RICH MATHEMATICAL TASK BOOKLET

PROBABILITY

YEAR 2

Teacher Booklet

Task 1

Decide how likely it is that you will have these things for breakfast tomorrow.

Toast
Ice cream
Weetbix
Fruit
Yoghurt
Pizza
Rocks
Pumpkin

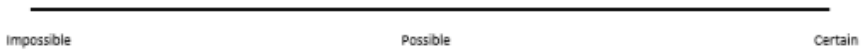
Put them on your continuum and be ready to justify why you have put them there.

Can you add two more things to your continuum and justify why you have put them there?

Teacher Notes

During the launch, ask the students to think of things that they would eat for breakfast. Ask them to share things that it would be impossible that they would eat for breakfast, possible, and certain.

Model putting these on a continuum as you discuss.



Provide each pair of students with a continuum (on paper or with masking tape and labels on the floor) and pictures of the food for them to place.

Facilitate the students to notice and discuss why the same events may be placed at different points on others' continuums.

Monitor for students using vocabulary of certain, impossible, possible, likely, unlikely or chance.

Big Ideas

When there is a chance-based situation, there are sets of possible outcomes that can be arranged into events.

Probability is the chance of an event occurring. This can be represented with probability language or numerical values (e.g., 0% - impossible or 100% certain).

Curriculum Links

During Year 2
Engage in chance-based investigations about everyday situations to:

– anticipate and then identify possible outcomes

– collect and record data

– create data visualisations for frequencies of possible outcomes (e.g., lists, pictures, graphs) come up)

Shareback

Select students to share who have placed the events on a continuum and can give an explanation and justification for the placement of the event.

Ask students who may have placed the same events at different places to share their reasons for why it would be on a different place on the continuum for them.

Connect

Represent the continuum and ask the students where they would put milk and jellybeans.

Ask student to choose three more food types and then explain where they would be put on the continuum.

Suggested Learning Outcomes

Use the language of probability to classify the chance of events happening.

Represent the probability of an event on a continuum.

Independent Tasks

Solve the following problems:

Leti's netball team scored 24 goals in one game and 13 goals in another game. How many goals did her team score altogether?
Sienna's netball team scored 36 goals in one game and 15 goals in another game. How many goals did her team score altogether?

14 + 15 =

26 + 17 =

39 + 28 =

Mathematical Language

Probability, impossible, unlikely, possible, likely, certain, chance.

Anticipations

Solutions, Misconceptions

Task 2

Decide the probability that you will do these things on the weekend.

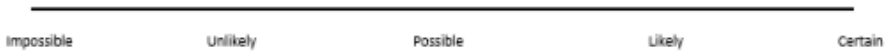
You will go to the supermarket.
You will play in the snow.
You will watch a movie.
You will eat some food.
You will go to a playground.
You will sleep.
You will see a live dinosaur.
You will listen to some music.

Put them on your continuum and be ready to justify why you have put them there.

Can you add two more things to your continuum and justify why you have put them there?

Teacher Notes

Before the launch, ask the students to sort the following situations into impossible, possible and certain.
If I look out the window now, I will see:
The sky
A teacher walking past.
A flying elephant.
A bee.
A dog.



Provide each pair of students with a continuum (on paper or with masking tape and labels on the floor) and the situations to place.

Facilitate the students to notice and discuss why the same events may be placed at different points on others' continuums.

Monitor for students using vocabulary of certain, impossible, possible, likely, unlikely, or certain.

For the independent task, provide students with a labelled continuum.

Big Ideas

When there is a chance-based situation, there are sets of possible outcomes that can be arranged into events.

Probability is the chance of an event occurring. This can be represented with probability language or numerical values (e.g., 0% - impossible or 100% certain).

Curriculum Links

During Year 2

Engage in chance-based investigations about everyday situations to:

– anticipate and then identify possible outcomes

– collect and record data

– create data visualisations for frequencies of possible outcomes (e.g., lists, pictures, graphs) come up)

Shareback

Select students to share who have placed the events on a continuum and can give an explanation and justification for the placement of the event.

Ask students who may have placed the same events at different places to share their reasons for why it would be on a different place on the continuum for them.

Connect

Represent the continuum and ask the students where they would put the following statements:

You will play outside.
You will colour your hair green.

Ask students to generate more events that would be placed on impossible and those that would be placed on certain on the continuum.

Suggested Learning Outcomes

Use the language of probability to classify the chance of events happening.

Represent the probability of an event on a continuum.

