand in early primary.

Thursday: Interleaved Practice Questions

Please read these questions to your child, rather than using them like a worksheet.

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 to talk about together

Number:

1. Starting at 6, count in 2s to 20.

2. There were 6 toy cars. Jamie had 2. The rest were hidden under a bowl. How many were hidden?

3. What number comes before 8?

4. Write the number 4 in words.

5. Share 6 counters equally between 2 people. How many does each person get?

Measurement/Geometry:

6. Find a long object and a short object. What are they?

7. What time of the day is it?

8. Draw 2 shapes that are similar.

Chance/Data:

9. Do you think it will rain tomorrow? Why do you think that?
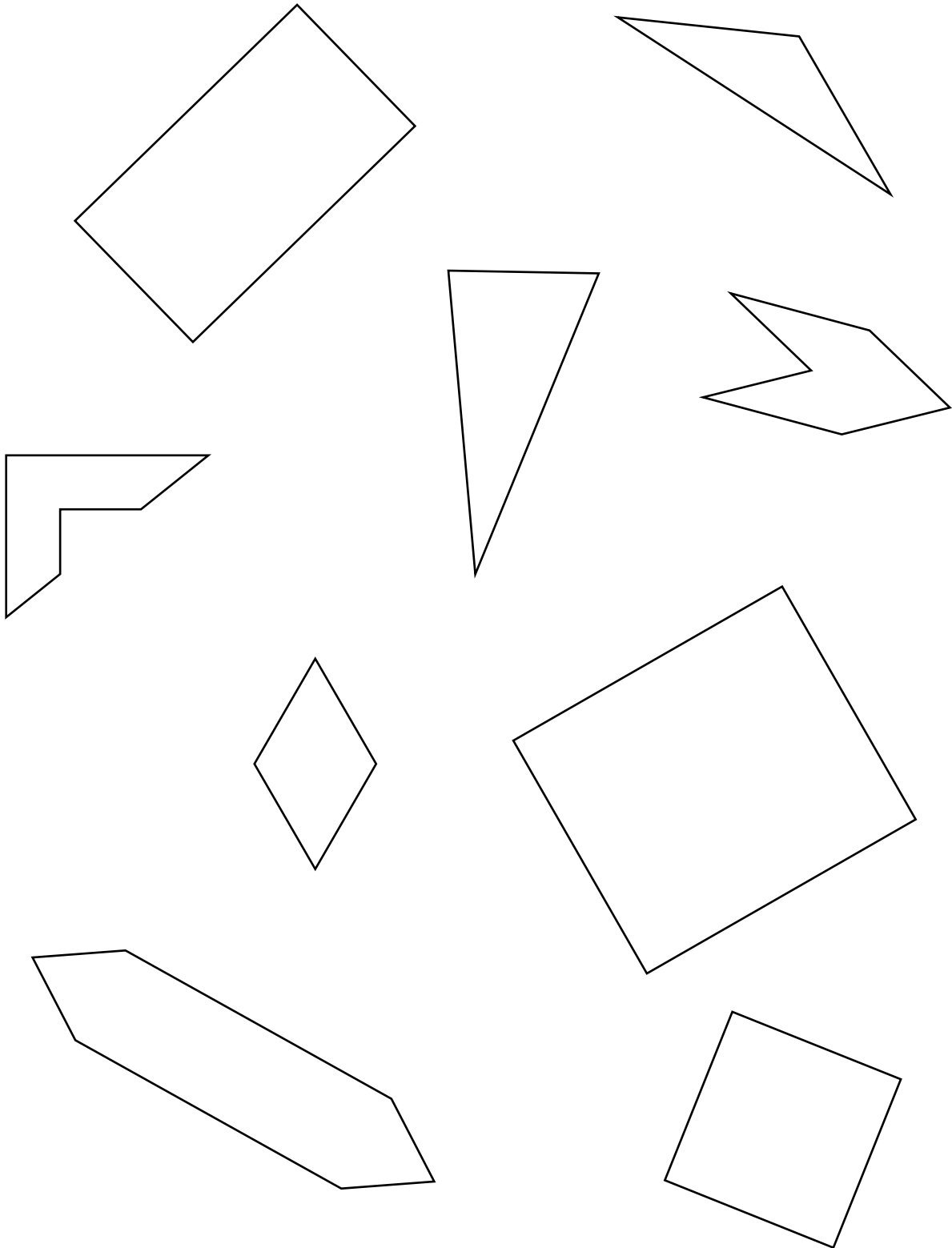
Teacher Overview

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 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

Ask your child to describe the shapes on this sheet. If they can, name the shapes. Ask your child to write the number of sides that each shape has inside the shape.

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 extend the idea of using mathematical language to describe and classify shapes. This is an A/B standard lesson depending on what the child works out about each shape.

To extend student thinking further:
- Ask students to consider the shapes on the lesson plan for parents and classify them. Ask "Which one doesn't belong?"
- Begin classifying shapes according to the number of sides, then considering the shapes with 4 sides as squares, rectangles or other shapes.
- Take the opportunity to use the words: long, short, big, small, narrow, corner, side, angle