Work Program for B2FMaths@Home Week 4 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 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 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.
- 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 into groups we end up with left overs, or we need to cut the objects into parts to share fairly. We can express remainders as whole numbers (e.g. if we were dividing 11 people into 5 teams and one person was left out), as fractions (e.g. if we were dividing 11 pieces of bread between people and we cut the left over piece in fifths), or as decimal numbers (e.g. if we were dividing $11 between 5 people, so everyone had $2.20). ***Please note: there is a video online to explain this concept.***
- Division is linked strongly with fractions.

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 for Monday
- Small squares cut from the grid paper for Tuesday.

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 quotition model (how many groups). For example, when given an amount a student could be asked how many people we could share that between (quotition), 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: factor, multiple, prime, composite, remainder, fraction, decimal
- 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.
- Students need to work out division with remainders for the Achievement Standard.

What to emphasise

If you have time online with a webcam
Use **Tuesday's connection lesson** on expressing remainders as whole numbers, fractions and decimals rather than worrying about the investigation from Monday. There is a video provided, but many parents will struggle with this concept.

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 were expected to recall division and multiplication facts for all single digit factors.

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:

- Can the student solve problems using all four operations? Tick **N3C.**
- Can the student make connections between powers of 10 and multiplication and division with decimals? Tick **N6C**.

In addition, we are looking at part of:
N1C: Recognise the properties of prime and composite numbers (not square or triangular numbers)
N4C: Connect fractions, decimals (and percentages) as different representations of the same number

Monday: At-Home Investigation

You will need:

- A copy of the coins and the grid paper.
  Please note, your 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.

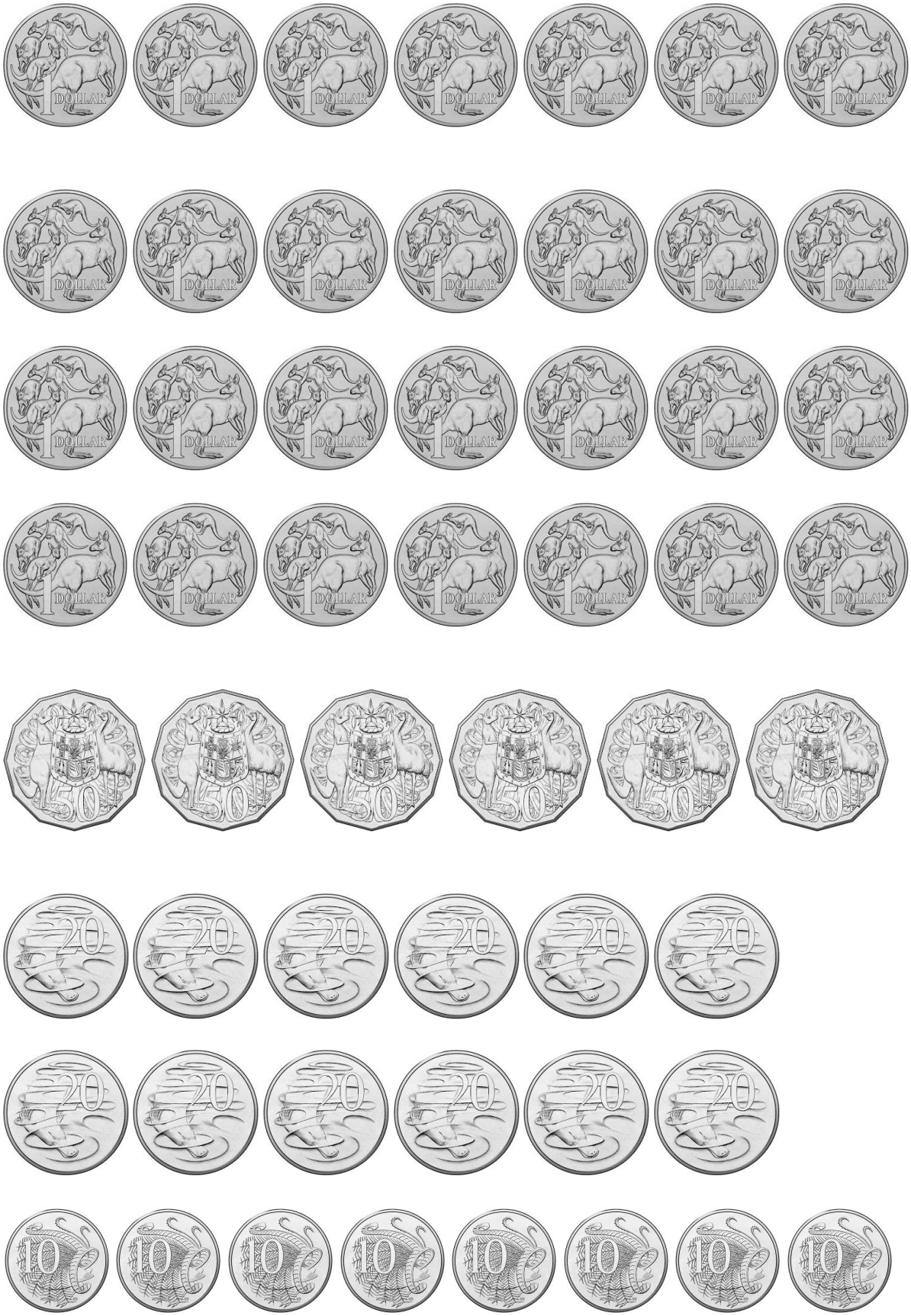
Steps:

1. Make sure you have read "What you need to know this week" so that you know what to emphasise with your child.
2. Read the sheet to your child. Ask for their ideas on how to solve the first problem. Encourage them to think about splitting the remaining $4 into cents to distribute. Provide the coins on the paper if needed to help your child think about exchanging the gold coins for silver.
3. If your child gets stuck, reduce the amount of money to $21. This
4. The second question should be relatively easy after the first. It provides a second opportunity to work out how to divide the money.
5. 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

You have $24 to share between 5 people. How could it be done?
Make sure that you show how much each person would receive. Show all your working.

What would happen if you had to share the $24 between 10 people?
Show how much money each person would receive and explain how you did it.



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*. This activity explores division as Partition (how many in each share), and extends student understanding by requiring whole dollars to be partitioned into cents. There is also an emphasis on *generalising*.

If children are stuck, they can use copies of the coins to work it out. This is something that you can look at via webcam but might not wish to do live. The grid paper is provided in case you need to find options for dividing 24 into whole numbers first.

Watch out for:

- Not having the same amount for each person
- Adults drawing for the children or prompting them too quickly to find the options.
- Leaving the $4 remaining instead of splitting it into cents to distribute.

Good questions to prompt thinking:

- Is it fair? Does everyone have the same amount?
- When we tried to share the $24 between 5 people, what was left over? How could we share the left over money out? What if we could change the dollars into silver coins instead?
- How would we do it if it was just $1 left over instead of $4? How could we share $1 between 5 people?

Students requiring support:

- Work on splitting $24 between 2, 3, 4, 6, 8 people instead of 5.

Extension:

- What if there were 9 people sharing $24 but you could use silver coins as well? How close could you get to sharing 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
Please make sure that you have read through this worksheet yourself before trying it with your child. You may also wish to watch the video online, either by yourself before teaching the concept or with your child to help you both to understand what is happening. While your child has learned this concept last year, it is still a difficult one to understand.

Expressing remainders as fractions and decimals is a particularly tricky concept, but hopefully the lesson yesterday on dividing $24 will help. You may wish to use small squares of paper to help model what is happening. The diagram below will show you how to use the paper.

How the examples are related:
For example 1: when we try to divide 16 squares into 5 rows or groups, there will 3 in each group and 1 left over. This is called a remainder.

For example 2, we think about what we could do with the left over square

In this case, as we are trying to divide the square between 5 groups, we could cut the square into 5 pieces (fifths), and put one piece in each group.

For example 3, we think about cutting the left over square into 10 pieces instead of 5. This allows us to express the remainder as a decimal number. An easier idea might be to think about dividing $16 between 5 people. Each person would receive $3.20, which is the same as 3.2.

If you get stuck with this worksheet, contact your child's teacher. Hopefully they will be able to use any online time to model the process with your child. Remember to check the video provided as well.

D14. Division remainders

TR p93

Sometimes when you divide a number it does not fit entirely into groups. For example, if you divided 16 by 5, you would have 3 groups of five, with 1 left over.

Example 1: Leaving remainders as whole numbers

$5\overline{)16}$ = 3 rem 1 $\quad 5\overline{)17}$ = 3 rem 2 $\quad 5\overline{)18}$ = 3 rem 3

What is the pattern?

