Level 5 – Statistics and Probability

Overview

Task name	What are the chances?
Learning intention	To list outcomes of chance experiments using fractions and a probability scale of 0 to 1
Duration	30 minutes

Links to Victorian Curriculum

These work samples are linked to Level 5 of the Mathematics curriculum.

Extract from achievement standard

Students list outcomes of chance experiments with equally likely outcomes and assign probabilities as a number from 0 to 1.

Relevant content descriptions

- List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (VCMSP203)
- Recognise that probabilities range from 0 to 1 (VCMSP204)

Links to NAPLAN

Minimum standards – numeracy

Year 5: Measurement, chance and data – Data

Students identify the possible outcomes for familiar events and predict their comparative likelihood. For example, students can generally:

- make predictions based on data.

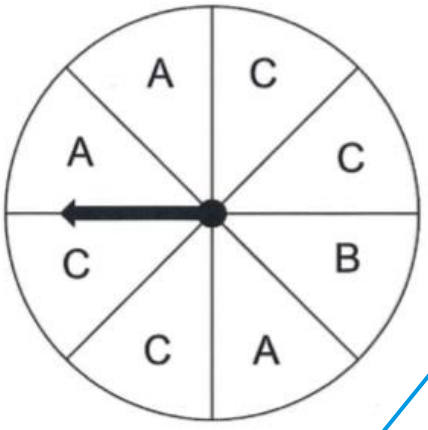
Student work samples – Probability as a fraction

These work samples were created by students working at Level 5. Evidence of student achievement has been annotated.

Victorian Curriculum links

List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (VCMSP203)

Please refer to the spinner below



Identifies probability of a spinner landing on a given section as a fraction

As a fraction, what is the probability (chance) of the spinner landing on each of the following

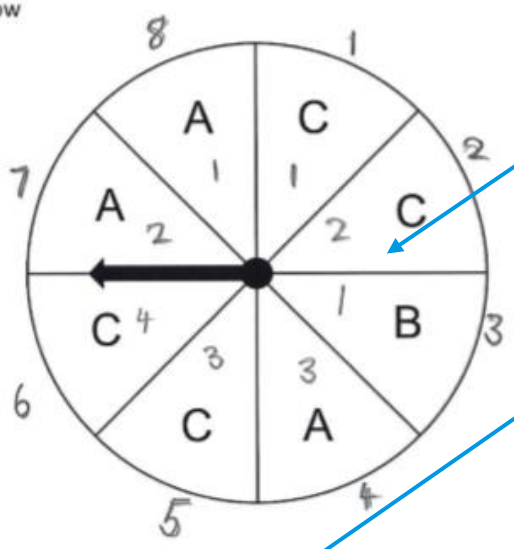
A 3/8	B 1/8	C 1/2 50%
A and B 1/2 50%	B and C 5/8	C and A 7/8

Makes connections between a half and 50%

On a 6 sided dice, what is the probability of the rolling the following

A 4	An odd number	A number greater than 2	A 1, 3, and 4
1/6	1/2 50%	4/6	1/2

Please refer to the spinner below



Labels spinner to count probable outcomes

Presents probability of outcomes using fractions

Identifies equivalent fractions

As a fraction, what is the probability (chance) of the spinner landing on each of the following

A $\frac{3}{8}$	B $\frac{1}{8}$	C $\frac{4}{8} = \frac{1}{2} = \frac{2}{4}$
A and B $\frac{4}{8} = \frac{1}{2} = \frac{2}{4}$	B and C $\frac{5}{8}$	C and A $\frac{7}{8}$

