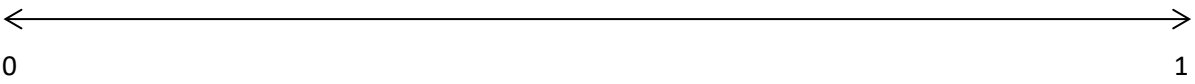
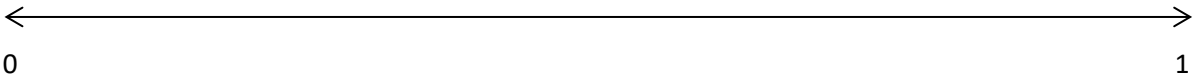
Ordering Fractions

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:

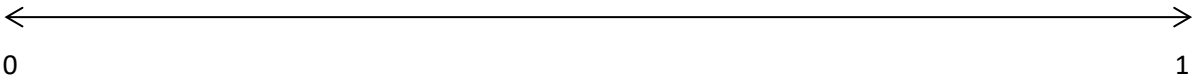
$\frac{1}{2}$ $\frac{1}{4}$ $\frac{3}{4}$ $\frac{1}{8}$ $\frac{3}{8}$ $\frac{1}{10}$ $\frac{2}{10}$ $\frac{5}{10}$ $\frac{8}{10}$ $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$

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.



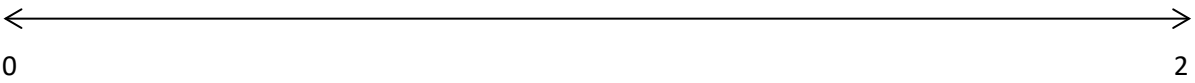


If you know how to convert to decimals, try writing the decimal fractions for the first 7 fractions above on this line.



Now let's try including some fractions that are greater than 1. Order the following fractions on the line below. Try as many times as you need.

$\frac{1}{2}$ $\frac{3}{2}$ $\frac{2}{3}$ $\frac{3}{4}$ $\frac{4}{3}$

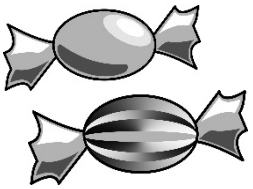


Fractions of a dollar as decimals

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:

$\frac{1}{3}$		

12. Probability as a fraction

TR p127

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?

I3. Conduct experiments to collect data

TR p127

You are going to conduct experiments to collect data (observed frequency)

Instructions:
1. Decide on how to conduct an experiment so that you have good results to analyse. Write a sentence to explain your experiment in the space indicated.
2. Predict what you think is likely to happen, and express this as a fraction if possible.
3. List the sample space in the left column of the tables below.
4. Tally the number of times each outcome actually occurs (observed frequency).
5. Comment on the accuracy of your prediction.

Experiment 1: Drawing out a red counter from a bag containing 10 red and 10 blue counters

My prediction (expected probability):

Sample Space:	Observed Frequency: Tally of number of outcomes from _____ trials:

How close were my predictions (compare expected probability to observed frequency):

Experiment 2: Rolling a standard die

My prediction:

Sample Space:	Number of outcomes from _____ trials:

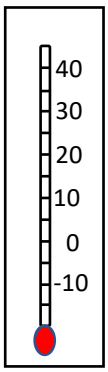
How close were my predictions? Compare the expected probability to observed frequency:

Interleaved practise

Year 6, week 8

Number:

1. The maximum temperature during the day reached 12^0. Overnight, it dropped 18^0. What was the lowest temperature? Show it on the thermometer below.



2. Biscuits are packed in trays of 6 for sale. The baker has made 500 biscuits. How many trays of biscuits will she fill?

3. If each tray of biscuits is sold for $12.50, what will the total sales amount to?

4. Decide whether these answers are true or false. Write T or F beside them.

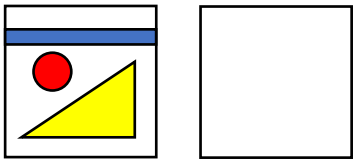
   4 x 3 + 7 = 40 14 + 23 – 17 = 14 + 6 36 ÷ (11 - 5) = 6 21 + 7 x 2 = 56

