



Assessment task				
Year level	6			
Learning area	Mathematics			
Subject	Statistics and Probability			
Title of task	In a spin			
Task details				
Description of task	Students will explore expected and observed frequency using fair and unfair spinners and conducting repeated trials. They will be describing probabilities using simple fractions, decimals and percentages. Students will be using an interactive website to conduct the experiment and will record their results and explain their thinking by answering some questions.			
Type of assessment	Summative			
Purpose of assessment	To inform moderation practices			
Assessment strategy	Written			
Evidence to be collected	Student worksheet 'In a Spin'			
Suggested time	Up to 3 x 1-hour lessons			
Content description				
Content from the Western Australian Curriculum	Describe probabilities using fractions, decimals and percentages Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies Compare observed frequencies across experiments with expected frequencies			
Proficiencies	Understanding	Fluency	Problem solving	Reasoning
	✓	✓	✓	✓
Task preparation				
Prior learning	Students will have an understanding of decimals and unit fractions. Students will have experience in interpreting different data sets and have listed outcomes of chance experiments with equally likely outcomes, assigning probabilities between 0 and 1. Students will also have an understanding of the connection between equivalent fractions, decimals and percentages.			
Assessment differentiation	Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their level of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment tasks.			
Assessment task				
Assessment conditions	This is an individual, in-class assessment			
Resources	http://www.scottle.edu.au/ec/viewing/L2376/ma_004_csiro_200/index.html Worksheet 'In a Spin'			

Instructions for teacher

Explain to students that there are two parts to this task.

Part one – the spinner experiment

Students will explore expected and observed frequency using fair and unfair spinners and conducting repeated trials. They will be describing probabilities using simple fractions, decimals and percentages.

They will use the interactive website to build and experiment with their spinners and complete an accompanying worksheet: http://www.scootle.edu.au/ec/viewing/L2376/ma_004_csiro_200/index.html

Note: Students will be using the interactive website and completing their hard-copy worksheet 'In a Spin' at the same time. Guide students through the website and the completion of the worksheet as a class using the following steps:

- i. Explain to students that they must make four spinners using the 'Build' tab at the top. At least one of their spinners must be fair and one must be unfair. *Allow time for all students to create their spinners.*
- ii. Discuss the percentage bar at the base of the spinner. Ensure students are familiar with the percentages that are calculated by the interactive tool.
- iii. Ask students to take out the accompanying worksheet: 'In a Spin'. Complete **Table 1** by calculating the fraction and the decimal that accompanies the percentage.
- iv. Ask students to click on the 'Experiment' tab. Discuss the table with two columns ('Experiment' and 'Theory'). Encourage students to click on the 'Explain table' tab. Discuss the purpose of the table as a class. Explain to students that 'experiment' and 'theory' is the same as 'observed' and 'expected frequencies'.
- v. Ask students to use the tables template to input the following information:
 - Colours on the spinner
 - Expected frequency (based on percentage/fraction/decimal table previously completed)
 - Observed frequency (**after** interactive test has been performed)
 - Amount of spins (10/100/1000)
- vi. Ask students to use the 'Experiment' tab to test their interactive spinners. Ensure students select all of the amount of spin options (10, 100, 1000) and use the 'fast spin' tab. They must then use the table to record each set of spins as they go (*or the information on the screen will disappear*).

Part two – explaining the results

Students will be comparing observed frequencies across experiments with expected frequencies.

Students will be using the data they collected from their interactive spinner experiment to compare the results of their experiments and justify their thinking by answering the following questions;

- i. Write down some observations that you noticed when you conducted the experiments.
- ii. Do you think the number of the trials, or the 'sample size' (1000/100/10 spins) affected the data you got? Why/why not? Give reasons for your answer, using specific examples from the experiment.
- iii. What is your understanding of observed frequency and expected frequency? Use an example from the experiment or another kind of example to explain.
- iv. Can you justify the data you collected from the spinner experiment? Explain your answer using mathematical words and specific examples.
- v. Can you briefly explain the design for a different type of experiment that measured observed and expected frequencies? Make sure you explain the 'tool' you will use, e.g. spinner.

Instructions to students

There are two parts to this task. They are;

- i. Part one – interactive spinner experiment
- ii. Part two – explaining your result

The following link to the interactive spinner website will allow you to conduct a chance experiment which you will use to explain expected and observed frequency and compare expected and observed frequency. You will also be asked to describe probabilities using fractions, decimals and percentages.

Your teacher will guide you through the steps of this experiment. As part of this task you will also be required to record some data on a separate worksheet, which you will then use to explain the results from the spinner experiment.

Spinners' website: http://www.scootle.edu.au/ec/viewing/L2376/ma_004_csiro_200/index.html

Student Booklet - Mathematics

Task title	In a spin
Student name	
School	
Year level	6
Date	

In a Spin

Table 1

Record the information from each of the spinners you created in the table below.

Spinner	Colour (%)				Colour (fraction)				Colour (decimal)			
	R	B	Y	G	R	B	Y	G	R	B	Y	G
Example	25%	25%	25%	25%	1/4	1/4	1/4	1/4	0.25	0.25	0.25	0.25
S1												
S2												
S3												
S4												

Table 2

Use the table template below to input the following information:

- Colours on the spinner
- Expected frequency (based on percentage/fraction/decimal table previously completed)
- Observed frequency (**after** interactive test has been performed) for amount of spins (10/100/1000)

Spinner 1	Colours on spinner	Expected frequency	Observed frequency		
			10	100	1000
Spinner 2	Colours on spinner	Expected frequency	Observed frequency		
			10	100	1000
Spinner 3	Colours on spinner	Expected frequency	Observed frequency		
			10	100	1000
Spinner 4	Colours on spinner	Expected frequency	Observed frequency		
			10	100	1000

Explaining your results

Answer the following questions, using the information you found in the spinner experiment to inform your answers.

- 1) Write down some observations that you noticed when you conducted the experiments.

- 2) Do you think the number of the trials, or the 'sample size' (1000/100/10 spins) affected the data you got? Why/why not? Give reasons for your answer, using specific examples from the experiment.

3) What is your understanding of observed frequency and expected frequency? Use an example from the experiment or another kind of example to explain.

4) Can you justify the data you collected from the spinner experiment? Explain your answer using mathematical words and specific examples.

5) Can you briefly explain the design for a different type of experiment that measures observed and expected frequencies? Make sure you explain the 'tool' you will use, e.g. spinner.

Marking key	
Description	Marks
Students describe probabilities using simple fractions, decimals and percentages	
Accurately records percentages from spinners and correctly calculates equivalent fractions and decimals for each component of each spinner.	3
Accurately records percentages from spinner and calculates most equivalent fractions and decimals for each component of each spinner.	2
Records percentages from spinner and calculates some simple equivalent fractions and decimals for each component of each spinner.	1
Subtotal	3
Description	Marks
Students record observed and compared frequencies	
Records expected and observed frequency accurately and provides analytical comments about information recorded.	5-6
Records expected and observed frequency and provides some simple comments about information recorded.	3-4
Records expected and observed frequency.	1-2
Subtotal	6
Description	Marks
Students compare observed and expected frequencies	
Clearly explains answers to all questions, justifying responses and providing specific examples.	3
Explains answers to most questions, providing some examples.	2
Provides answers to some questions.	1
Subtotal	3
Total	12