

[Contents – click on the link below](#)

[How to use this work program](#)

Accessing the online resources

Running the program each week

Getting help

[What you need to know this week](#)

Week overview

Students need to work out:

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

You will need the following objects:

Structural stages

Monday: At-Home Investigation

Tuesday: Connecting Lesson

Wednesday: Application Lesson

Thursday: Interleaved Practice Questions

Friday: Connecting Lesson

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 arrays and counting patterns. In early primary, this means looking for examples of objects being arranged into a grid-like pattern (e.g. tiles or the top of Lego blocks).

Students need to work out:

- When we line objects up, or group them, we can count them more easily (e.g. counting shoes in twos instead of individually).
- How to draw arrays (grid-structures) for small amounts, e.g. a square made of 4 smaller squares
- How to count in 2s.

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:

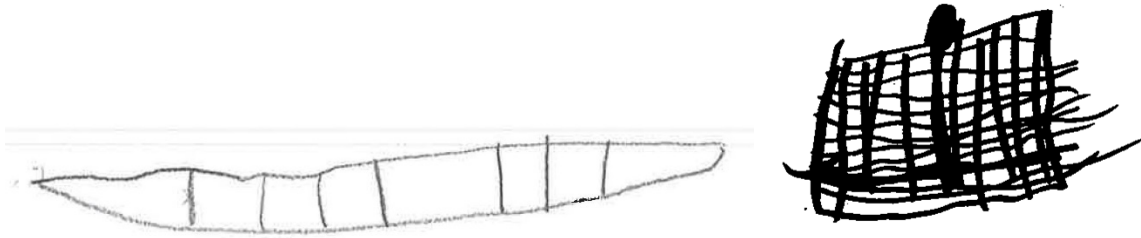
- Lego if you have any, or similar bricks that have dots arranged across the top
- An egg carton if you have one, and small objects to fit in each of the slots (coins, buttons, small toys, counters from a board game, bottle caps)
- Print out of the squares, or if you have small cubes (like dice) then use those instead

Structural stages

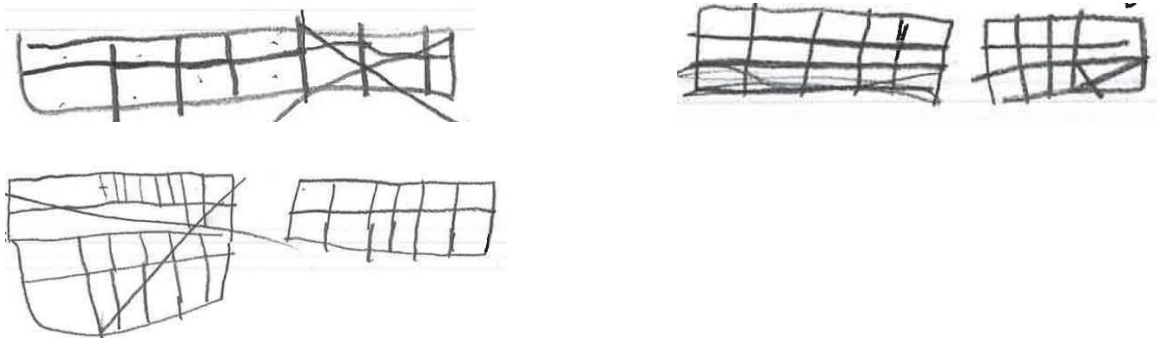
Look at your child's drawings to determine what structural level they are at. Emphasise moving to the next structural stage rather than drawing larger amounts. For teachers: Joanne Mulligan has more information on developing structural thinking in the [PASMAT research available online](#).

Each of the drawings below is of a tens frame (rectangle with 2 rows of 5), drawn by a child who is familiar with tens frames but can't see one. Each drawing was completed by a child aged between 5 and 8.