5. How much is 25% of these amounts?

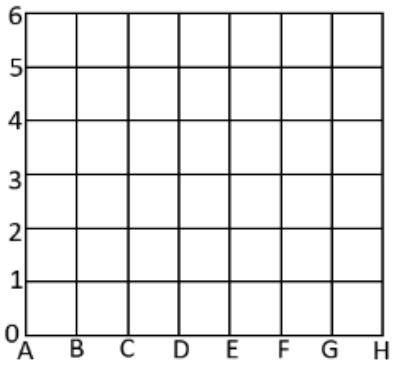
   $130 2400mL $38.00

Measurement/Geometry:

6. Use the shapes on the first tile to create a new tile using flips, slides and turns. Describe what you did.

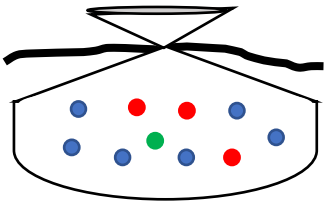


7. Draw the shape that has vertices located at the following coordinates: C5, G5, F2, B2
   What shape have you made?



8. Use the grid from question 7 to draw a triangle. Write the coordinates for each of the vertices.

Chance/Data:

9. 

This bag has counters in it. Write one of the following words to describe the chance of drawing each colour: **impossible, certain, likely, unlikely**.

blue red orange green

14. Probability as a measure between 0 and 1

TR p128

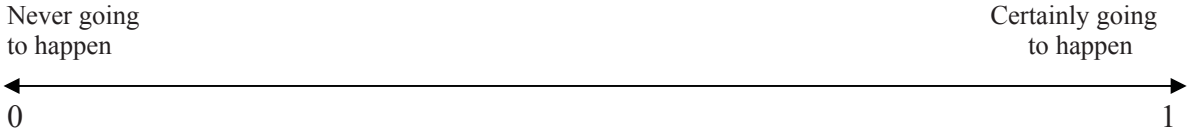
In this activity you will learn what is meant by expected probability.

1. If I toss a coin a number of times, what fraction of the times would you expect the coin to land as tails? Write it as a fraction, decimal and percent:

2. The probability of the coin landing as tails is 0.5. How is this related to the fraction that you found in the question above?

Below are some other examples of expected probability. Examine them to find the patterns and try to further your understanding of probability. Plot the letters corresponding to the statements on the line beneath and think about the fractions involved.

A.	The sun will always rise tomorrow. The probability of the sun rising tomorrow is 1.
B.	People will never stop needing oxygen to breathe. The probability of people not needing oxygen to breathe is 0.
C.	There are two possible outcomes of a situation that are equally likely to occur. The probability of a specific one of them occurring is 0.5 (50%).
D.	There are three possible outcomes of a situation that are equally likely to occur. The probability of a specific one of them occurring is 0.3333 recurring (33%).
E.	There are four possible outcomes of a situation that are equally likely to occur. The probability of a specific one of them occurring is 0.25 (25%).
F.	In a bag I have 5 lollies. Two of them are red, one is blue, one is green, one is yellow. The probability of a red lolly being drawn out is 0.4 (40%). The probability of a blue lolly is 0.2. The probability of a green lolly is 0.2. The probability of a yellow lolly is 0.2. (20% each)



How do you think expected probability is calculated?

How do you think expected probability is related to fractions?

Backwards Question:

If the expected probability of something was 0.75 what would this mean?

Complete the table below to help you work out how to calculate expected probability.

Use your calculator to work out what to do with the numbers to calculate the probability:

Situation: I draw out one ball from a bag. In the bag there are…	Number of red balls	Total number of balls	Expected probability of red ball	**Calculator:** How did I get the expected probability from the numbers in columns 2 and 3?
2 red balls, 2 blue balls, 1 green ball, 1 purple ball	2	6	0.3333333 33%	
1 red ball, 4 purple balls, 5 green balls	1	10	0.1 10%	
3 green balls, 2 red balls	2	5	0.4	
5 red balls, 3 green balls	5	8	0.625	

What pattern have you found?

Use it to calculate the probabilities for the following situations. Check with your teacher.

Situation: I draw out one ball from a bag. In the bag there are…	Number of red balls	Total number of balls	Expected probability of red ball	**Calculator:** How did I get the expected probability from the numbers in columns 2 and 3?
3 red balls, 2 blue balls, 5 green balls	3	10		
2 green balls, 1 red ball, 1 black ball				
5 red balls, 1 blue ball				
2 red balls, 2 green balls, 3 purple balls				
1 red ball, 8 black balls, 4 purple balls, 2 green balls				

How do I think that I would calculate probability? Would it be ok to use percentages too?

Backwards Question:

Which of the possibilities above would be the highest expected probability? What colour is it? What is its probability?