

Max's Prime Number Puzzles

Learning objective: To identify, describe and represent prime numbers up to 100 and recognise prime numbers as having exactly two factors.

Max the monkey is obsessed with maths puzzles! Help him categorise these numbers by identifying which are prime and which are composite. Remember: a prime number is a natural number greater than 1 that has no positive divisors other than 1 and itself.

Max has gathered a collection of numbered acorns to sort for his winter store. He only wants to keep the prime numbers in his special box. A number is prime if it has exactly two factors: 1 and itself. If a number has more than two factors, it is a composite number.

Word bank: Prime number · Composite number · Factor · Multiple · Divisor · Product

1. Max has the following acorns: 7, 9, 13, and 15. Identify which of these are prime numbers and explain why the others are composite. (2 marks)

2. Is the number 1 a prime number? Justify your answer by considering the definition of a prime number. (2 marks)

3. List all the prime numbers between 20 and 40. Show your working out to prove they have no other factors. (3 marks)

4. Max says, 'All prime numbers are odd.' Is Max correct? Explain why or why not, using an example to support your argument. (2 marks)

5. Compare and contrast the properties of the number 2 and the number 9. Why is one prime and the other composite? (3 marks)

6. What might happen if we tried to find a prime number larger than 100? Do you think the sequence of prime numbers ever ends? Justify your reasoning. (3 marks)

Draw: Draw a 'Prime Number Tree' where the trunk is a composite number, and the branches show its factors. Can you draw a second tree for a prime number? How would the branches look different?



Extension challenge: Investigate 'Twin Primes'—these are pairs of prime numbers that have a difference of two (for example, 3 and 5). Research and list five pairs of twin primes. Then, create your own 'Prime Number Mystery' for a classmate to solve, where they must identify a secret number based on three clues about its factors.