

# Experimental probabilities

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Date: \_\_\_\_\_

## Experimental probabilities

Sit down with a pen and paper.



Calculator allowed



**Bias:** Favouring one outcome over another.

It isn't always possible to know the probability of an event happening. For example what is the probability you forget your house keys?

In these situations it might be a good idea to conduct an experiment to see if we can create probabilities.

**Experiment probabilities:** Probabilities created from doing an experiments.

**Frequency:** The number of times an outcome occurs.

Click to load the spinner.

1) Context

2) Instructions

3) Predictions

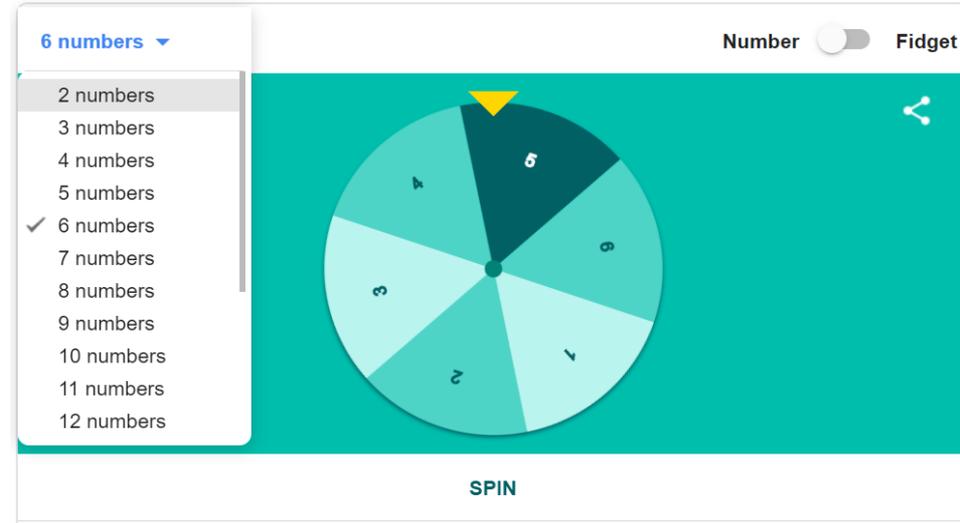
4) Table

5) Experiment

6) Ex Prob

7) Conclusion

Change to  
6 sectors



Spin

You have been asked to check the randomness of an online spinner. In real life you could be paid to do this sort of work.

You will be checking for **possible bias**.

Does it **favour one answer** more than others?

Is it actually **random**?

Does it follow any **pattern**?

The experiment we are doing is an **initial test** to see how it spins. **30 spins will not be enough** to say if there is a true bias.

You will feedback your results in a conclusion.



**Do not start** the experiment **until** you have made **predictions**.

- Spin the spinner **30 times** and record the results.
- **Record** the results **in the order** they happen in the top row.
- Use the **tally** column to **quickly sort** the results.
- Write the **final totals** of each outcome in the **frequency** column.
- The **experimental probability** will be discussed later.

Recording data – Draw the table [Back](#) [Next](#)

Results:

Outcome	Tally	Frequency	Experimental Prob
1			
2			
3			
4			
5			
6			

# Recording data – Draw the table

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**Results:**

<b>Outcome</b>	<b>Tally</b>	<b>Frequency</b>	<b>Experimental Prob</b>
<b>1</b>			
<b>2</b>			
<b>3</b>			
<b>4</b>			
<b>5</b>			
<b>6</b>			

# Recording data – Example

Results: 1,6,5,5,2,1,4,5,2,2,2,5,2,1,6,1,3,3,2,3,3,2,2,2,2,2,3,6,3,6

Outcome	Tally	Frequency	Experimental Prob
1		4	Frequency is the tally as a number.
2		11	
3		6	
4		1	
5		4	
6		4	Experimental probability will be explained at the end.

Every fifth mark crosses the previous 4.