Prestructural: does not have 10 squares, not arranged into correct number of rows or columns



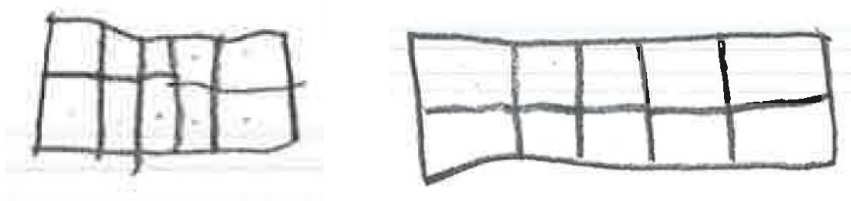
Emergent: correct number of rows or columns, but not both, or just 10 in one line but without 2 rows



Partial structural: can draw 10, but not also keep the structure of rows and columns, often this means 2 rows of 5 but not having the squares touching



Structural: both drawings show structural thinking, however the dots on the images show that the child needed to check that there really were 10



Teacher Overview

Students will be thinking about arrays to develop multiplicative thinking. They will also be focusing heavily on structural drawing of amounts (e.g. drawing a tens frame instead of 10 individual squares).

Students need experience in creating, counting and drawing objects arranged into structures in order to develop strong mental objects for numbers. The term “mental objects” refers to being able to move them around like real objects in your mind. You have to be able to manipulate them, not just picture them. This will help them later with place value, algebraic thinking, multiplicative thinking, understanding fractions and lots more.

- Students need to develop an appropriate vocabulary to describe what they see. Use words such as: rows, lines, columns, 3 twos or 3 groups of two, lined up, arranged, “counting in 2s” etc
- Construction and deconstruction of models provides experiences that help young students to build perceptive understanding of multiplicative relationships.
- Drawing the models helps students develop a stronger understanding. Have them collect a certain number of blocks and then line them up, cover the blocks, then draw from memory.
- Skip counting collections is faster than counting individually. Using an array allows us to see the relationship between addition and multiplication.

What to emphasise

If you have time online with a webcam

Work on having students make arrays, cover them, then draw them. Try to emphasise sticking the squares together, drawing the whole rectangle, then cutting, rather than drawing the squares individually. Hopefully families will also have an empty egg carton that you can use for making odd and even numbers to emphasise the “twoness” of even numbers.

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 described sequences involving counting in 2s and 5s?

- If so, tick **N1C** on the tracking sheet.
- Have they created and continued these sequences? Tick **N1B**.

Has the student continued simple patterns (such as recognising that adding on an extra row adds the same amount each time)?

- If so, tick **N5C**. Can they create simple patterns as well? Tick **N5B**.

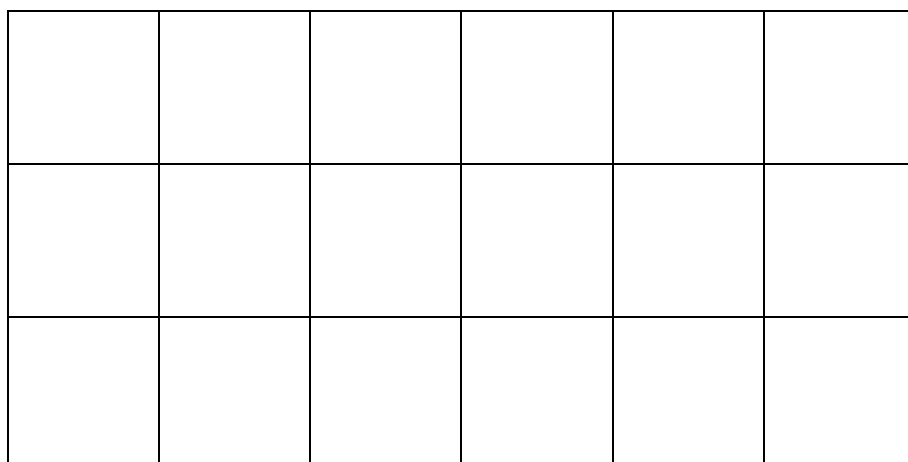
Monday: At-Home Investigation

You will need:

