Max’s Probability Challenge: A Year 5 Assessment

Learning objective: To calculate, compare, and justify the probability of events occurring using fractions, decimals, and percentages.

Read each question carefully. Max the monkey has provided a variety of puzzles for you to solve. Show your working out clearly to gain full marks.

Max is organising a charity fair to raise money for new library books. He has a box of 20 coloured tokens: 10 blue, 5 red, 3 yellow, and 2 green. He also has a spinner divided into 8 equal segments, numbered 1 to 8.

Word bank: impossible · unlikely · even chance · likely · certain · probability · event · fraction · percentage · outcome

1. Max pulls one token from the box at random. What is the probability that he pulls a blue token? Give your answer as a fraction in its simplest form. (2 marks)

2. If Max spins the 8-segment spinner, what is the probability of landing on a prime number? List the prime numbers on the spinner first. (3 marks)

3. Explain why the probability of pulling a purple token from Max’s box is described as 'impossible'. (2 marks)

4. Max wants to sell raffle tickets for £2 each. He says, 'The probability of winning is 1/4'. If there are 100 tickets in total, how many people will win a prize? Justify your calculation. (4 marks)

5. Compare the probability of pulling a red token versus a green token. Express both as percentages. Which is more likely and why? (4 marks)

6. Max adds 5 more green tokens to the box. Calculate the new total number of tokens and the new probability of picking a green token. Has the likelihood of picking a green token changed from 'unlikely'? Explain your reasoning. (5 marks)

7. Max suggests that if he spins the spinner 100 times, it will land on the number 8 exactly 12.5 times. Explain why this is a theoretical prediction rather than a guaranteed result. (5 marks)

Draw: Draw a spinner that represents an 'even chance' of landing on blue and an 'unlikely' chance of landing on yellow. Label your segments clearly.

Extension challenge: Imagine you are designing a game for the fair. Create a game involving a bag of marbles where the probability of winning is exactly 0.25. Write a short paragraph justifying why your game is fair and how you calculated the contents of your bag. Total: /25