Functional Skills
Maths

Level 2

Use probability to assess the likelihood of an outcome

v1.0

Functional Skills Maths:
Level 2

Skill Standard:
12

Coverage and Range:

Use probability to assess the likelihood of an outcome.

- Understand that probability is an expression of likelihood and can be written as a fraction, decimal or percentage.
- Understand that probability is expressed as a number of ways an event can happen compared with the number of possible outcomes, for example the probability of choosing a red card from a pack of cards is 26/52 = ½, a club 13/52 = ¼ and an ace 4/52 = 1/13.
- Identify the range of possible outcomes of combined events and record the information in tree diagrams or tables. For example, one bag of 10 balls contains six red balls. A spinner divided into five equal sections has two red sections. In which situation is red most likely?[1]

1 QCA Functional Skills guidance: amplification of the standards June 2008 QCA/08/3700

Explain the Skill

Probability

Probability is a measure of how likely an event is to happen. This is measured on a scale from 0 (impossible) to 1 (certain) and can be written as fractions, decimals or percentages. Fractions should be written in their lowest terms.

To calculate the probability of a particular event, you divide the number of ways the event can happen by the number of all the possible outcomes.

$$\text{The probability of an event} = \frac{\text{Number of ways the event can happen}}{\text{Total number of all outcomes}}$$

What is the probability of a coin landing heads up when flipped?

If you flip a coin it may land on heads or tails.
There are 2 outcomes so the chance of getting one of those outcomes is always 1 in 2. No matter how many times you flip the coin, you will still have just a 1 in 2 chance of it landing on heads.

$$\frac{\text{Number of way of landing on heads}}{\text{Total number of all possibilities}} = \frac{1}{2}$$ 1 chance in 2

A fair six sided dice is rolled.
What is the probability of a landing on an even number?

There are 3 even numbers on a six sided dice out of a possible 6 numbers.

$$\frac{\text{Possible events}}{\text{Total number of all possible results}} = \frac{3}{6}$$ 1 chance in 2

The probability of an event happening *and* the probability of an event not happening add up to 1 (or 100%).

The probability that the sun will shine tomorrow is 0.6

What is the probability that the sun will **not** shine tomorrow?

The sum of the probabilities is 1 so the probability that the sun will not shine tomorrow is

1 – 0.6 = 0.4

Practise the Skill

1) There are 14 women and 7 men in a café.
What is the probability that a person picked at random will be a woman?
Give your answer as a fraction in its lowest terms.

_____

2) Sally has a pack of playing cards and she chooses a card at random.

a) What is the probability that she picks an ace?
Give your answer as a fraction in its lowest terms.

_____

b) What is the probability that she picks a black ace?
Give your answer as a fraction in its lowest terms.

_____

3) A container holds 5 yellow balls, 3 blue balls and 2 red balls.

a) You choose a ball at random.
What is the probability you will pick a red ball?
Give your answer as a fraction in its lowest terms.

_____

b) You choose a ball at random.
What is the probability of not picking a blue ball?
Give your answer as a fraction in its lowest terms.

_____

4) A survey showed the probability that a student will get a job within 6 months of graduating was 64%.
What was the probability that a student will **not** get a job within 6 months of graduating?

_____ %

5) Brad catches the bus to work. The probability that the bus will arrive on time is 0.6 and the probability that it will be late is 0.3.
What is the probability that it will arrive early?

_____

6) A bag contains 4 red balls and 6 blue balls.
A spinner has 5 equal sections. 2 sections are blue and 3 are red.
Daisy picks a ball at random and spins the spinner.

Which of the following statements is true?

Circle your answer.

Daisy is more likely to pick a red ball than land on red on the spinner.

Daisy is more likely to land her spinner on red than pick a red ball.