- 12 small cubes, or cut out the squares below to use instead
- A tea towel or piece of paper to cover the cubes or squares
- Lego blocks if you have them

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 move the squares or cubes around to form a rectangle. Ask them, “Is this a rectangle? Is everything lined up?”
3. Your child should come up with 3 different rectangles: 1 row of 12, 2 rows of 6, 3 rows of 4. These can be horizontal or vertical – it won’t matter. The important part is using each different arrangement for the same quantity. If they get stuck try asking, “How about if we have 2 rows? How about if we put them all in 1 row?”
4. Make sure that your child tries drawing the array when it is covered. This means they have to think far more about the 12 objects, such as thinking about the 3 lines of four squares. Be aware that many children need multiple attempts at this question. If your child is wrong, uncover the blocks/squares and look at them again with your child. Help your child think about what worked and what didn’t, then come up with a new plan if needed. Have them count the number in each row and look at how the squares/blocks are aligned. Re-cover the objects and try again.
5. If your child is still wrong after multiple attempts, reduce the number of blocks/squares to 8 or 6 and try again.
6. Encourage your child to find and draw an array with 12-20 objects from somewhere in the house. Scribe for them if you need to, but please don’t do the drawings as they help the child to develop a stronger understanding. Some examples include: eggs in an egg carton, windows in a frame, a muffin tin, Lego bricks, shelving or sets of drawers, ceiling panels or tiles.
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. Try to encourage your child to count in 2s, 3s or 4s rather than 1s.



At-Home Investigation

Here is an array of muffins. They are lined up in rows. Use the squares to make some arrays and draw them.



Make 3 arrays from your 12 squares. Cover your arrays with a tea towel or piece of paper and draw what you can remember:
How are your arrays similar? How are they different?

Find 2 arrays in your house and draw them.

How many objects are in your arrays? How could you count them?

Lego arrays:

If you have Lego, find 2 different **shaped** blocks with the same number of dots. Draw them here.

Teacher Overview

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

The emphasis is *modelling* arrays and discussing the *similarities, differences* and *patterns* or *characteristics*. We want students to explore arrays and develop structural thinking. There is also an emphasis on *generalising* – such as realising that the orientation of an array does not change how many objects are in the array.

Finding arrays at home is something that you can do via a webcam. Children can also hold up their drawings of arrays if they do them in pen. If needed, children can also cut out and glue the squares into an array before drawing.

Watch out for:

- Needing to see the array to be able to draw it
- Not having equal numbers in each row/column (this is not an array)
- Adults drawing for the children
- Levels of structural thinking

Good questions to prompt thinking:

- Show me an array. It has to be all lined up into rows. What can you find that is an array?
- Is this an array? (NB you would draw 12 not arranged in an array)

Students requiring support:

- Reduce the number of squares to 6 or 8
- Glue the squares into an array
- Use your finger/pen to trace the outside lines for each square then try drawing them

Extension:

- Make arrays of 24.
- Emphasise the need to move from partial structural to structural thinking

Tuesday: Connecting Lesson

Number game for 10-15 minutes: *Target partitioning*

You will need: a piece of paper, or tea towel to act as the “target”, and 12 objects to throw at it.

1. Show your child the items and ask them how many there are.
 - a. If your child cannot work out that there are 12 objects, reduce the number to 8 and try again.
2. Ask your child to try throwing the objects to land on the target. Once all 12 have been thrown, record how many hits and how many misses as shown in the table below.

Hits	Misses	Number sentence
5	7	$5+7=12$

3. Focus on counting only one of the numbers, then guess the other number, and count to confirm (whether right or wrong). Have your child read the number sentence out before trying again.

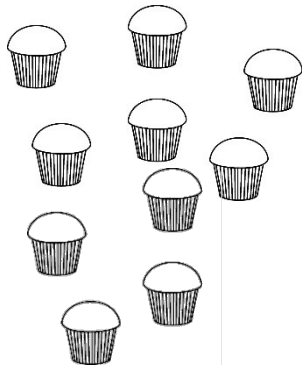
Worksheet task: 15-20 minutes

This lesson is following on from what your child learned yesterday about **arrays**. The purpose of the lesson is to discuss **aligning** objects into rows, then **counting them in groups** (e.g. for the muffins: 2, 4, 6). The last question (missing dots) is likely to be particularly tricky, but should be a good extension for students who were able to understand arrays of 12.

