Max’s Magical Maths Machines: An Introduction to Algebra

Learning objective: To understand how to use simple formulae and express missing number problems algebraically.

Max the monkey has built some special number machines! Read how each machine changes the input number to get the output. Use your knowledge of inverse operations to find the missing numbers.

Max the monkey loves to find patterns in everything he sees. He has created three special number machines to help him solve puzzles. Each machine follows a secret rule. Machine A adds 5 to any number you put in. Machine B multiplies the input number by 3. Machine C takes the input number, multiplies it by 2, and then subtracts 4. Max uses the letter 'n' to stand for the number he puts into the machine.

Word bank: algebra · formula · input · output · variable · inverse · equation

1. If Machine A follows the rule 'n + 5', what is the output if the input (n) is 12? (1 mark)

2. Machine B follows the rule 'n × 3'. If the output is 21, what must the input (n) have been? (2 marks)

3. Machine C follows the rule '(n × 2) - 4'. If the input (n) is 10, calculate the final output. (2 marks)

4. Max has a secret box. He says: 'If you double the number of apples in my box and add £3, you get £15.' Write this as an algebraic equation using 'a' for apples. (2 marks)

5. Solve the equation from the previous question: How many apples are in Max's box? (2 marks)

Draw: Draw a diagram of Max's 'Machine C'. Show the input 'n' going into a box, the operations happening inside, and the output coming out the other side.

Extension challenge: Create your own 'Mystery Machine' rule. Write a formula using 'n' and give a partner two inputs and outputs to see if they can guess your rule!