Year 5 · Probability: Testing Chance with Trials

Name: _____ Date: _____

Hi there! This sheet is all about chance, how likely things are to happen and what we find out when we actually try an experiment lots of times. Grab a pencil and let's explore!

Warm-up

1. Choose the best word for this event: 'The sun will rise tomorrow morning.' Is it impossible, unlikely, even-chance, likely, or certain?

2. Choose the best word for this event: 'You will roll a 7 on an ordinary six-sided dice.' Is it impossible, unlikely, even-chance, likely, or certain?

3. When you flip a fair coin, what are all the possible outcomes? (This set of outcomes is called the sample space.)

4. A bag has 5 red counters and 5 blue counters. If you take one without looking, is picking a red counter unlikely, even-chance, or likely?

Practice

5. Ana spins a spinner split into 4 equal colours: red, blue, green and yellow. What is the probability the arrow lands on green? Write your answer as a fraction.

6. On the spinner above, what is the probability of landing on either red OR blue?

7. Draw a number line from 0 to 1. Place these three events on it: A – 'It will rain somewhere in New Zealand this week', B – 'You will grow wings and fly to school', C – 'A tossed coin lands on heads'.

8. Word problem: Tama rolls a six-sided dice 30 times and records how often he gets an even number (2, 4 or 6). He gets an even number 14 times. Write his experimental probability of rolling an even number as a fraction, then compare it to what he would expect.

9. Word problem: In Room 12 at Avondale Primary, the teacher puts 8 lolly names in a jar: 3 chocolate, 4 mint and 1 caramel. A name is pulled out at random. Which flavour is most likely to be picked, and what is its probability?

10. Mere flips a coin 20 times and gets 12 heads and 8 tails. What fraction of her flips were tails? Was tails more or less common than expected?

Challenge

11. A spinner has sections coloured red, blue and green. The probability of red is 1/4 and the probability of blue is 1/2. What is the probability of green? Explain how you know.

12. Hemi rolls a dice 60 times. He records 6 appearing 18 times. The theoretical probability of rolling a 6 is 1/6. Roughly how many 6s would he expect in 60 rolls, and does his result suggest the dice might be unfair? Explain.

Answer key (for parents and tutors)

1. Choose the best word for this event: 'The sun will rise tomorrow morning.' Is it impossible, unlikely, even-chance, likely, or certain?
   Certain. The sun rises every single day, so this event will definitely happen. It sits at 1 on the probability number line.

2. Choose the best word for this event: 'You will roll a 7 on an ordinary six-sided dice.' Is it impossible, unlikely, even-chance, likely, or certain?
   Impossible. A normal dice only has the numbers 1, 2, 3, 4, 5 and 6, so a 7 can never appear. It sits at 0 on the probability number line.

3. When you flip a fair coin, what are all the possible outcomes? (This set of outcomes is called the sample space.)
   The sample space is {heads, tails}. There are 2 possible outcomes, and each is equally likely with a probability of ½ (0.5).

4. A bag has 5 red counters and 5 blue counters. If you take one without looking, is picking a red counter unlikely, even-chance, or likely?
   Even-chance. There are 5 red and 5 blue out of 10 counters, so red has 5 ways out of 10, which is ½ (0.5). Red and blue are equally likely.

5. Ana spins a spinner split into 4 equal colours: red, blue, green and yellow. What is the probability the arrow lands on green? Write your answer as a fraction.
   There are 4 equal sections and only 1 is green. Probability = number of green sections ÷ total sections = 1 ÷ 4 = ¼. So the probability of landing on green is ¼.

6. On the spinner above, what is the probability of landing on either red OR blue?
   Red is 1 section and blue is 1 section, so together that is 2 favourable sections out of 4. Probability = 2 ÷ 4 = ½. So the chance of red or blue is ½ (0.5).

7. Draw a number line from 0 to 1. Place these three events on it: A – 'It will rain somewhere in New Zealand this week', B – 'You will grow wings and fly to school', C – 'A tossed coin lands on heads'.
   Event B goes at 0 (impossible – people cannot grow wings). Event C goes at ½ in the middle (even-chance – a coin has an equal chance of heads or tails). Event A goes close to 1, on the 'very likely' part, because it almost always rains somewhere in NZ during a week. Order along the line: B (0), C (½), A (near 1).

8. Word problem: Tama rolls a six-sided dice 30 times and records how often he gets an even number (2, 4 or 6). He gets an even number 14 times. Write his experimental probability of rolling an even number as a fraction, then compare it to what he would expect.
   Experimental probability = number of even results ÷ total trials = 14 ÷ 30 = 14/30, which simplifies to 7/15. The expected (theoretical) probability is 3 even numbers out of 6 = 3/6 = ½. 7/15 is about 0.47, which is very close to ½, so the experiment gave a result near what we expected.

9. Word problem: In Room 12 at Avondale Primary, the teacher puts 8 lolly names in a jar: 3 chocolate, 4 mint and 1 caramel. A name is pulled out at random. Which flavour is most likely to be picked, and what is its probability?
   Mint is most likely because it has the most names (4). Probability of mint = 4 ÷ 8 = ½ (0.5). Chocolate = 3/8 and caramel = 1/8, both smaller than ½, so mint has the best chance.

10. Mere flips a coin 20 times and gets 12 heads and 8 tails. What fraction of her flips were tails? Was tails more or less common than expected?
    Tails came up 8 times out of 20 flips, so the fraction is 8/20 = 2/5 (which is 0.4). We would expect tails about ½ (0.5) of the time, so tails was a little less common than expected in this experiment.

11. A spinner has sections coloured red, blue and green. The probability of red is 1/4 and the probability of blue is 1/2. What is the probability of green? Explain how you know.
    All the probabilities must add up to 1. Red + blue = 1/4 + 1/2. Change 1/2 into 2/4, so 1/4 + 2/4 = 3/4. The rest must be green: 1 – 3/4 = 1/4. So the probability of green is 1/4.

12. Hemi rolls a dice 60 times. He records 6 appearing 18 times. The theoretical probability of rolling a 6 is 1/6. Roughly how many 6s would he expect in 60 rolls, and does his result suggest the dice might be unfair? Explain.
Expected 6s = 1/6 of 60 = 60 ÷ 6 = 10. Hemi actually got 18 sixes, which is much higher than the expected 10. Because 18 is well above 10, this suggests the dice might be weighted or unfair, favouring the number 6. (With a fair dice we would expect a number close to 10, though small differences are normal.)