Connecting Arrays

Muffins

Here are some muffins. Draw them lined up to make an array.
How could you count the muffins? How many are there?



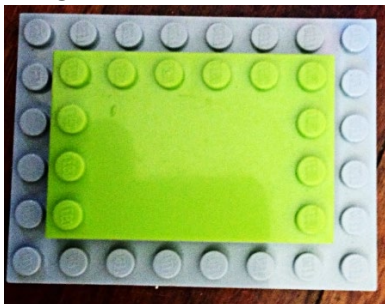
How would your answer change if there was one less muffin? Draw it:

Egg carton

Draw the inside of an egg carton. How many holes are there? How could you count them?
How are the eggs arranged differently to the muffin tray we looked at yesterday?

Missing Lego dots

A Lego block has some dots missing. Draw in the missing dots and count them.



Teacher Overview

This is a **Reasoning** task.

The purpose of this lesson is to *discuss*, the *similarities* and *differences* between arrays and make *connections* to counting. This activity emphasises partial structural models for arrays, so feel free to work on structural models instead. Make sure children try drawing each array.

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 students, emphasise counting in 2s, lining objects up, and positional language.

Wednesday: Application Lesson

This lesson allows your child to practise what they have learned over the past two days.

Number game for 10-15 minutes: *Egg carton fun*

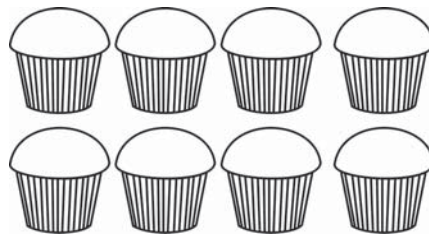
You will need: an empty egg carton and 12 small objects that fit in the carton.

1. Show your child the items and ask them how many there are. Show them the egg carton and ask how many holes there are.
2. Ask your child to look away or close their eyes. Place 6 of the items into the egg carton, arranged up one end so that you use 3 rows of 2.
3. Ask your child to look at how many objects there are and how many spaces there are. Have them state the numbers like this, "There are 6 objects. We need 6 more to make 12".
4. Ask your child to look away again, and this time rearrange the six so that they fill up one complete row of 6 in the carton. Repeat step 3.
5. Swap roles. This time your child can place any number of objects in the egg carton. Make sure that you say the amount out loud as well, "There are 8 objects. We need 4 more to make 12.". Change roles each time.
6. Encourage your child to work out how many objects/spaces there are without having to count them all.

Worksheet task: 15-20 minutes


This lesson is following on from what your child learned yesterday about **arrays**. The purpose of the lesson is to **connect** the arrays with counting and introduce a very simple example of multiplication. For each array, have your child describe the number of rows, the number in each row, and count the muffins (by the number of rows or columns).

Mitchell baked 8 muffins. He put the muffins out onto a rack to cool. He made rows of muffins like this:



2 rows

4 muffins in each row


 Draw the rows he could have made if he had baked 10 muffins.


How many rows did you make?



How many muffins are in each row?



 Could you have made a different number of rows?

 How many muffins would have been in these rows?

Problem solving:

Teacher initials:

Date:

Student solved the problem with:

- ☐ Minimal help
- ☐ Some prompting
- ☐ Solved after explanation
- ☐ Did not work out a solution by themselves
- ☐ N/A – not a novel problem

Peer Assessment

Name:



