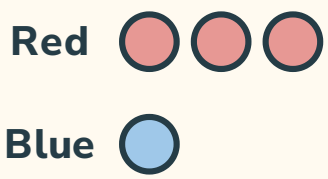
MATHS FIELD GUIDE · GRADE 5

Probability compares equally likely outcomes

OPENING PROBLEM

Four same-sized counters differ only in colour. On a random draw, which colour is likelier?



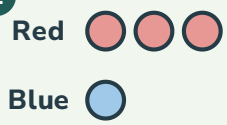
02 Build the sample space first
03 Rules and worked cases
04 Spin the prize wheel
05 Compare the models
06 Read an experiment before predicting
07 Check your reasoning

ILLUSTRATED PROBLEM SHEET

Build the sample space first

Count possible results and check whether they are equally likely.

1



Four same-sized counters differ only in colour. On a random draw, which colour is likelier?

Red has three chances out of four. Blue has one.

2

Coin 1	Coin 2
H	H
H	T
T	H
T	T

Which results have exactly one head?

HT and TH. With two independent fair coins that is two of four results.

3



A fair die wins on 5 or 6. What is the chance of losing?

Four other faces lose. The chance is 4/6, or 2/3.

4



One red counter is added to a bag containing two red and two blue. Is it still fair by colour?

No. The new counts are three red and two blue.

No winning tickets
chance zero.

Every ticket wins
chance one.

CHAPTER PROBLEM

An event is impossible. What is its probability?

Zero.

MATHS REFERENCE · GRADE 5

Probability compares equally likely outcomes

Probability describes how likely an event is.

Zero means impossible; one means certain. For equally likely outcomes, divide the favourable count by the total possible count.

Cases to recognise

Situation	What to do and why
A fair die shows a multiple of three	Favourable faces 3 and 6 give 2/6 = 1/3.
A fair die shows more than six	No face qualifies. Probability is zero.

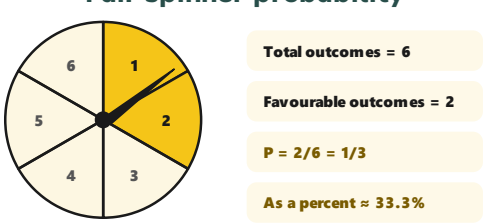
Read the model

Count equal spinner sectors

This fair spinner has six equal sectors. Two are yellow.

The probability of yellow is 2/6 = 1/3. Equal-sized sectors make the counted outcomes equally likely in this model.

Fair spinner probability



Probability from a spinner

An event may include several outcomes

Yellow can occur in either of two sectors, not just one.

The favourable count is two. The total count includes every sector, yellow or not.

event An outcome or group of outcomes of interest.
equally likely Having the same chance.
favourable Outcomes included in the chosen event.
probability A number from zero to one describing chance.

Heads	Tosses	Share
3	4	3/4
5	10	1/2

Which trial set landed closer to half heads?

The second. The first did not disprove a fair-coin model.

WORKED INVESTIGATION

Spin the prize wheel

Divide a wheel into eight equal sectors. Colour three gold, two blue and three green. On a fair spin each sector is an equally likely outcome.

Look at this part	What it tells you
Gold	3/8
Blue	2/8
Gold or green	6/8

Work it through

Blue and green cannot occur on the same spin. Add their counts to get five favourable sectors out of eight.

Catch the mistake

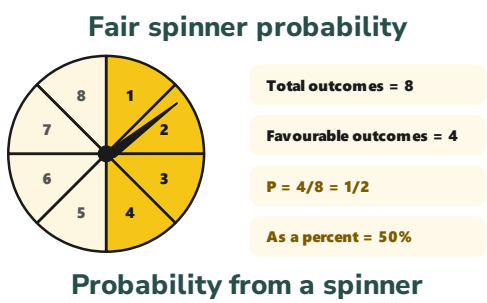
Three colour names do not make each colour equally likely. The blue colour covers fewer equal sectors than gold.

Compare the cases

Try another fair spinner

Four of eight equal sectors are yellow.

P(yellow) = 4/8 = 1/2. Half of the possible outcomes are favourable.



