Max’s Mathematical Squares: A Grade 5 Challenge

Learning objective: To identify, calculate, and apply knowledge of square numbers up to 12 x 12, including identifying squares within a range.

Read each question carefully. Max the monkey has left you some puzzles to solve. Show your working out clearly, especially when identifying the relationship between multiplication and square numbers.

Max is organising his collection of golden monkey nuts. He likes to arrange them into perfect squares so that the number of rows equals the number of columns. A square number is the product of a number multiplied by itself.

Word bank: Square number · Product · Factor · Multiply · Integer · Array

1. Max has a square array with 7 rows and 7 columns. How many nuts does he have in total? Write this as a square number calculation (e.g., $5^2 = 25$). (2 marks)

2. List all the square numbers between 20 and 100. Show the multiplication calculation for each one. (3 marks)

3. Max says, 'If I add two different square numbers together, I will always get another square number.' Is he correct? Use an example to prove or disprove his statement. (3 marks)

4. A shopkeeper sells bags of marbles. A 'Square Pack' contains a square number of marbles. If a bag costs 5p per marble and the bag contains 9^2 marbles, how much does the bag cost in total? (3 marks)

5. Find the missing number: If $12^2 = 144$, what is the square root of 144? Explain how you know. (2 marks)

Draw: Draw a visual representation of the square number 4^2 (16) by creating a grid of 16 small circles arranged in a perfect square.

Extension challenge: Max has 200 building blocks. What is the largest square number of blocks he can use to build a single square structure? How many blocks will he have left over?