

Grade 4 Mathematics

PROBABILITY & CHANCE

Explore chance, predict outcomes and reason about events



Name: _____

Chance • Likely • Unlikely • Fair & Unfair • Outcomes • Probability

Teacher-friendly • Printable • Answer Key Included

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Certain, Possible or Impossible?

Use certain, possible or impossible.

1. Getting a number when you roll a normal six-sided die.
2. Rolling a 7 on a normal six-sided die.
3. The sun rising tomorrow.
4. Picking a red card from a bag containing only blue cards.
5. Getting heads when you toss a fair coin.
6. Picking a triangle from a bag containing only circles.
7. A number less than 7 when rolling a six-sided die.
8. Write one event that is possible but not certain.

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How Likely Is It?

Use very likely, likely, equally likely, unlikely or very unlikely.

1. A bag has 9 red counters and 1 blue counter. Picking red is _____.
2. A bag has 1 red counter and 9 blue counters. Picking red is _____.
3. A fair coin is tossed. Getting heads is _____ to getting tails.
4. A spinner has 7 green sections and 1 yellow section. Landing on green is _____.
5. A box has 5 pencils and 5 pens. Picking a pencil is _____ to picking a pen.
6. A die is rolled. Is rolling less than 4 more or less likely than rolling greater than 4?
7. Write one event that is very likely.
8. Write one event that is very unlikely.

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List the Possible Outcomes

An outcome is a result that can happen.

1. List all possible outcomes when a fair coin is tossed.
2. List all possible outcomes when a six-sided die is rolled.
3. A spinner has red, blue and green. List all possible colour outcomes.
4. A bag contains red, blue and yellow counters. List all possible colours.
5. A coin is tossed twice. List HH, HT, TH and TT.
6. Can a die roll be both 2 and 5 at the same time? Explain.
7. Can a coin toss be heads and tails at the same time? Explain.
8. Why is it useful to list all possible outcomes?

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Fair or Unfair Games?

A fair game gives players equal chances of winning.

1. A coin is tossed. Player A wins heads and Player B wins tails. Is it fair?
2. A bag has 8 red and 2 blue counters. Is a red-vs-blue game fair? Explain.
3. A spinner has 4 equal sections: red, blue, green and yellow. Are colours equally likely?
4. A spinner has 3 equal sections for A and 1 for B. Who is more likely to win?
5. Design a fair game for two players using a coin.
6. Design a fair game for two players using a die.
7. Explain how you could make an unfair spinner fair.

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Complete the Chance Sentences

Choose: certain, possible, impossible, likely, unlikely or equally likely.

1. It is _____ that you will need a pencil for this worksheet.
2. It is _____ that you will roll a 1 on a die.
3. It is _____ that you will roll a number from 1 to 6 on a normal die.
4. It is _____ that you will roll a 9 on a normal die.
5. It is _____ that a fair coin will land heads or tails.
6. A bag has 9 red and 1 blue. Picking red is _____.
7. A bag has 1 red and 9 blue. Picking red is _____.
8. Write an event that is possible but not certain.

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Probability as a Fraction

Probability = favourable outcomes $\div$ total possible outcomes.

1. A bag has 3 red and 2 blue. Find $P(\text{red})$.
2. A bag has 1 green and 4 yellow. Find $P(\text{green})$.
3. A die is rolled. Find $P(6)$.
4. A die is rolled. Find $P(\text{even number})$.
5. A bag has 5 red, 3 blue and 2 green. Find $P(\text{blue})$.
6. A spinner has 4 equal sections: 1 red and 3 blue. Find $P(\text{red})$.
7. Which is more likely: red from 3 red/2 blue, or green from 1 green/4 yellow?

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Predict, Experiment & Record

Perform each experiment and compare your prediction with your results.

1. Toss a fair coin 20 times. Predict heads. Record heads ____ and tails ____.
2. Roll a die 20 times. Predict which number may appear most. Record it: ____.
3. Draw from a bag with 6 red and 4 blue counters 20 times, replacing each time. Which colour did you predict?
4. Was your prediction close? Explain.
5. Why might experimental results not exactly match theoretical probability?

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Probability in Everyday Life

Think about chance in real situations.

1. A weather report says 90% chance of rain. Is rain likely or unlikely?
2. A weather report says 10% chance of rain. Is rain likely or unlikely?
3. A lucky dip has 18 blue and 2 gold tickets. Which colour are you more likely to pick?
4. A game has a prize on 1 of 10 cards. Is winning likely or unlikely?
5. Give an example of an equally likely event.
6. Give an example of an impossible event.
7. Give an example of a certain event.

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Probability Detective

Read carefully and explain your thinking.

1. Bag A has 7 red and 3 blue. Bag B has 4 red and 6 blue. Which gives a greater chance of red?
2. Is rolling an odd number more, less or equally likely than rolling an even number on a die? Explain.
3. A student says: 'I got heads five times, so tails must come next.' Is that correct? Explain.
4. A spinner has 5 green and 3 yellow equal sections. Which is more likely?
5. Can an unlikely event still happen? Give an example.
6. Can a likely event fail to happen? Give an example.

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Super Chance Challenge

Use everything you know about probability and chance.

1. Create a bag with 10 counters where red is more likely than blue.
2. Create a bag with 10 counters where red and blue are equally likely.
3. A game has 4 equal outcomes. One player wins on 3 and another on 1. Is it fair?
4. A die is rolled twice. Is getting two 6s possible? Is it certain?
5. Write three events and label them certain, possible and impossible.
6. Explain in your own words what probability tells us.

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Answer Key

Answers for the Grade 4 pack.

1. Page 2: 1 possible, 2 impossible, 3 certain, 4 impossible, 5 possible, 6 impossible, 7 certain, 8 answers vary.
2. Page 3: 1 very likely, 2 unlikely, 3 equally likely, 4 very likely, 5 equally likely, 6 rolling less than 4 is more likely, 7–8 answers vary.
3. Page 4: 1 H/T, 2 1–6, 3 red/blue/green, 4 red/blue/yellow, 5 HH/HT/TH/TT, 6 no, 7 no, 8 answers should mention identifying all outcomes.
4. Page 5: 1 fair, 2 unfair, 3 yes, 4 A, 5–7 answers vary.
5. Page 6: 1 certain, 2 possible, 3 certain, 4 impossible, 5 equally likely, 6 likely, 7 unlikely, 8 answers vary.
6. Page 7: 1 $\frac{3}{5}$, 2 $\frac{1}{5}$, 3 $\frac{1}{6}$, 4 $\frac{3}{6}=\frac{1}{2}$, 5 $\frac{3}{10}$, 6 $\frac{1}{4}$, 7 first event is more likely.
7. Page 8: experimental answers vary; over many trials results generally tend toward theoretical probability.
8. Page 9: 1 likely, 2 unlikely, 3 blue, 4 unlikely, 5–7 answers vary.
9. Page 10: Bag A; odd/even equally likely; 'tails must come next' is incorrect; green; yes; yes; examples vary.