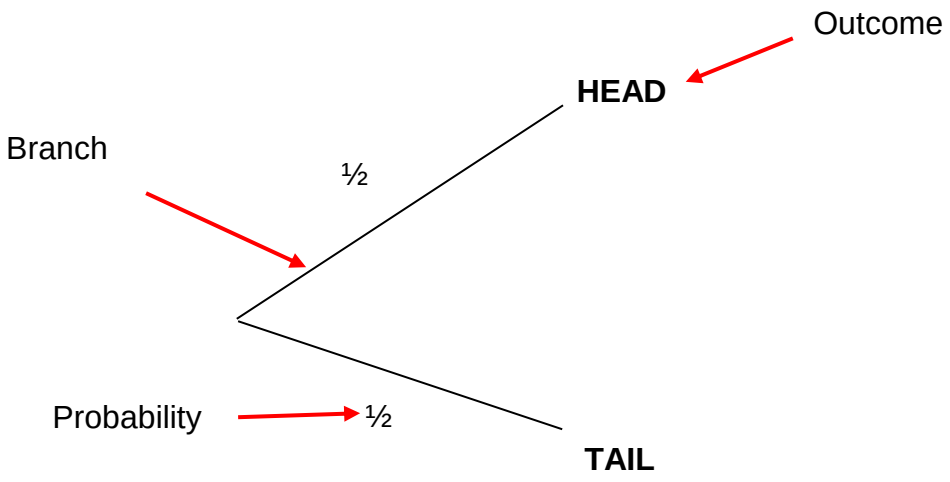
Explain the Skill

Tree Diagrams & Tables

Two events are independent if the first event has no effect on the second. When you flip a coin twice, what you get on the first flip has no effect on the second flip.

When two or more events are involved a tree diagram or a table can be used to help show probabilities.

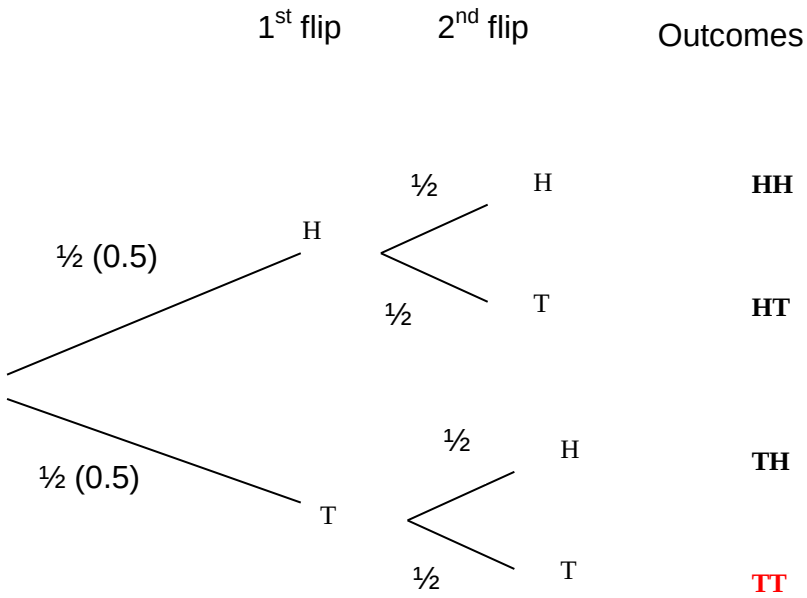
Here is a tree diagram showing the possible outcomes for flipping a coin. The probability is written on each 'branch' and the outcome is written at the end of each 'branch'.



A coin is flipped twice what is the probability of getting exactly **two tails**?

There are two branches – Heads and Tails.

The probability of each branch is written on the branch.
The outcome is written at the end of each branch.

