

Max's Mathematical Challenge: The Mystery of Primes

Learning objective: To identify, describe and represent prime numbers up to 100 and establish whether a number up to 100 is prime and recall prime numbers up to 19.

Read each question carefully. Max the monkey has left some clues to help you, but you must use your knowledge of factors to solve the puzzles. Show all your working out clearly.

Max the monkey is organising his jungle collection of fruit. He has noticed that some numbers of fruits can be arranged into neat rectangular grids (composite numbers), while others stubbornly refuse to form anything other than a single long line (prime numbers). Help Max classify his jungle treasures.

Word bank: Prime number · Composite number · Factor · Multiple · Divisible · Product · Sequence

1. Define what a 'prime number' is. Provide two examples of prime numbers greater than 10 but less than 20. (2 marks)

2. Max has 15 bananas. Is 15 a prime number? Justify your answer by listing all the factors of 15. (3 marks)

3. Circle the prime numbers in this list: 2, 9, 17, 21, 29, 33, 37. Explain why 9 and 21 are not prime numbers. (3 marks)

4. Max says, 'All prime numbers are odd.' Is Max correct? Explain your reasoning using an example to support your answer. (3 marks)

5. Compare and contrast a prime number and a composite number. Use the terms 'factor' and 'product' in your explanation. (4 marks)

6. Max buys 3 bags of nuts for £2.50 each. If the total cost is a prime number of pounds, how much did he spend? Show your calculation. Is the total cost a prime number? (5 marks)

7. What might happen if all numbers were prime? Discuss the impact this would have on multiplication and division as we know them. (5 marks)

Draw: Draw a visual representation showing why the number 7 is prime and the number 8 is composite, using dots or counters to show the possible arrangements for each.

Extension challenge: Total: /25. Imagine you are teaching a younger student about prime numbers. Write a short, creative explanation (no more than 100 words) using the metaphor of 'The Stubborn Numbers' to explain why primes cannot be broken down into smaller equal groups.