Example 2: Expressing remainders as common fractions

$5\overline{)16}$ = $3\ {}^{1}/_{5}$ $\quad 5\overline{)17}$ = $3\ {}^{2}/_{5}$ $\quad 5\overline{)18}$ = $3\ {}^{3}/_{5}$

What is the pattern?

Example 3: Expressing remainders as decimal fractions

$5\overline{)16.{}^{1}0}$ = 3.2 $\quad 5\overline{)17.{}^{2}0}$ = 3.4 $\quad 5\overline{)18.{}^{3}0}$ = 3.6

What is the pattern?

BACKWARDS QUESTION:

Try to work out what the missing numbers are.
Explain how you did it:

$5\overline{)\quad}$ = 3 rem 2

Division remainders 2

Use what you learned in the previous activity to help you to solve the following problems. You will need to look for where the remainder (left overs) goes.

Example 1: Leaving remainders as whole numbers

$5 \overline{)16}$ = 3 rem 1 $\qquad 5 \overline{)19}$ $\qquad 5 \overline{)21}$

What is the pattern?

Example 2: Expressing remainders as common fractions

$5 \overline{)16}$ = $3\ {}^{1}/_{5}$ $\qquad 5 \overline{)19}$ $\qquad 5 \overline{)21}$

What is the pattern?

Example 3: Expressing remainders as decimal fractions

$5 \overline{)16.{}^{1}0}$ = 3.2 $\qquad 5 \overline{)19.0}$ $\qquad 5 \overline{)21.0}$

What is the pattern?

BACKWARDS QUESTION:

Try to work out what the missing numbers are.
Explain how you did it:

$6 \overline{)\ \ }$ = 3.2

D15. Expressing a remainder

TR p94

Sometimes different forms are more appropriate for expressing a remainder in division. Examine the following example and use it to help you answer the questions below.

Example: There are 31 children to be divided into 3 groups. How many in each group? Circle the most appropriate answer from those below.

$31 \div 3 =$ 10.33 $10\ ^1/_3$ (10 rem 1)

Answer: 10 remainder 1 is the most appropriate answer because you cannot divide a living child into fractions for different groups. They have to stay as a whole child, therefore as a remainder.

Questions:
For each of the following questions circle the most appropriate answer from the group and justify your choice on the lines below.

3 chocolate bars were split between 2 people. How much chocolate did each one receive?

1.5 bars each 1 ½ bars each 1 bar each and 1 remainder

My Reason:

Gerard ran four 100m races in 54 seconds. How long did he take to run each one?

13.5 seconds each $13\ ^2/_4$ seconds each 13 seconds each, remainder 2

My Reason:

Four people had to divide 9 books between them. How many books did each person get?

2.25 books each 2 ¼ books each 2 books each and 1 remainder

My Reason:

Describe how you decided which form was appropriate for each question.

Backwards Question:
Danielle found that she could make 12 ¼ cookies from each batch of dough. How many batches do you think she cooked to work this out?

Multiplication practice grids:

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

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

Teacher Overview

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

You are likely to need an online lesson for this task. We will also provide a video example for families to use for this task, which may involve viewing it with their children if necessary.

The purpose of this lesson is to *connect* division with regrouping and introduce a model for recording remainders as fractions and decimals. This idea should be familiar from Year 5, but children may have difficulty with the idea of cutting the remainders to make fractions and decimals. The lesson tomorrow will provide contexts to discuss which remainders are appropriate for each circumstance. To help students retain the information, make sure that they have *explained their reasons* for the way they have expressed each remainder to their parents. Try to emphasise the connections between the questions in each example. The questions use the same numbers so that the connections will be easier to identify.

Wednesday: Connecting Lesson

This lesson allows your child to think through using dividing decimal numbers. It also gives them further opportunity to explore similar questions to those you tried yesterday. If you don't feel that your child is ready to move on, simply use this time to practise more division questions where they have to express the left overs as remainders, fractions and decimals.

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

D17. Decimals in dividing

TR p95

Dividing with decimal numbers is very similar to multiplying with decimal numbers, but involves a pattern between the decimals in the dividend and divisors rather than between the terms and answer.

Examples:

$$7\overline{)714}\quad 102 \qquad 0.7\overline{)71.4}\quad 102 \qquad 7\overline{)71.4}\quad 10.2 \qquad 0.7\overline{)7.14}\quad 10.2$$

What is the pattern?