Experimental probability will be explained at the end.

# Predictions

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Write these predictions down now so you can compare them to your answers at the end. **The prediction might just be a guess.**

1 How many 6's will occur?

2 What number will occur the most?

3 How many trials before all 6 numbers have appeared?

4 How many trials before the same number appears twice in a row?

5 Will you get the numbers 1 to 6 in order in a row?

6 Will a number appear less than 3 times?

7 What will be the sum (+) of all 30 numbers?

8 What will be the longest run of the same number?

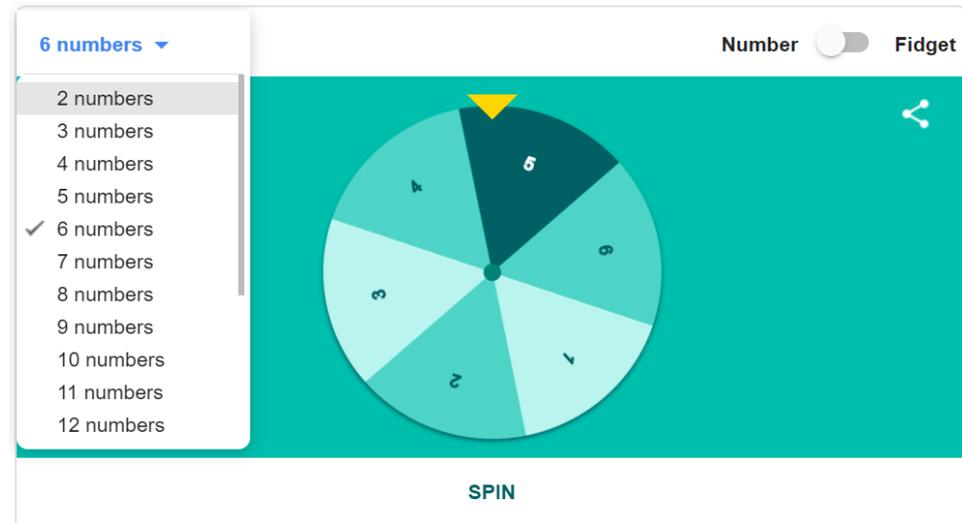
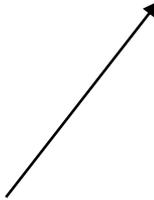
It is now time to do the experiment.

Good luck.

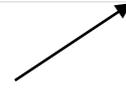
Click to load the spinner.



Change to  
6 sectors



Spin



# Experimental probability

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$$\textit{Experimental Probability} = \frac{\textit{Frequency of that outcome}}{\textit{Total number of trials}}$$

Work out the experimental probability of each outcome.

See example

The experimental probability can be compared to the results we expected to get. This is called the **theoretical probability**.

The theoretical probability of getting a 4 is a sixth,  $\frac{1}{6}$  or  $\frac{5}{30}$ .

Look at your results and compare your experimental with the theoretical probability. **You can mention this in your conclusion.**

# Example

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Results:			
Outcome	Tally	Frequency	Experimental Prob
<b>1</b>		4	$\frac{4}{30}$
<b>2</b>		11	$\frac{11}{30}$
<b>3</b>		6	$\frac{6}{30}$
<b>4</b>		1	$\frac{1}{30}$
<b>5</b>		4	$\frac{4}{30}$
<b>6</b>		4	$\frac{4}{30}$

Complete your conclusion by answering these questions  
Imagine this is a report you are handing in to the spinner designer.

**Write your answer in full sentences.**

- 1 Talk about your predictions – did you get any correct?
- 2 Were the results close to the expected outcomes (theoretical prob)?
- 3 Did any patterns occur?
- 4 Do you think the spinner is bias?

**Please make sure you take a picture of your conclusion and send it to your teacher.**

**Well done for completing the lesson.**



## Reflections

A large, empty rounded rectangular box with a black border, intended for students to write their reflections.