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Week overview

Students need to work out:

We are also hoping that students will learn:

For your own information:

You will need the following objects:

Monday: At-Home Investigation

Tuesday: Connecting Lesson

Wednesday: Connecting Lesson

Thursday: Interleaved Practice Questions

Friday: Connecting or Extending 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.
- **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 dividing (or sharing fairly). This concept is strongly linked with the work on arrays and counting patterns that we did last week. It also links strongly with the fractions work that we will be introducing in a few weeks' time.

Students need to work out:

- When dividing, it is important to ensure that each portion contains the same number of objects.
- When given an amount, work out how many people could share that amount fairly and also work out how much each person would receive. NB. It is particularly helpful if students can work out how to share the amount in more than one way.
- Arranging objects into arrays helps with dividing.
- When we divide collections of items, it is the same as making a fraction of that collection. For example, dividing 12 counters between 2 people is the same as finding half of the counters. Dividing 12 counters between 3 people is the same as finding one third of the counters.
- How to easily calculate multiplication and division for 1, 2, 3, 4, 5 and 10 facts, and be able to efficiently work out 6, 7, 8 and 9 facts.

We are also hoping that students will learn:

- Arrays can show us the amount altogether (total number of items), the number of groups we are making (rows or columns) and the amount in each group (columns or rows) at the same time. For example, 15 soldiers lined up in 5 rows gives 3 in each row.
- Arrays show us the link between "counting in" and multiplication/division. For example, counting in 5s from 0 means that we can also make an array with 5 in each row for each of those numbers.
- Prime numbers, when formed into arrays, only make lines. Composite numbers make other arrays as well as lines.
- Sometimes when we are dividing objects between people we end up with left overs, or we need to cut the objects into parts to share fairly.

For your own information:

When we are dividing, we can use two different models. Both ask "how many". Here is a simple example of dividing some objects between people.

Partition division: "how many" objects will each person receive? Children are determining the number in each share.

Quotition division: "how many" people can share the objects fairly? Children are determining the number of shares.

You will need the following objects:

- Copies of the coins and grid paper

Teacher Overview

Students will be thinking about dividing and its relationship to arrays to develop multiplicative thinking. The work will be linked heavily with what we did last week to help reinforce both ideas.

Students need experience in dividing objects using both the partition model (how many in each group) and the quotient model (how many groups). For example, when given an amount a student could be asked how many people we could share that between (quotient), or how many items each person would receive (partition).

- 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, shared and “fair share”.
- Construction and deconstruction of models provides experiences that help students to build perceptive understanding of multiplicative relationships. Drawing these models reinforces ideas.
- Using an array allows us to see the relationship between addition and multiplication.
- At this stage it is useful to introduce the language of fractions in division situations. Try to talk about finding halves, thirds and quarters of the collections.

What to emphasise

If you have time online with a webcam

Discuss the Investigation with students. Reinforce both the idea of quotient (how many teams) and partition (how many in each team).

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 3 students are expected to recall division and multiplication facts listed below.

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 similar concepts to last week:

- Has the student solved problems using **efficient strategies** for multiplication/division (one number should be 2, 3, 4, 5 or 10)? Tick **N2C**.
- For N2B students need to use efficient strategies for solving problems using any single digit number.
- Can students recall multiplication/division facts for 2, 3, 5, and 10? Tick **N7C**.

This week’s activities also form the basis for the fractions work we will be doing later:

N3C – Model and represent unit fractions

Monday: At-Home Investigation

You will need:

- A copy of the coins and the grid paper.
Please note, you child will only need the dollar coins to complete this activity. Providing the other coins will also encourage your child to think about dividing the amount into dollars and cents which shows a higher level of thinking.

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. Ask your child to make \$24 from the coins.
3. Read the sheet to your child. Ask for their ideas on how to solve the first problem. Encourage them to guess how many people could share the money and how much each person would receive.
4. Make sure that your child draws the answers rather than just writing the numbers. Do not do the drawing for them as drawing is an important part of reinforcing ideas. Using a circle is fine for the coin – they do not need to draw the kangaroos!
5. Try to find all the combinations of people and money that would make \$24. Use the grid paper to track your thinking by shading rectangles (e.g. 3 people with \$8 each, shade 3 rows of 8).
6. If the question is too easy, ask your child what would happen if 5 people tried to share the \$24. Provide the extra coins for stimulus if needed. Please note: this question is a higher standard than needed but provides a great link into understanding decimal numbers in Year 4.
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

Sharing out money.

You have \$24 to share between people in as many ways as you can. How could it be done?

Make sure that you show how many people are sharing the money and how much each one would receive. Write a number sentence with multiplication for each one.

How can you be sure that you have found all the ways to share the money?



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 sharing as both Quotition (how many shares) and Partition (how many in each share). There is also an emphasis on *generalising*.

If children are stuck, they can use multiple copies of the coins and glue them onto a page with people. This is something that you can look at via webcam but might not wish to do live. You should also emphasise the use of grid paper for recording the options.