Independent Tasks

Think of what you will do after-school today. On your continuum draw a picture of something that is:

- certain.
- impossible.
- possible.
- likely.
- unlikely.

Add other pictures to your continuum and choose where you place them.

Mathematical Language

Probability, impossible, unlikely, possible, likely, certain, chance.

Anticipations

Solutions, Misconceptions

Task 3

Nanny has asked Manaia to help the whanau by doing one chore before he goes and plays. The chores are:

Sweeping the kitchen
Washing the dishes
Feeding the cat
Hang the washing out

After he has done his chore, Manaia can play:
With the ball
On his bike
Running races

Can you show the different chores and play activities that Mania might choose?

How many different combinations are there?

Teacher Notes

Notice whether students are able to systematically record the different options for the chores and play activities and work out how many different combinations are possible.

The possibility of each chore or play activity could be linked to fractions in relation to the chance of each combination.

This could be recorded as one quarter chance for each chore and one third for each play activity.

Shareback

Select students to share that have worked systematically to find all the possible combinations.

Select students to share who have used a tree diagram or model this to the students.

Big Ideas

When there is a chance-based situation, there are sets of possible outcomes that can be arranged into events. Probability is the chance of an event occurring. This can be represented with language or values (e.g., 0% - impossible or 100% certain).

Data visualisations can be used to show what outcomes are possible and more likely. They can also be used to represent the results of a probability investigation.

Curriculum Links

During Year 2

Engage in chance-based investigations about games and everyday situations to:

– anticipate and then identify possible outcomes

– collect and record data

– create data visualisations for frequencies of possible outcomes (e.g., lists, pictures, graphs)

Connect

What is the chance that Manaia will hang the washing out?
What is the chance that Manaia will play with the ball?
What is the chance that Manaia will fly a kite?

Suggested Learning Outcomes

Represent the different outcomes for an event.
Find all of the possible outcomes for an event.

Independent Tasks

Nanny has asked Manaia to help the whanau by doing one chore before he goes and plays. The chores are:

Vacuum the lounge
Mop the kitchen
Clean the toilet

After he has done his chore, Manaia can play:
Snakes and ladders
Building blocks
Cars
Tag

Can you show the different chores and play activities that Mania might choose?

How many different combinations are there?

Mathematical Language

Probability, chance, impossible, unlikely, possible, likely, certain, quarter.

Anticipations

Solutions, Misconceptions

Task 4

When you toss a coin, what is the chance that you will land on heads?
What is the chance that you will land on tails?

What do you think will happen if you toss a coin ten times?
Make a prediction with your buddy.

Toss your coin ten times and record what happens.

What do you think will happen if you toss the coin another ten times?
Record what you find.

What do you notice?

Teacher Notes

During the launch, act out pulling two different coloured beans from a feely bag.

Model to students how to record outcomes using a tally chart.

Have coins available for students to toss for the chance experiment.

Notice whether students are recording the results accurately and systematically and support them to do this.

Facilitate the students to notice that we can express probability as a fraction.

There is a half chance that the coin will lands on heads or tails. We can also call this an equal chance.

For the independent task, have counters with different coloured (blue and red) stickers on each side.

Big Ideas

When there is a chance-based situation, there are sets of possible outcomes that can be arranged into events. Probability is the chance of an event occurring. This can be represented with language or values (e.g., 0% - impossible or 100% certain).

For some situations or games, the chance or probability of particular outcomes can be calculated (theoretical probability). Theoretical probability and what happens in an experiment will differ.

For some situations or games using repeated testing can give a sense of which outcomes are more likely (experimental probability).

A probability experiment involves repeated trials. Results can differ in different trials.

Shareback

Select students to share who have used a systematic way of recording the data to show the results of their chance investigation.

Ensure that you share the results from several pairs of students. Ask students to discuss why different pairs of students got different results.

Select students who have used tally-charts, or model this to the students.

Connect

Model for the students how to represent their count or tall-chart using a picture graph using the pictures of the coins – heads or tails (see copy masters). Show results from different pairs of students.

Can we predict what way the coin will land and why?

Suggested Learning Outcomes

Identify possible outcomes in a chance situation.
Make a prediction about a chance situation.
Collect and record data for a chance investigation.
Create a data visualisation to represent the results of a chance investigation.

Independent Tasks

John and Mia are playing a game where they flip the counter ten times. John wins the game if it lands on blue and Mia wins if it lands on red.

Is John or Mia more likely to win the game?

