Work Program for B2FMaths@Home Week 8 Year 5

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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 chance and linking it with what we learned last week about fractions. We want students to be able to describe outcomes of events and consider how likely these are to occur, and also create a number line to show probability as a fraction between impossible (no chance, 0%) and certain (100% chance).

For your information: When students are learning about chance or probability, they need to understand that chance is linked heavily with fractions. That means that all the ideas we explored last week with fractions still apply. Probability is always a fraction between 0 and 1.

We are hoping that students will:

- Decide on how likely some events are to occur: are they certain, possible or impossible? Are they likely or unlikely?
- Predict what might occur in simple familiar events. Predict what will definitely not occur.
- Classify outcomes of events according to how likely they are to occur.
- Conduct simple experiments to gather data (e.g. flipping a coin, tossing dice, drawing out a coloured ball from a bag).
- List the possible outcomes of an experiment (e.g. the coin could only land on H or T).
- Explain why the results vary in experiments (e.g. why a coin doesn't just go H, T, H, T, H, T…)
- Create a number line between 0 and 1 and use this to represent fractions and decimals.
- Change fractions into decimals using the idea "of a dollar". For example, what is half "of a dollar"? 50c, which written in dollars is 0.50.

Important terms to use:

- Impossible: there is no chance that this event will ever occur
- Certain: there is 100% chance that this event will occur (NB. Note the saying that the only things to be certain of in life are death and taxes. This points out that very few events are considered "certain". An example would be drawing out a ball that is red from a bag that only contains red balls.)
- Likely: over 50% chance of occurring, but not certain
- Unlikely: less than 50% chance of occurring, but not impossible
- Outcomes: the possible results or things that might occur, for example the results of an experiment
- Sample space: a list of all the possible outcomes of an experiment
- Variation: how the results can change each time you conduct a trial
- Independent events: the results of this experiment are not changed by other factors (e.g. flipping a coin)
- Dependent events: sometimes outcomes are reliant on or changed by previous events (e.g. if you draw out a coloured ball from a bag of red and green balls and don't put it back, the chance of red or green next time depends on what you drew out the first time)

Teacher Overview

Students will be considering chance and the idea of likelihood and using fractions between 0 and 1 to represent probability. Many students have difficulty thinking about chance as they tend to think of every event as either certain or impossible – we have to teach them about events being likely or unlikely (e.g. while we are likely to have school tomorrow, a natural disaster or illness could stop that happening so it is likely rather than certain). This year it is important to focus on comparing and ordering the likelihood of events and relating them to some kind of numerical measure in preparation for later year levels (e.g. there is a 50:50 chance of flipping a coin and landing on heads or tails). This week we will also be learning about converting fractions to decimal numbers.

What to emphasise

If you have time online with a webcam
Ask students questions that emphasise the "students need to work out" section from the previous page, such as asking them to explain how to change from a fraction to a decimal (Tuesday).

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 on Monday and Tuesday so that students think about the connections between fractions and place value.

Tracking student achievement

This week we are focusing on consolidating fractions and introducing chance. It is likely that the activities included will take more than one week to complete. In year 4 fractions and chance were linked for the first time, however many students may not have understood this concept when it was originally taught so spend more time if you need to.

Achievement Standard statements for this week include:

- List outcomes of chance experiments with equally likely outcomes and assign probabilities between 0 and 1 (**P2C**)
- Order decimals and unit fractions and locate them on number lines (**N6C**)

Monday: At-Home Investigation

Today your child will be working on making a number line to show how big fractions are, and where they are positioned between 0 and 1. This is a very important task and should take a considerable amount of thought. Make sure that your child does the thinking, rather than you simply telling them the answers. Ideally, you would make a very large number line stretching down the length of your hallway and ask your child to fold each fraction from paper so they can compare them.

Helpful materials:

- Strips of paper or string that can be folded to show fractions of a length (e.g. fold the string in half and half again to find quarters)
- Pieces of paper all the same size that can be folded and coloured to make fractions so that they can easily be compared.