Watch out for:

- Not having the same amount for each person
- For the final question: not sure how to account for all the factors
- Adults drawing for the children or prompting them too quickly to find the options.
- Levels of structural thinking (See information provided in Week 3)

Good questions to prompt thinking:

- Is it fair? Does everyone have the same number of pieces?
- Do you have enough/too many?
- How could you make it fair? How could you make it the same?
- What if only 2 people were sharing the money?
- Could we share it between 3 people? Let's check.

Students requiring support:

- Reduce the coins to \$12 and try the task. Make sure that you push students or children to sharing between 3 people rather than just even numbers of people.

Extension:

- What if there were 5 people sharing \$24 but you could use silver coins as well? How could you share it fairly?

Tuesday: Connecting Lesson

Multiplication practice: 10-20 mins

Have your child complete one of the multiplication practice grids provided on the following pages.

Worksheet task: 15-20 minutes

The first worksheet should be relatively simple for your child as it is easier than yesterday's investigation – it simply introduces the symbol for division in case your child is not already familiar with it. The second worksheet asks the child to calculate some division facts.

Please make sure that you discuss your child's ideas with them as discussing ideas helps children to retain them for longer periods. As division is a particularly difficult concept in later years, we need to make sure that children in Year 3 use multiple modes of thinking to build strong understanding and retention:

- Discuss ideas of sharing and dividing
- Use physical materials to model sharing and dividing
- Draw what they have made
- Write numbers to represent what they have made and explain it out loud

Work out remaining division facts

This activity focuses on the division facts for 3s, 6s, 7s, 8s and 9s. Answer the following questions as quickly as you can.

Draw or make a model of the following facts to work out the answers if you are stuck. Think of them either as being shared equally among that many people, or as making that many groups, e.g. $9 \div 3$ means share 9 between 3 people. It could also mean make 3 equal groups out of 9. Remember that these are related to the multiplication facts, so if you get stuck think about them.

$3 \div 3 =$

$18 \div 3 =$

$6 \div 3 =$

$15 \div 3 =$

$12 \div 3 =$

$21 \div 3 =$

$24 \div 3 =$

$27 \div 3 =$

$9 \div 3 =$

$54 \div 6 =$

$30 \div 6 =$

$12 \div 6 =$

$18 \div 6 =$

$24 \div 6 =$

$6 \div 6 =$

$36 \div 6 =$

$42 \div 6 =$

$48 \div 6 =$

$7 \div 7 =$

$49 \div 7 =$

$14 \div 7 =$

$21 \div 7 =$

$63 \div 7 =$

$35 \div 7 =$

$42 \div 7 =$

$28 \div 7 =$

$56 \div 7 =$

$56 \div 8 =$

$64 \div 8 =$

$16 \div 8 =$

$24 \div 8 =$

$32 \div 8 =$

$72 \div 8 =$

$8 \div 8 =$

$48 \div 8 =$

$40 \div 8 =$

$45 \div 9 =$

$63 \div 9 =$

$72 \div 9 =$

$18 \div 9 =$

$27 \div 9 =$

$36 \div 9 =$

$81 \div 9 =$

$9 \div 9 =$

$54 \div 9 =$

What patterns have I found?

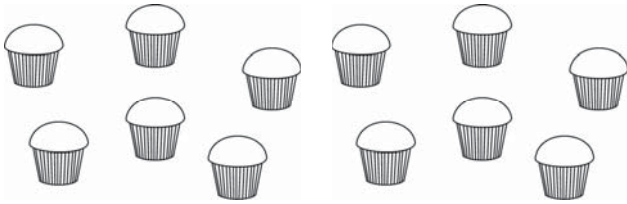
What strategies can I use to help me remember the answers?

D22. Dividing and arrays

Dividing is a way of organising. It asks 'How many' rows, or columns, or groups you can make from a collection of objects. Work through the following problems to try to work out how dividing works and how it is similar to multiplying.

Organising muffins:

Rohan has made some muffins. He wants to organise them into rows with three muffins in each row. Draw how he could arrange them.



Draw Rohan's muffins when organised into rows of 3:

$$12 \div 3 = 4$$

$$12 \div 4 = 3$$

Organising shoes:

Laura has the following shoes in her cupboard. She wants to know how many pairs of shoes she has. Draw lines to show the pairs of shoes and work out how many pairs she has.



$$10 \div 2 = 5$$

$$10 \div 5 = 2$$

What do you think dividing means? How is it similar to multiplying?

