LESSON

8A4.1 Constructing simple equations

OBJECTIVES

- Generate and describe sequences.
- Use letters or symbols to represent unknown numbers.
- Construct simple linear equations.
- Solve problems and puzzles in the context of algebra.

STARTER

5 minutes

On the board, draw a number line from 0 to 1 with ten steps; mark 0, 0.5 and 1.

Ask pupils to chant along the number line, including silent counting to generate sequences such as 0, 0.2, 0.4, 0.6, 0.8, 1.0.

Use a range of intervals: 0.2, 0.25, 0.4, 0.15.

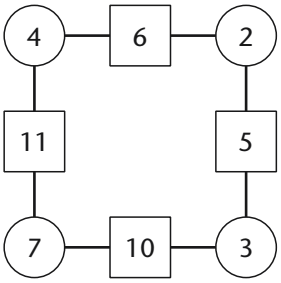
MAIN ACTIVITY

40 minutes

Vocabulary
algebra
arithmagon
equation

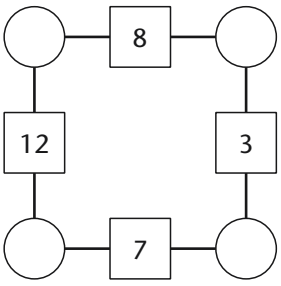
Resources
Framework examples, page 124

Give a brief recap of what an arithmagon is.



Remind pupils that the number in each square box is the sum of the numbers in the adjacent circles.

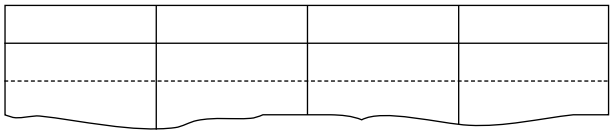
Ask pupils, working in pairs, to complete an arithmagon that has the numbers 8, 3, 7 and 12 in the square boxes.



Pupils will need 10–15 minutes for this. Support the pairs as they work on the problem. If necessary prompt pupils to find more than one solution.

Ask volunteers to explain their solutions on the board.

Transfer the solutions to a table, making sure that numbers in the same position are transferred to the same columns.



Check pupils' understanding of the problem.

Q How many solutions are there?

Q When might there be no solution?

Explore with the class any relationships between the columns of the table and any patterns that they can see.

Q Describe in words any relationships that you can see. For example, columns 1 and 2 add up to … what?

Express the relationships described using algebraic equations.

Write some algebraic equations on the board and discuss equivalent statements. For example, using a to stand for the number in the first column and b for the number in the second column:

$a + b = 8$ $\quad 8 - b = a$

Set pupils to work in pairs to find their own patterns.

PLENARY

15 minutes

Ask pupils to explain their findings and look for equivalent expressions.

Q What is the best way of finding all the solutions?

Q When might there be no solutions?

Explain that some algebraic expressions may look different but are really the same.

Introduce the idea of a triangular arithmagon.

For homework ask pupils to complete given triangular arithmagons and invent some.

KEY IDEAS FOR PUPILS

- You can construct equations to show simple relationships, such as:

  $a + b + c + d = 15$ or $a + b = 8$

- There are different ways to write the same equation, for example:

  $6 + 2 = 8$, so $8 - 6 = 2$ or $8 - 2 = 6$

  $a + b = 8$, so $8 - a = b$ or $8 - b = a$