Steps:

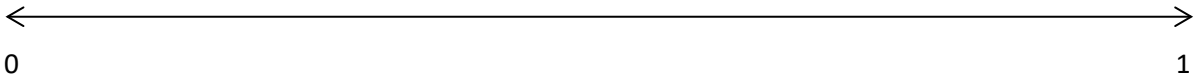
1. Make sure you have read "What you need to know this week" so that you know what to emphasise with your child and are familiar with the terminology.
2. Read the sheet to your child. Ask for their ideas. If your child gets stuck, focus on using fractions that should be familiar such as halves, quarters and eighths. Fifths and tenths may be tricky, but they will be very helpful for tomorrow's lesson when your child learns how to convert fractions into decimal numbers.
3. Help your child think about what worked and what didn't, then come up with a new plan if needed. Let them know that they can start with any of the fractions that they know rather than following the order supplied. You may find it easier to draw lines in landscape mode on a piece of paper as that way they are slightly longer.
4. 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.
5. The second last question extends the line from 0-2. Feel free to skip it if you need to, but it should be achievable for students at this level. The last question is referring to equivalent fractions (e.g. $^{2}/_{4} = ½$)
6. At the end: consider writing a comment to your child's teacher to say what went well or what you are concerned about. Fractions is a particularly difficult concept, so contact your school if you have concerns.

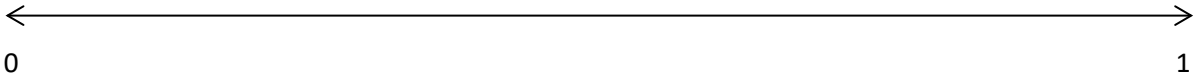
Ordering Fractions

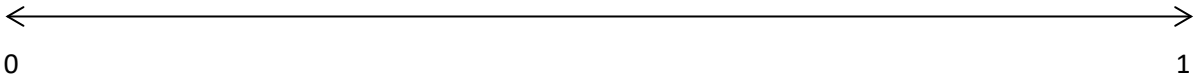
Find a line that stretches across your room. Label one end of the line 0 and the other end 1. Place the following fractions onto the line in their correct position:

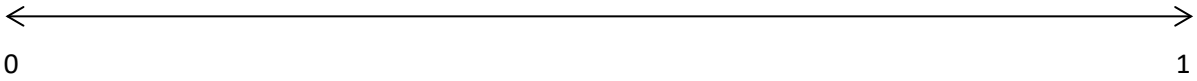
$\frac{1}{2}$ $\frac{1}{4}$ $\frac{3}{4}$ $\frac{1}{8}$ $\frac{3}{8}$ $\frac{1}{10}$ $\frac{2}{10}$ $\frac{5}{10}$ $\frac{8}{10}$ $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$

Draw what you did here. Write each of the fractions on the lines in their correct position.
You might need to try a few times, so more lines are provided. Use more paper if you need it.









Does having bigger numbers always mean that the fraction is bigger? Explain:

What would happen if your number line went from 0 to 2? Can you think of some fractions that would fit between 1 and 2? Write some here.

Why are some of the fractions in the same place even though they have different numbers?
Think about what terms you used last week for fractions that are the same size.

Teacher Overview

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

The emphasis is on *investigating* a question, *discussing* similarities and differences, *comparing* sizes of various fractions, *debating*, *justifying* and also *explaining*. There is also an emphasis on *generalising*.

If you are at school: Make each fraction from paper and order it along a line that stretches the full length of your classroom. You might also want to use improper fractions.

Watch out for:

- Students who have not established the concept of fairness – they have pieces that are different sizes.
- Students who change the size of the whole because they can't fold the pieces fairly (e.g. when trying to make thirds they fold quarters and then cut one off).

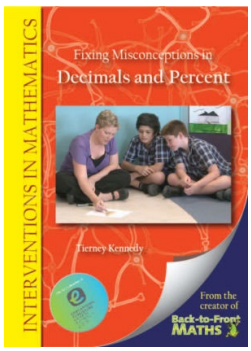
Good questions to prompt thinking:

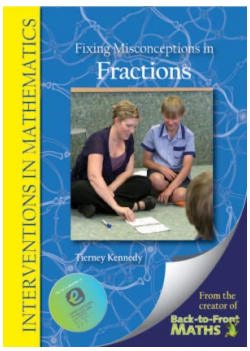
- "What fraction will go in the middle of our line? Now which of the fractions are bigger than this? Which ones are smaller than this? Can you work out where to put them?".
- "Which is the smallest of the fractions? Now can you work out the others?".
- "Can you show me $^1/_2$? How about $^1/_4$? How about $^3/_4$? Now how about the eighths? Can you mark in all the fractions please?" – continue as needed adding one piece at a time until the student sees the pattern.
- "What patterns do you notice about how many parts there are and where the numbers go on the line?".
- "Why is $^1/_8$ closer to the zero that one third?".
- "Can you see any fractions that are the same? Why do you think they are in the same place? How is it possible that they are the same size but have different numbers?".
- Look specifically at the fractions that are all halves and ask if the students think these are all halves and what is the same about all of them.
- "How does the size of the denominator affect the size of the fraction?".