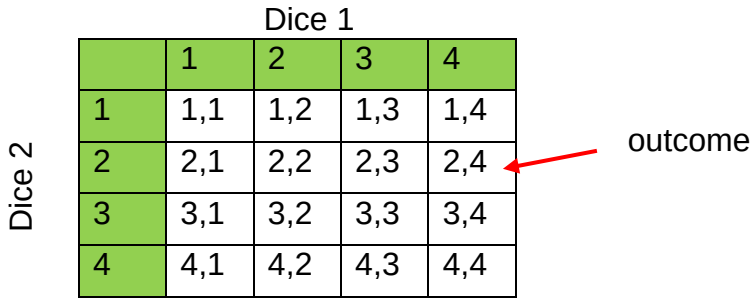


There are a total of 4 outcomes but only 1 outcome out of the 4 contains exactly two tails.
This gives a probability of $\frac{1}{4}$

What is the probability of getting a head and a tail?

If you look at the possible outcomes you will see 2 of the possible outcomes contain both a head and a tail so the probability is 2 outcomes out of a possible 4 outcomes $= \frac{1}{2}$.

Here is a table showing the possible outcomes for throwing two four-sided dice.



	1	2	3	4
1	1,1	1,2	1,3	1,4
2	2,1	2,2	2,3	2,4
3	3,1	3,2	3,3	3,4
4	4,1	4,2	4,3	4,4

There are 16 possible outcomes altogether.

How many possible outcomes are there for getting at least one four?

There are seven possible outcomes that contain at least one four out of a total of 16 outcomes. So the probability is $\frac{7}{16}$

Practise the Skill

1) A bag contains blue and red balls. Two balls are taken at random. Use a tree diagram to work out how many possible outcomes include a red ball.

There are ____ possible outcomes.

2) Jenni flips a coin three times.
What is the probability she will get a tail on at least one of the flips?
Use a tree diagram to work out the answer.
Give your answer as a fraction in its lowest terms.

_____

3) When a rugby team play a match they can either win (W) lose (L) or draw (D).
The team plays two games.
Draw your own tree diagram on paper to show all the possible outcomes and then answer the question below.

What is the probability that the team will win at least one of the matches?
Give your answer as a fraction in its lowest terms.

_____

4) Two four-sided dice are thrown and their scores added.

Draw your own table to work out the number of possible outcomes.

a) How many possible outcomes are there?

_____

b) What is the probability of getting a score of 4 or more?
Give your answer as a fraction in its lowest terms.

_____

c) What is the probability of getting a score of 6 or more?
Give your answer as a fraction in its lowest terms.

_____

5) Two six-sided dice are rolled and the scores on each dice are multiplied together to give a final score.

Draw your own table to work out the number of possible outcomes.

a) What is the probability of getting a total score of that is an odd number?
Give your answer as a fraction in its lowest terms.

_____

b) What is the probability of getting a total score of less than 30?
Give your answer as a fraction in its lowest terms.

_____

Apply the Skill

1) Molly and her family are going to the Summer Carnival.

There is a giant spinning wheel at the carnival. The wheel is numbered 1 to 12. Each section is the same size. The wheel is spun and if it stops on your number you win a prize.

Molly has the number 8. What is the probability that she wins a prize?
Give your answer as a fraction in its lowest terms.

_____

2) Molly's brother has numbers 2, 5 and 11.
What is the probability that he wins a prize?
Give your answer as a fraction in its lowest terms.

_____

3) In a paddling pool there are 30 floating ducks. Each duck is marked with a number on the underside. 15 are marked with the number 1, 9 are marked with the number 2 and 6 are marked with number 3. There are prizes for those who pick a duck with the number 3 on it.

What is the probability of Molly picking a duck with the number 3 on it?
Give your answer as a fraction in its lowest terms.

_____

4) Molly's Mum has a 1 in 5 chance of winning the egg and spoon race.
What is the probability that she does **not** win the race?
Circle your answer.

8% 20% 60% 80%

5) These letter cards are shuffled and put into bag 1.

C A R N I V A L

These letter cards are shuffled and put into bag 2.

B A T

Molly will win a prize if she picks a letter **A**.

From which bag is Molly more likely to pick a letter **A**?
Circle your answer.