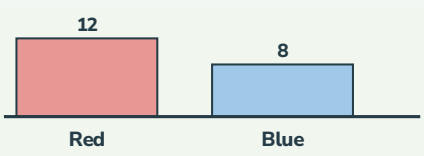
Size matters for fairness

A spinner with one huge yellow region and three tiny white regions does not give each region equal probability.

Counting colour regions alone would be misleading. Our simple rule needs equally likely outcomes.

Change one condition

Recolour one green sector blue. Gold and blue now each cover three sectors, but green is still possible.



Estimate the chance of red from these twenty draws.

12/20 = 3/5. Record whether each counter was replaced before comparing trials.

PROBABILITY COMPARES EQUALLY LIKELY OUTCOMES

Compare the models

Chance is not a promise

A probability of one half does not promise exactly five yellows in ten spins.

It describes the model's chance on each fair spin, not a fixed short sequence.

Find the complementary event

If P(yellow) is one third and every sector is yellow or white, P(not yellow) is two thirds.

The two probabilities sum to one because together they cover all possible outcomes.

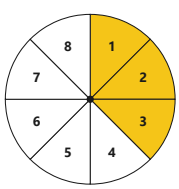
State the conditions

The spinner is fair and sectors have equal sizes.

If the mechanism favours one side, the equal-sector calculation may not match what actually happens.

Explain your reasoning

This fair spinner has equal sectors. What is the probability of yellow?



3/8. Three of the eight equally likely sectors are yellow.

Two more worked cases

Situation	Reasoning
Bag has two green and six white counters	Chance of a non-green counter is 6/8 = 3/4.
A red half-wheel plus two equal blue quarters	Each colour covers half the area even though their sector counts differ.

Set	Hits	Tries
A	3	5
B	9	15

Combine the evidence.

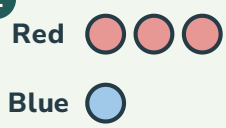
Twelve hits in twenty tries gives 3/5. Pool counts before dividing.

ILLUSTRATED PROBLEM SHEET

Read an experiment before predicting

Identify one trial, its possible results and what counts as success.

1



Draw one counter without looking. Which result is possible but less likely?

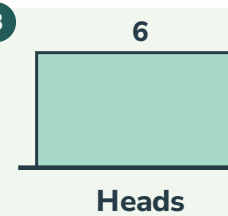
Blue. One of the four equal-chance counters is blue.

2

What changed when the last blue was taken away?

A blue draw became impossible. A red draw is certain.

3



A child records ten coin tosses. Did both outcomes occur?

Yes. Heads occurred more often in this record.

4

Try	1	2	3	4
Colour	R	B	R	R

Return each counter and mix before drawing again. Must B come next?

No. A short run of reds does not force the next colour.

An all-red bag
a red draw is certain.

Add one blue
a red draw is possible but no longer certain.

CHAPTER PROBLEM

Does a probability of one half guarantee half the results in six trials?

No. A short run can vary.

QUESTION BANK · FOLD OR COVER THE RIGHT COLUMN

Check your reasoning

Try the problem	Solution and reasoning
01 Must ten fair coin tosses produce exactly five heads?	No. Five is the expected count over repeated sets of ten, not a promise for one set.
02 Can you fairly compare two guessing games if one player gets twice as many turns?	Compare successes per turn or give both the same number of turns.
03 How many sectors must be blue for its chance to be one half? How many more than in the original wheel?	Four of eight sectors must be blue. Recolour two of the original non-blue sectors.
04 A fair spinner has twelve equal sectors; five are yellow. Chance of a non-yellow result?	Seven of twelve sectors qualify, so 7/12.
05 Add two green counters to a bag of three red and one green. Which colour is more likely now?	Three red and three green give equal chances.

Chance ¼
↓
80 trials
↓
80 × ¼ = 20

Does an expectation of twenty guarantee twenty hits?

No. Actual totals vary even when the chance stays fixed.

BANANALEARN LEARNING LIBRARY

Where will your maths take you next?

GRADE 5 MATHS

Choose your next problem.

Explore more illustrated guides and practise a related topic.

Browse Grade 5 guides →

Keep exploring

GRADE 5 · TOPIC GUIDE

Mean, median, mode and spread tell different stories

Open guide →

GRADE 5 · TOPIC GUIDE

Use trials to estimate a chance

Open guide →

Visit bananalearn.com →