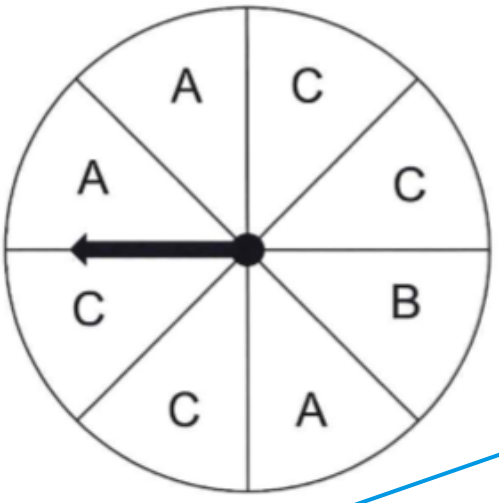
Counts number of odd and even numbers

Records fraction of probability in simplest form

On a 6 sided dice, what is the probability of the rolling the following

A 4	An odd number	A number greater than 2	A 1, 3, and 4
$\frac{1}{6}$	$\frac{3}{6} = \frac{1}{2} = \frac{2}{4}$	$\frac{4}{6} = \frac{2}{3}$	$\frac{3}{6} = \frac{2}{4} = \frac{1}{2}$

Please refer to the spinner below

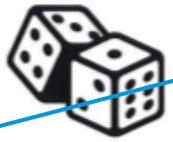


Presents probabilities of outcomes using fractions

As a fraction, what is the probability (chance) of the spinner landing on each of the following

A 3/8	B 1/8	C 4/8 = 10/20
A and B 4/8 = 1/2	B and C 5/8	C and A 7/8

Records equivalent fractions



On a 6 sided dice, what is the probability of the rolling the following

A 4	An odd number	A number greater than 2	A 1, 3, and 4
1/6 = 6/12	3/6 = 5/10	4/6	3/6 = 1/2

Student work samples – Determining likelihood

These work samples were created by students working at Level 5. Evidence of student achievement has been annotated.

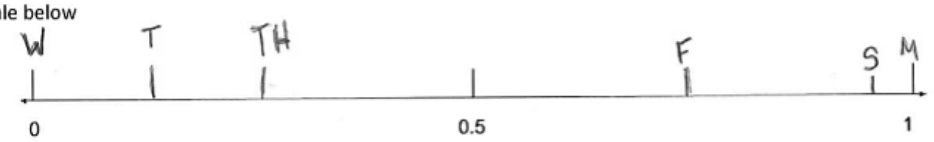
Victorian Curriculum links

Recognise that probabilities range from 0 to 1 (VCMSP204)

M	T
Min 10 Max 16 **Showers developing.** Possible rainfall: **3 to 10 mm** Chance of any rain: **100%**	Min 9 Max 19 **Partly cloudy.** Chance of any rain: **10%**
W	**Th**
Mostly clear. Chance of any rain: **0%**	Min 10 Max 18 **Partly cloudy.** Chance of any rain: **20%**
F	**S**
Min 11 Max 17 **Showers clearing.** Possible rainfall: **2 to 5 mm** Chance of any rain: **70%**	Max 17 **Dry morning. Rain developing later.** Possible rainfall: **4 to 10 mm** Chance of any rain: **95%**

Places days correctly on the probability scale

Using the letters for each of the days in the table shown above, locate them according to likelihood of rain on the scale below



Impossible | Very Unlikely | Unlikely | Equally likely | Likely | Very Likely | Certain

Connects percentage with likelihood of probability

On what days would you take an umbrella? Why?

Saturday, Monday and Friday because they have a higher chance of rain (more than 50%). Also, on Monday it has a 100% chance of rain which I means it's certain to rain.

Identifies a certain event

On what days would you **NOT** take an umbrella? Why?

Wednesday has a 0% chance of rain meaning it's impossible for it to rain. Tuesday and Thursday because their chance is closer to 0%.

Identifies an impossible event

Identifies Tuesday, Wednesday and Thursday as the least likely days to rain

M	T
Min 10 Max 16 **Showers developing.** Possible rainfall: **3 to 10 mm** Chance of any rain: **100%**	Min 9 Max 19 **Partly cloudy.** Chance of any rain: **10%**
W	**Th**
Mostly clear. Chance of any rain: **0%**	Min 10 Max 18 **Partly cloudy.** Chance of any rain: **20%**
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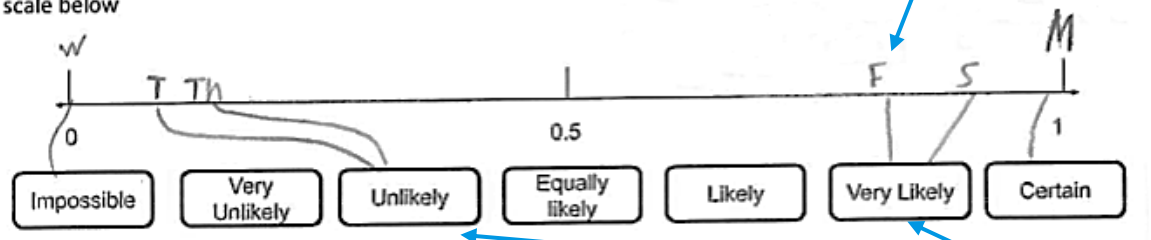
Using the letters for each of the days in the table shown above, locate them according to likelihood of rain on the scale below