Draw a picture and write a story about this number sentence: $15 \div 3 =$

Multiplication practice grids:

| | 2 | 3 | 4 | 5 | 10 |
|----|---|---|---|---|----|
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

| | 2 | 3 | 4 | 5 | 10 |
|----|---|---|---|---|----|
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

Division practice grids:
Find all the missing numbers!

| | 2 | 3 | 4 | 5 | 10 |
|---|----|----|----|----|----|
| 2 | | | 8 | | |
| | | | | 15 | |
| 4 | | | | | |
| | | | 20 | | |
| | | 18 | | | |
| 7 | | | | 35 | |
| | | | | | 80 |
| | 18 | | | | |
| | | | 40 | | |

| 2 | | | 10 | | |
|----|----|----|----|----|---|
| 3 | 12 | | | | |
| 4 | | | | | 8 |
| 5 | | | | 50 | |
| 6 | | 18 | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

Teacher Overview

This is an ***Understanding and Reasoning*** task.

The purpose of this lesson is to *connect* the symbol for division with the dividing and sharing that students have already done. The worksheets provide children with an opportunity to practise division and become familiar with it.

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 practising multiplication and division facts to become fluent. The division practice grids provide a good opportunity to work backwards and forwards.

Wednesday: Connecting Lesson

This lesson allows your child to develop pictures in their mind for division. It is important for developing a strong connection between multiplication and division. If you find that your child has difficulty picturing the situations, try using the grid paper from the previous lesson to draw it out.

We also understand that “rolls of film” are no longer used! We have left this question in as it might provide a fun idea to research on the internet and find out about how photographs used to be taken.

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

D23. Dividing number sentences and stories

Try to answer the following dividing questions. You can draw pictures or use numbers to work them out. A story is given to explain each number sentence.

Questions:

$18 \div 3 =$ There were 18 students in a class. Their desks were in three rows. How many desks were in each row?



$6 \div 3 =$ Kevin had 6 rolls of film to use over 3 days. How many should he use each day?

$30 \div 6 =$ There were 30 students who were divided up into 6 teams. How many were there in each team?

$18 \div 6 =$ 18 students went on an excursion to the zoo. They were led through the koala enclosure in groups of 6. How many groups went through the koala enclosure?

$21 \div 7 =$ 21 soldiers stood in rows on parade. Each row had 7 soldiers in it. How many rows were there?

What do you think dividing means? How is it similar to multiplying?

Teacher Overview

This lesson is very similar to Tuesday's, providing a direct **Application** of the concept of division. The lesson gives students an opportunity to build mental images for division, to understand how it is used in the real world, and to link division with multiplication. It would be useful to encourage students to draw their answers on grid paper rather than just writing the number sentences.

Make sure that you discuss the final question with students to create a strong understanding of division and its link with multiplication.

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. Complete the following number sequence:

102, 105, 108, _____, _____, _____, 120, _____, _____

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

$$245 - \boxed{} = 97$$

3. What number has 16 ones, 4 tens and 12 hundreds?
4. Toothbrushes can be bought in packs of 3. How many toothbrushes will you have if you buy 5 packs? Show how you worked out your answer.
5. Split 18 counters into 3 groups, so that 2 of the groups have the same number. How many ways can that be done?

Measurement/Geometry:

6. Find a rectangular prism (box, like for cereal). How many faces does it have? What do you notice about the faces, edges and vertices (corners)?
7. What will the date be on Tuesday next week? How many days are there until Tuesday of next week?
8. Draw a clock on the back of this sheet.

Chance/Data:

9. Roll a dice 50 times and record how many times each number comes up. Use the table below to record your results.

| Number | 1 | 2 | 3 | 4 | 5 | 6 |
|------------------------|---|---|---|---|---|---|
| Number of times rolled | | | | | | |

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: Connecting or Extending Lesson

For this lesson your child will need to focus strongly on the connections between multiplication and division. While it is not strictly necessary to solve the problems, it would be sensible to do so once your child has decided which operation is necessary. This acts as additional practice.

D26. Identify situations requiring \times or \div

The situations below are either multiplication or division. Decide on the operation needed but don't solve the questions. Explain why you chose that operation, and write a number sentence for the question.

1. There are five people. Each person needs 3 drinks. How many drinks would be required?
2. Our total bill at the cafe arrived. It was \$35. We were sharing it between 7 people. How much did each person have to pay?
3. Ice skating costs \$8 every week. How much will it cost for 12 weeks?
4. A packet of pens costs \$10. There are 5 pens in the pack. How much is it per pen?
5. 30 students needed to be organised into 5 groups. How many students would be in each group?

BACKWARDS QUESTION:

Write the operation and number sentences for this:

I had 6 people coming to visit. Each person would need 2 drinks. I bought 3 bottles of drink. Each bottle holds 4 drinks. Do I have enough?

Teacher Overview

This is a **Generalising** lesson, designed to help students connect multiplication and division, and select which is appropriate for the circumstance. It promotes **Reasoning**, by asking students to show and explain how they have worked out the answers. It also provides an opportunity to demonstrate both the dividing and counting aspects of the Achievement Standard mentioned earlier.

To extend student thinking further:

- Have the children design multiplication/dividing questions for you to solve.
- Change the numbers to involve “left overs”. For example, for question 4 you could change the number of pens to 4 pens in the pack meaning that they would cost \$2.50 each instead of \$2.00.