Max’s Probability Puzzle-Solver

Learning objective: To calculate the probability of independent events and express them as fractions, decimals, and percentages.

Max the monkey has been busy setting up a carnival game to test your maths skills! Use this template to calculate the likelihood of different outcomes. Remember to simplify your fractions where possible and think about whether an event is impossible, unlikely, evens, likely, or certain.

Word bank: Probability · Fraction · Decimal · Percentage · Outcome · Certain · Impossible · Likely · Unlikely · Equally likely

1. The Scenario: Max has a bag of 20 coloured marbles: 10 blue, 5 red, 3 green, and 2 yellow. If you pick one at random, what is the probability of picking a blue marble? Show your answer as a fraction, a decimal, and a percentage. (3 marks)

2. The Challenge: Calculate the probability of picking a green or yellow marble. Explain your reasoning using the language of probability (e.g., is it likely or unlikely?). (3 marks)

3. The Impossible Event: Describe a scenario with Max’s bag of 20 marbles that would result in a probability of 0 (an impossible event). (2 marks)

4. The Certainty: If Max adds 5 more marbles to the bag, all of which are purple, what would have to happen for the probability of picking a purple marble to be 1 (a certain event)? (2 marks)

5. Real-World Application: If you were to play this game 100 times, how many times would you expect to pick a red marble based on your probability calculation? Show your working out. (3 marks)

Extension challenge: Design your own marble bag with a total of 50 marbles. Create three different probability questions for a partner to solve, ensuring you have the correct answers written on the back of your sheet.