Students requiring support:

- Use physical manipulatives
- Stick to base-two fractions

If you are concerned about teaching fractions and decimals, consider purchasing the following books from our website.





Tuesday: Connecting lesson

In this lesson your child will be learning how to **write fractions as decimal numbers**. The questions should lead them through the thinking to connect fractions to decimals without expressly telling them to divide. The idea is to build understanding of a simple connection so that they can work out later to divide and retain the understanding for high school. The basic idea is explained for you below for each question along with the answers.

Question 1
½ of a dollar is 50c.

- We write that in dollars as $0.50 or $0.5
- We write ½ as a decimal as 0.5 (you could also write 0.50)

As our measurement system uses tenths, hundredths and thousandths we can find many other examples. Some include:

- ½ a kilo of mince is 500g, which is 0.5kg
- ½ a metre of fabric is 50cm which is 0.5m
- ½ a litre is 500mL or 0.5L

No matter what the example, ½ is always 0.5.

Question 2
The same idea works for other fractions too.

- ¼ of a dollar is 25c or 0.25, ¼ of a metre is 25cm or 0.25, ¼ of a kg is 250g or 0.25
- ¾ of a dollar is 3 lots of 25c, which is 75c or 0.75
- $^{2}/_{4}$ of a dollar is the same as ½ of a dollar

Question 3
Tenths are much simpler as they are already in the same base as decimals (called base 10: because 10 ones = 1 ten, 10 tens = 1 hundred etc.)

- $^{1}/_{10}$ of a dollar is 10c, which is 0.10 or 0.1
- 0.1 is named one tenth. It has the same name as $^{1}/_{10}$ because it is the same amount. They are equal.
- $^{2}/_{10}$ of a dollar is 0.2 or 0.20

Table:

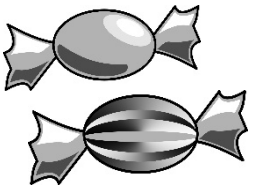
- 5/10 = 0.5
- 7/10 = 0.7
- 1/5 = 20c = 0.2
- 2/5 = 0.4
- 3/5 = 0.6
- 4/5 = 0.8
- 1/3 won't make a whole number of cents. 33c will do, but there is still 1c left. The decimal would be 0.33333…. keeping going forever. We write this usually with only one three and a dot above it.

Fractions of a dollar as decimals

A lot of the time we tend to assume that fractions are difficult. Understanding a few connections tends to make fractions and decimals much easier. Today we are going to use what you already know about money to help us to connect fractions and decimal numbers. Work through the questions below to help.

Half as a decimal

1. I could buy two lollies for a dollar. This means that each lolly is worth half a dollar ($^1/_2$).
    - How many cents is half a dollar? Circle the coin/s above in black.
    - How would you write 'half a dollar' in dollars? $_____
      If you leave off the $ sign that is how you write half as a decimal.
      Write one half as a decimal number.
    - How come you would not write half a dollar as 1.2 even though it has a 1 and a 2?
      What would $1.2 mean?



One quarter as a decimal

2. This time I could buy four lollies for a dollar. This means that each lolly is worth one quarter of a dollar ($^1/_4$).
    - How many cents is $^1/_4$ of a dollar? Circle the coin/s at the top of the page in red.
    - How would you write '$^1/_4$ of a dollar' in dollars? $_____
      If you leave off the $ sign that is how you write $^1/_4$ as a decimal.
      Write one quarter as a decimal number.
    - How come you would not write $^1/_4$ of a dollar as 1.4 even though it has a 1 and a 4?
      What would $1.4 mean?
    - What would $^3/_4$ of a dollar be? So how would we write $^3/_4$ as a decimal?
    - What would $^2/_4$ of a dollar be? So how would we write $^2/_4$ as a decimal? How is this fraction related to our first question?

One tenth as a decimal

3. This time I could buy ten lollies for a dollar. This means that each lolly is worth one tenth of a dollar ($^1/_{10}$).
    - How many cents is $^1/_{10}$ of a dollar? Circle the coin/s above in black.
    - How would you write $^1/_{10}$ of a dollar in dollars? $\_\_\_\_\_$
      If you leave off the $ sign that is how you write $^1/_{10}$ as a decimal.
      Write one tenth as a decimal number.
    - 2.1 is called, "two and one tenth", 0.7 is called "seven tenths". Use this information to help you write the name for the decimal number from your last answer.
      What connection can you find to the name for $^1/_{10}$?