Flip the counter ten times and record the results.

Flip the counter ten more times and record the results.

What do you notice?

Curriculum Links

During Year 2

Engage in chance-based investigations about games:

– anticipate and then identify possible outcomes

– collect and record data

– create data visualisations for frequencies of possible outcomes (e.g., lists, pictures, graphs)

– answer the investigative question

– notice variations in outcomes (e.g., how often each of the numbers on a dice come up)

Agree or disagree with the statements made by others about chance-based situations

Mathematical Language

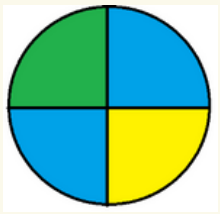
Chance, half, equal chance, tally-chart, picture graph.

Anticipations

Solutions, Misconceptions

Task 5

Mikaere has made this spinner for a game.



He says:
The spinner will land on blue, green or yellow.
There is a half chance of the spinner landing on blue.
The spinner might land on red.
Blue and green have an equal chance.
The spinner will land on blue the most.
There is a quarter chance that the spinner will land on yellow.

Decide which statements that you agree or disagree with and provide reasons.

Make your own statements about the spinner.

Teacher Notes

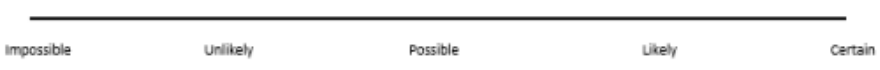
Expect students to justify their responses referring to the spinner and the layout of equal chance.

Monitor for students using vocabulary of certain, impossible, possible, likely, unlikely, or equal chance.

For the independent activity have colouring pens or pencils available.

Shareback

Select students to share back that are able to provide reasons for why they agree or disagree with the statements. Re-introduce the probability continuum during the sharing back and ask students to place the statements on this:



Big Ideas

When there is a chance-based situation, there are sets of possible outcomes that can be arranged into events. Probability is the chance of an event occurring. This can be represented with language or values (e.g., 0% - impossible or 100% certain).

For some situations or games, the chance or probability of particular outcomes can be calculated (theoretical probability). Theoretical probability and what happens in an experiment will differ.

For some situations or games using repeated testing can give a sense of which outcomes are more likely (experimental probability).

A probability experiment involves repeated trials. Results can differ in different trials.

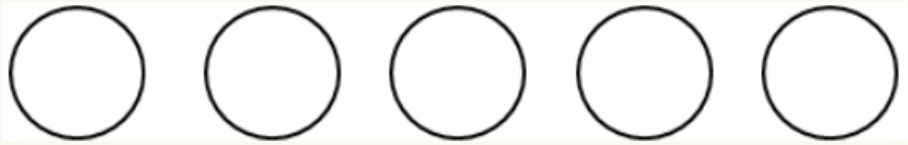
Connect

Make statements about these probability spinners:

Suggested Learning Outcomes

Identify possible outcomes in a chance situation.
Make a prediction about a chance situation.
Analyse statements about a chance situation.
Put statements about a chance situation on a probability continuum.

Independent Tasks



Can you make a spinner that has a half chance of landing on blue?

Can you make a spinner that has a half chance of landing on yellow?

Can you make a spinner that has an equal chance of landing on red or green?

Can you make a spinner that has the most chance of landing on blue?

Can you make a spinner that has the least chance of landing on yellow?

Curriculum Links

During Year 2

Engage in chance-based investigations about games

Describe what these visualisations show:

– answer the investigative question

– notice variations in outcomes (e.g., how often each of the numbers on a dice come up)

Agree or disagree with the statements made by others about chance-based situations.

Mathematical Language

Chance, equal chance, half, probability, fair, unfair.

Anticipations

Solutions, Misconceptions

Task 6

Mohammed and Ayaan are playing a game. They have to roll a six to start. Ayaan says “It is much harder to roll a six than other number. Let’s change it to roll a three to start as that will be easier”.

Do you agree with Ayaan?

Roll the dice twenty times and record the numbers that you roll.
What do you notice?

Record what you find.

Represent your findings using a tally chart or picture graph.

What do you notice?

Teacher Notes

During the launch remind students how to record outcomes using a tally chart or picture graphs.
Have dice available for each pair.
Notice whether students are recording the results accurately and systematically and support them to do this.
For the independent task have dice available.

Shareback

Select students to share who have used a systematic way of recording the data to show the results of their chance investigation. Select students who have used tally-charts or picture graphs, or model this to the students. Ensure that you share the results from several pairs of students.