On what days would you take an umbrella? Why?

Monday, Tuesday, Thursday, Friday and Saturday because it has 10% and over on the chance of rain.

On what days would you **NOT** take an umbrella? Why?

Wensday because it has 0% of chance of raining

Places days correctly on the probability scale

Matches days with likelihood of rain

Makes the choice to take an umbrella with a likelihood of rain over 10%

Takes an umbrella for anything over 0% chance of rain

M	T
Min 10 Max 16 **Showers developing.** Possible rainfall: **3 to 10 mm** Chance of any rain: **100%**	Min 9 Max 19 **Partly cloudy.** Chance of any rain: **10%**
W	**Th**
Mostly clear. Chance of any rain: **0%**	Min 10 Max 18 **Partly cloudy.** Chance of any rain: **20%**
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Places days correctly on the probability scale

Using the letters for each of the days in the table shown above, locate them according to likelihood of rain on the scale below

Impossible | Very Unlikely | Unlikely | Equally likely | Likely | Very Likely | Certain

On what days would you take an umbrella? Why?

You would take it on Monday because it is going to rain.
You would take it on Saturday because it is 95% to rain.

Identifies percentages over 90% as a reason to take an umbrella

On what days would you **NOT** take an umbrella? Why?

You wouldn't take it on Wednesday because it isn't going to rain.
You wouldn't take it on Tue or Thu because it is 10% and 20% respectively.

Justifies choice using percentages of chance

Where to next for the teacher?

When the task on which these annotated student work samples is based has been used as a classroom activity, there is opportunity to gather data on student achievement to help inform further teaching.

An analysis of student responses, on an individual, group or whole class basis, can be used to develop and direct student learning with respect to the following content.

For students needing to review underpinning knowledge and skills at Level 4

- Describe possible everyday events and order their chances of occurring (VCMSP175)
- Identify everyday events where one cannot happen if the other happens (VCMSP176)
- Identify events where the chance of one will not be affected by the occurrence of the other (VCMSP177)

For students consolidating knowledge and skills at Level 5

- List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (VCMSP203)
- Recognise that probabilities range from 0 to 1 (VCMSP204)

For students moving on to new knowledge and skills at Level 6

- Describe probabilities using fractions, decimals and percentages (VCMSP232)
- Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies (VCMSP233)
- Compare observed frequencies across experiments with expected frequencies (VCMSP234)

Resources

- Mathematics Sample Programs, Victorian Curriculum and Assessment Authority (VCAA) – This set of sample programs covering the Victorian Curriculum Mathematics: F–10 were developed *as examples* to illustrate how the Mathematics curriculum could be organised into yearly teaching and learning programs.
- Numeracy Learning Progressions, Victorian Curriculum and Assessment Authority (VCAA) – The Numeracy Learning Progressions amplify, extend and build on the numeracy skills in the Victorian Curriculum Mathematics F–10 and support the application of numeracy learning within other learning areas.
- FUSE, Victorian Department of Education and Training (DET) – The FUSE website provides access to digital resources that support the implementation of the Victorian Curriculum F–10, including an extensive range of activities and other resources for Primary Mathematics and Secondary Mathematics.
- Mathematics Teaching Toolkit, Victorian Department of Education and Training (DET)
- Mathematics Curriculum Companion, Victorian Department of Education and Training (DET)
- Victorian Numeracy Portal, Victorian Department of Education and Training (DET)
- Aligned Australian Curriculum Resources (Mathematics), Australian Curriculum, Assessment and Reporting Authority (ACARA)