Apply what you know

Use the idea "of a dollar" to help you write each of the following fractions as decimals

Fraction	How much is this out of a dollar?	Decimal
$\frac{1}{10}$	10c or $0.10 or $0.1	0.1
$\frac{2}{10}$		
$\frac{5}{10}$		
$\frac{7}{10}$		
$\frac{1}{5}$		
$\frac{2}{5}$		
$\frac{3}{5}$		
$\frac{4}{5}$		

Optional challenge question if you want something trickier:

$\frac{1}{3}$		

Teacher Overview

The worksheet task is a ***Reasoning and Understanding*** activity that aims to build connections between fractions and decimals as well as links to place value. Linking fractions to money is the easiest and fastest way that we have found to build retention of conversion. While you will obviously also need to teach that the vinculum symbolises division, this is easier to retain if we already have reference points. If students can refer back to half a dollar as 50c, 0.5 and therefore also 50%, they can use that to determine that 1 ÷ 2 = 0.5, so the / symbol means divide.

If you have time online, this is the lesson to do with children. Work through the examples together to work it out.

If you are at school, try using play money to make $1 in as many ways as you can using the same amount before trying this task. (e.g. 2 x 50c coins to make a dollar, 5 x 20c, 4 x (20c+5c), 10 x 10c…)

Wednesday: Connecting lesson

This lesson allows your child to conduct some simple chance experiments and collect data. They will also describe the possible outcomes of an experiment as the “sample space”.

You will need:

- A coin to toss
- Dice

For each experiment, ask your child to first make a prediction about what they think will happen. Then carry out the experiment and record what actually happens. Once children return to school, they will combine the data for their whole class and look at the variation in results.

If you do not have real dice or coins, you can find an online version here:
https://www.random.org/dice/

11. Sample Space: all possible outcomes

TR p114

In this activity you will learn about the Sample Space in an experiment. Look at the descriptions below to work out what the sample space is. Use this to describe the sample space for the experiments listed below.

Example:
For tossing dice, the possible outcomes are 1, 2, 3, 4, 5 and 6.
The sample space is 1, 2, 3, 4, 5, 6.

Describe what you think sample space means:

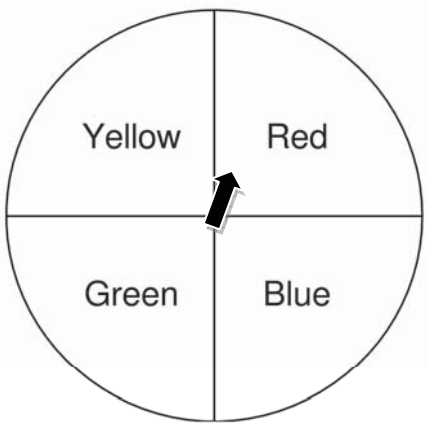
For the experiments below, list the sample space:

1. Tossing a coin

2. Choosing a ball from a bag that contains red and blue balls

3. Choosing a number from 1 – 10

4. Spinning the spinner shown below:



What does sample space mean?

Backwards Question:
If the sample space for a spinner was yellow, yellow, red, blue, what do you think the spinner might look like? Draw it:

12. Conduct experiments to collect data

TR p115

You are going to conduct some experiments to collect data. You will list the sample space in the left column of the tables below. You will repeat the experiment 20 times, and record the number of times each outcome occurs using tally marks.

Experiment 1: Tossing a coin

Sample Space:	Number of outcomes out of 20 trials:

What did you find?

Experiment 2: Rolling a die

Sample Space:	Number of outcomes out of 20 trials:

What did you find?

BACKWARDS QUESTION:

If an experiment gave the following results for 40 spins of a spinner, draw what you think the spinner might look like:

Red: 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸

Blue: 𝍸 𝍸

Why do you think having more spins makes a difference?

Teacher Overview

This is an ***Application and Connection*** lesson. It gives students an opportunity to build their understanding of chance by conducting experiments and collecting the data. Once you return to school, spend a lesson examining the results from each child to look at the **variation**. Make sure that you discuss why each set of trials is not the same, and spend time running more trials as needed. Over many trials, the experimental outcomes will approach the theoretical probability, however this is not guaranteed in any one experiment.

Another option is to build in some graphing of results. Combine results from everyone and graph that.