Apply this pattern to answer the questions below.

$$5\overline{)615} \qquad 0.5\overline{)61.5} \qquad 5\overline{)61.5} \qquad 5\overline{)6.15}$$

Check your answers with a calculator. If you are still having difficulty seeing the pattern, go back and look at the examples again. Compare the total number of decimal places in the dividend with the total number of decimal places in the divisors. Show your answers to your teacher before continuing.

Apply this pattern to answer the questions below:

$560 \div 8 = 70$

$5.60 \div 8 =$

$56.0 \div \square = 70$

$5.60 \div 0.8 =$

$56.0 \div \square = 0.7$

Make up a rule to describe how to know where to put the decimal points when dividing:

Backwards Question:

Put the decimal points into the following equation and fill in the box. What other possibilities are there? Write as many as you can:

$56 \div \square = 0.07$

Teacher Overview

This lesson provides opportunities for children to find patterns in dividing, including by decimals. It should hopefully connect easily with what students learned last week on multiplying with decimals.

You will probably need time online with children to discuss this idea, but hopefully the worksheet will step them slowly through the process. Most adults are more comfortable with short division than long division, so we are skipping long division altogether in this work program. Hopefully the adults in the household will remember how to divide with decimal remainders, so can at least teach that part. If they find the worksheet confusing but are comfortable teaching short division with decimals on their own, just let them go for it.

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 and describe it:

   $^{1}/_{7}$, $^{3}/_{7}$, _____, _____, _____, $1^{4}/_{7}$, _____, _____, $2^{3}/_{7}$

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

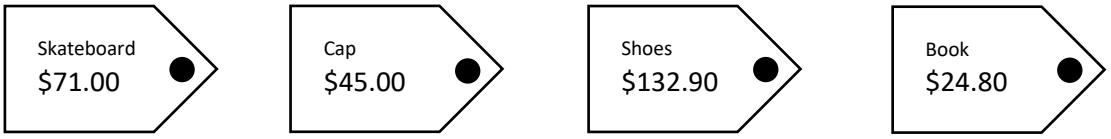
   ☐ + 134 = 3 x 76

3. Complete the table to write numbers as fractions, decimals and percentages.

Fraction	Decimal	Percentage
½		
	0.2	
		25%
¾		

4. 28 x 6 Work out the answer in more than one way.

5. The following items are on sale at 10% off. How much would you expect to pay?



Measurement/Geometry:

6. Find 3 prisms in your home and draw them here. What is the same about all of them?

7. List 5 activities that you complete during the day and when they occurred. Write the time in 12-hour and 24-hour time.

8. Use the back of this page to draw as many rectangles as you can with a perimeter of 24cm.

Chance/Data:

9. List all of the possible outcomes when two 6-sided dice are rolled. If the numbers shown on the dice are added, which total or totals would you expect to occur most frequently? Which would occur least frequently?

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: Revision Lesson

This lesson will revise what you learned last week about factor trees and prime factors. Is should be a relatively simple end to the week. If you feel that your child would benefit from further practise of division instead then feel free to swap this lesson for some practise time.

Problem 10: Prime Factors

TR p83

Prime factors of:
12: 2 x 2 x 3 **20:** 2 x 2 x 5 **30:** 2 x 3 x 5
What do you think prime factors are?
Find them for: 50, 60, 80, 90 and 100.

What do you think prime factors are?

How do you think you could work out the prime factors of a number?
What operations would you need to use?

Find them for: 50, 60, 80, 90 and 100.

If I was trying to find a number with the first four prime factors, what number would it be? Explain:

If I was trying to find a number with the largest prime factor under 100, what number would it be? What would the prime factors be? Explain:

What number under 100 has the most prime factors? Explain:

Is there another number under 100 with the same number of prime factors? Explain:

Communicating:
How did you work out your answers?

Understanding:
How can you be sure that your answers are right? What would you do to check them?

Manipulation problem:
What number under 100 has the most prime factors, one of which is 5? Explain:

Teacher initials:

Date:

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

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

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

- o Student not observed

Teacher Overview

This is a ***Generalising*** lesson, designed to help students connect multiplication and division, and factors. It promotes ***Reasoning***, by asking students to show and explain how they have worked out the answers. It also provides an opportunity to demonstrate understanding of prime and composite as well as prime factors.