Bag 1 / Bag 2

6) A fish bowl contains blue, green and red plastic fish. When a fish is picked out a random, the probability of it being blue is 0.7 and the probability of it being green is 0.2. A prize is given if a red fish is picked out.

a) What is the probability of Molly picking a red fish?

_____

b) There are 60 fish in the fish bowl. How many of the fish are red?

_____

7) There are two giant six-sided dice that players can roll. When the dice are rolled both numbers are added together to give a final score.

a) Complete the following table to work out all the possible outcomes.

		Dice 1					
		1	2	3	4	5	6
Dice 2	1						
	2						
	3						
	4						
	5						
	6						

Molly throws the dice.

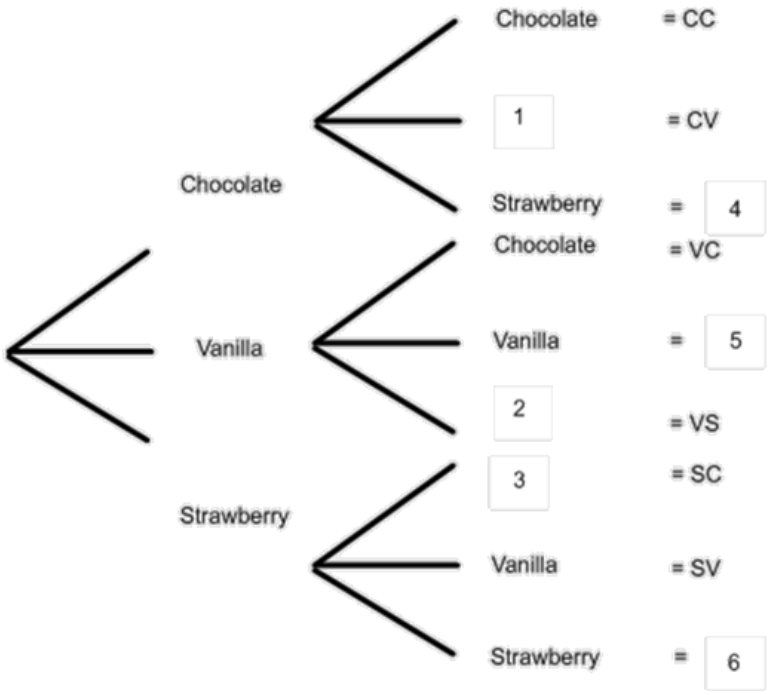
b) What is the probability she will get a total score of 10?
Give your answer as a fraction in its lowest terms.

_____

c) What is the probability she will get a total score of more than 8?
Give your answer as a fraction in its lowest terms.

_____

8) Molly and Jack are given an ice cream. It is equally likely that they are given a chocolate, vanilla or strawberry flavour.



a) Complete the tree diagram to show all the possible outcomes in terms of flavours Molly and Jack could receive. Circle your answers.

1 = Chocolate / Vanilla / Strawberry

2 = Chocolate / Vanilla / Strawberry

3 = Chocolate / Vanilla / Strawberry

4 = CC / CV / CS / VS / SS

5 = VC / VV / VS / CV / SV

6 = SC / SV / SS / CS / VS

b) Use your tree diagram to work out the probability that they both get the same flavor of ice cream.
Give your answer as a fraction in its lowest terms.

_____

c) What is the probability that at least one of them will get strawberry flavour?
Give your answer as a fraction in its lowest terms.

_____

9) There is a stall with 500 blue balloons and 300 red balloons. Inside 1 balloon there is a prize.

Molly picks 15 blue balloons and 5 red balloons.

Her brother, Jack, picks 10 blue balloons and 10 red balloons.

Molly says,

“I have a greater chance of winning than Jack because I have more blue balloons”.

Is Molly correct?

Circle the reason for your answer.

Yes, Molly is correct because she has more blue balloons

Yes, Molly is correct because Jack has more red balloons

No Molly is not correct because they both have the same chance of winning