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 practise

Year 5, week 8

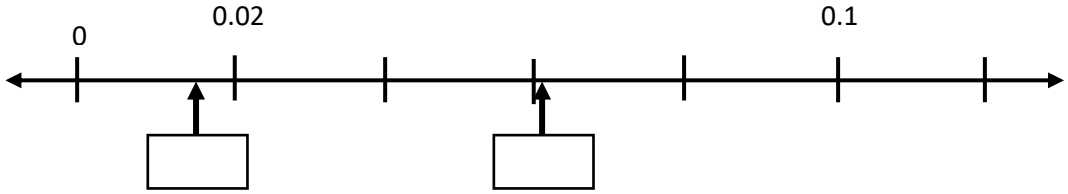
Number:

1. Make up a number pattern that starts with the number 12.05 and uses addition or subtraction. Write it on the lines and describe the pattern.

   12.05 , _____ , _____ , _____ , _____ , _____ , _____

2. Some biscuits are packed in boxes in layers that look like this. How many layers would there be if the box contained 60 biscuits? Show how you worked it out.

3. What numbers would go where the arrows are pointing?



4. $^{9}/_{10} - {}^{4}/_{10}$ = ☐

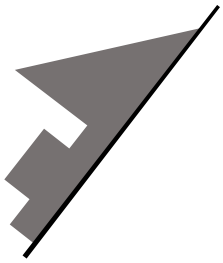
5. $26.85 - $9.60 = ☐

Measurement/Geometry:

6. This measuring jug holds 1¼ L of liquid. I use 5 jugs to fill my bucket. What is the capacity of my bucket?

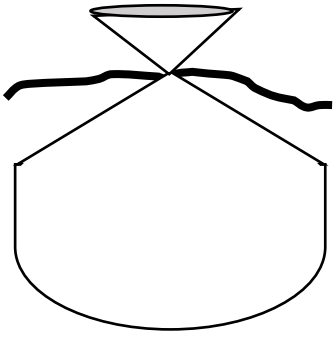
7. What is the answer to question 6 in millilitres?

8. This shape has been cut along the line of symmetry. Draw the part of the shape that is missing.



Chance/Data:

9. Draw the counters that are in the bag using this information:
   - There are 24 counters in the bag. They are blue, yellow, green and red.
   - If I shut my eyes and take out a counter, I have the same chance of drawing a blue or a yellow counter.
   - I have a greater chance of drawing a red counter
   - Drawing a green counter is unlikely



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: Generalising lesson

In this lesson your child will connect what they have been learning about chance with the learning from earlier this week and last week on fractions. They will use fractions to express the chance of an outcome occurring and will then order those events on a number line, just like you ordered fractions along a number line on Monday.

For your reference:

- The chance of throwing head or tails is ½ or 0.5 or 50% (these are all the same).
- For the bag with 5 lollies (1 blue, 1 green, 1 yellow, 2 red)
    - Blue, green and yellow are all $^1/_5$, 0.2, 20%
    - Red is twice as much, so $^2/_5$, 0.4, 40%
- The chance of rolling any one number on a six-sided dice is $^1/_6$ or 0.1$\underline{66}$ or 17% (these are all the same, I have just rounded off the percent to give a whole number)
- Adding another red to the bag would change the fractions to sixths, with red as $^3/_6$ or ½

14. Probability as a fraction

TR p120

In this activity you will learn to express the likelihood of an outcome as a fraction rather than just using words.

1. If I toss a coin 100 times, about how many times would you expect the coin to land as tails? Explain your answer:

2. The probability of the coin landing as tails is ½. How is this related to the fraction that you found in the question above?

Working out what the numbers in the fraction refer to:

1. Which of the numbers in the fraction refers to the total number of possible outcomes from tossing a coin?

2. Which of the numbers in the fraction refers to the number of "tails" on a coin?

This pattern is the same for every example of probability where the outcomes are equally likely!

Have a go writing these possibilities as fractions:

1. In a bag I have 5 lollies. Two of them are red, one is blue, one is green, one is yellow.
   a. The likelihood of drawing out a blue one is:
   b. The likelihood of drawing out a green one is:
   c. The likelihood of drawing out a yellow one is:
   d. The likelihood of drawing out a red one is:

2. A die has 6 sides with the numbers 1-6:
   a. The likelihood of rolling any one of the numbers is:

Now order each of the events from the questions above from the least likely to the most likely using the line beneath. Explain how you have made your decisions.

Never going to happen — Certainly going to happen

0 — 1

BACKWARDS QUESTION:

If another red ball was added to the bag, how would this change your answers?

Teacher Overview

This lesson should help students generalise their learning about fractions to understand probability as a fraction and as a measure between 0 and 1. You should check understanding of this concept when students return to school and spend time consolidating this idea. You should also consider asking students to convert each fraction to a decimal.

If you are at school, consider referring back to your fractions line from Monday and adding extra events in. Try ideas as well such as designing spinners with equally and unequally likely outcomes. Where would they fit?