Max’s Mathematical Squares

Learning objective: To identify, calculate, and apply square numbers up to 12 x 12.

Read the information below about square numbers, then help Max the monkey solve the puzzles. Remember to show your working out clearly.

Max the monkey has been busy arranging his collection of shiny pebbles. He noticed that when he arranges pebbles into a perfect square shape, the total number of pebbles is always a 'square number'. A square number is the product of an integer multiplied by itself. For example, 3 × 3 = 9. So, 9 is a square number. Max writes them down like this: 1^2, 2^2, 3^2, and so on. As he climbs through the forest, he keeps track of his squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, and 144. Max says, 'If you can draw a perfect square with your items, you have found a square number!'

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

1. Max has a collection of 49 pebbles. If he arranges them into a square array, how many pebbles will be in each row and each column? (2 marks)

2. Calculate the value of 8^2. Show your multiplication sum. (1 mark)

3. Ellie the elephant has 120 cookies to share. Is 120 a square number? Explain your reasoning using your knowledge of multiplication tables. (2 marks)

4. Find the missing number in this sequence: 81, 100, ___, 144. What is the root of the missing number? (2 marks)

5. Max wants to buy square-shaped floor tiles that cost £5 each. If he needs to cover a square area that is 6 tiles long and 6 tiles wide, what will be the total cost of the tiles? (3 marks)

Draw: Draw a visual representation of 4^2 (four squared) using a grid of dots or small squares to show why it is called a square number.

Extension challenge: Investigate 'cube numbers'. If a square number is a number multiplied by itself once (n^2), what do you think a cube number (n^3) is? Calculate the first three cube numbers.