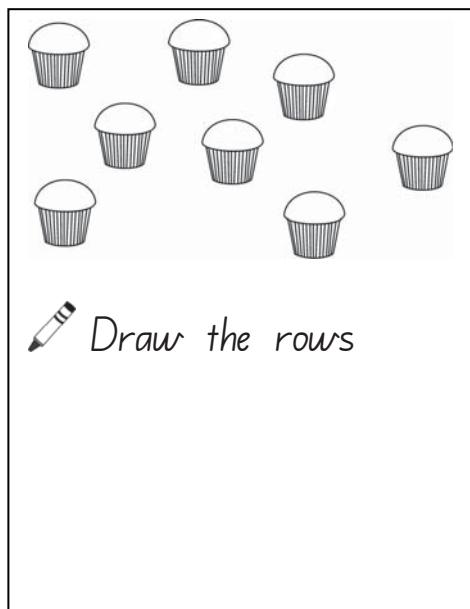
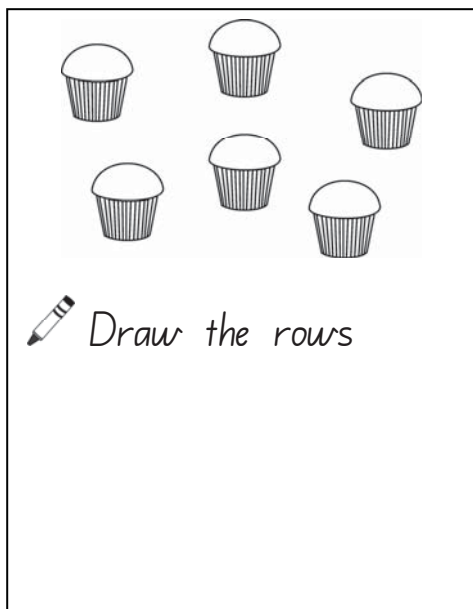
 Tell a friend about the rows you made.

Application problems

1. Mitchell made more muffins.



Draw the rows he could make with these muffins.



2.  Fill in the labels to describe these groups of muffins.

rows with
muffins in each row.



rows with
muffins in each row.



rows with
muffins in each row.



rows with
muffins in each row.



Teacher Overview

This is an **Application** lesson. It gives students another chance to develop an understanding of arrays. At the end of this lesson students need to be able to describe counting patterns.

Other considerations:

- Check that the student has played the number games and remind parents that it is important if they haven't played it with their child.
- If the student can describe the counting patterns, that is the C standard. If they can continue and create patterns, then that is an A/B.

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:

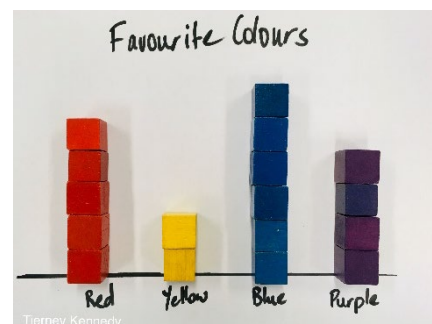
1. Starting at 11, count in 2s until you get to 25.
2. $12 - \underline{\quad} = 7$
3. What number is 10 more than 19?
4. Write the number 18 in words.
5. Share 15 counters equally between 3 people. How many does each person get?

Measurement/Geometry:

6. Find a cup or jug with a small capacity or volume (it doesn't hold much). Find one with a bigger capacity or volume.
7. What time will it be at lunch time?
8. Describe how to get from your bedroom to the kitchen. How many steps are needed?
How do you have to turn?

Chance/Data:

9. What can you tell from the information in the graph?



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

Array Hunt

Go on an array hunt! Take photos or draw 3 or 4 arrays that you can find in your house that have at least 20 objects in them. Count the number of items in your arrays and write down the numbers. Explain how you counted them.

What shoes do you own? Try to find at least 8 pairs of shoes in your house. Draw them here in an array and count them.

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 give students an opportunity to start looking for arrays in the real world and draw their attention to the structures present in everyday objects.

To extend student thinking further:

- Ask students to place a number of objects into an egg carton and draw them
- Ask students to make arrays with given numbers of objects
- Ask students to count all the shoes in their house. They could line the pairs of shoes up down the hallway to take a photo and count them.
- Counting objects by 5s and 10s.
- Create their own arrays and count them.