Connect

Why did different pairs/groups get different results?
Is it easier or harder to roll a six than other numbers?
Model to the students that each number has one sixth chance of being rolled.
Can we make predictions about what number the dice will roll?

Big Ideas

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For some situations or games using repeated testing can give a sense of which outcomes are more likely (experimental probability).

A probability experiment involves repeated trials. Results can differ in different trials.

Suggested Learning Outcomes

Identify possible outcomes in a chance situation.
Make a prediction about a chance situation.
Collect and record data for a chance investigation.
Create a data visualisation to represent the results of a chance investigation.

Independent Tasks

Devon thinks it is more likely to roll a one than a five. Do you agree or disagree?

Roll the dice 20 times and record the results. What do you notice?

Roll the dice another 20 times and record the results. What do you notice?

Represent your results using a tally-chart or picture graph.

Curriculum Links

During Year 2

Engage in chance-based investigations about games:

– create data visualisations for frequencies of possible outcomes (e.g., lists, pictures, graphs)

Describe what these visualisations show:

– answer the investigative question

– notice variations in outcomes (e.g., how often each of the numbers on a dice come up)

Mathematical Language

Chance, half, equal chance, tally-chart, picture graph.

Anticipations

Solutions, Misconceptions

Task 7

Jaylan and Orion were playing beanz. They are trying to predict the likelihood of which bean they will draw.

They make these statements:
'It is more likely that we will draw a green bean than any other colour"
"It is less likely to draw a red bean than a green bean"
"It is less likely to draw a yellow bean than any other colour"
Discuss the statements and see whether you agree or disagree.

Make your own statements.

Now test the game by drawing a bean and recording the result and then putting the bean back and drawing another.

Play the game 10 times and record the results.
Play the game another 10 times and record the results.

Teacher Notes

Before the launch have a selection of counters or blocks that are two colours. Have more of one colour than another. Demonstrate putting these into a bag and drawing one out. Ask the students to make a prediction as to the colour that will you draw out.
Have feely bags and jelly-beans available for each pair to experiment with the chance situation.
Notice whether students are recording the results accurately and systematically and support them to do this.

Shareback

Select students to share who can justify their response to the statements by referring to the number and proportion of beans. Record the statements that students have made and ask other students to agree or disagree with these with a reason. Ask different pairs of students to share the results from their chance investigation.

Connect

Make a picture graph of the results of your chance investigation.

How does your picture graph compare to the statements that Orion and Jaylan made and your own statements?

Big Ideas

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For some situations or games using repeated testing can give a sense of which outcomes are more likely (experimental probability).

A probability experiment involves repeated trials. Results can differ in different trials.

Suggested Learning Outcomes

Identify possible outcomes in a chance situation.
Compare the likelihood of events.
Make a prediction about a chance situation.
Collect and record data for a chance investigation.
Create a data visualisation to represent the results of a chance investigation.

Independent Tasks

Assessment Task: Beans or Coins

Curriculum Links

During Year 2

Engage in chance-based investigations about games and everyday situations to:

– anticipate and then identify possible outcomes

– collect and record data

– create data visualisations for frequencies of possible outcomes (e.g., lists, pictures, graphs)

Describe what these visualisations show:

– answer the investigative question

– notice variations in outcomes (e.g., how often each of the numbers on a dice come up)

Agree or disagree with the statements made by others about chance-based situations

Mathematical Language

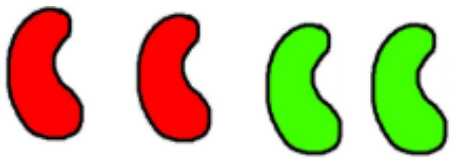
Chance, unfair, fair, likely, unlikely, tally chart, picture graph.

Anticipations

Solutions, Misconceptions

Assessment Task 1 - Probability - Year 2

[Provide students with a feely-bag and models to carry out the chance experiment]
I put these beans in a bag and draw two out at the same time. What are all combinations that I could draw out?



Make statements about the likelihood of the combinations.

Now test your statements by drawing two beans, recording the results and putting the beans back. Play the game 15 times and record and represent your results. What do you notice?

Assessment Task 2 - Probability - Year 2

[Provide students with a feely-bag and models to carry out the chance experiment]
I toss two coins. What are all combinations of heads and tails that I could get?

Make statements about the likelihood of the combinations.

Now test your statements by tossing two coins and recording the results. Play the game 15 times and record and represent your results. What do you notice?