Lesson 11 (Teach and practise)

Starter
Reason: Write on the board the numbers 1, 2, 3, 4, 6, 8 and 12 and ask: *Which number is the odd one out?* Discuss that all the numbers except 1 and 3 are even but decide that all the numbers apart from 8 can be paired up to make 12. (They are factors of 12.) Repeat with 1, 2, 3, 4, 8 and 16. (3 is not a factor of 16.)

Main teaching activities
Whole class: Draw a 'seed' on the board and write 36 on the seed. Explain that this seed is going to grow roots, the roots are what makes the number and these are called factors. Draw some roots with factors (1, 36, 2, 18, 3, 12, 4, 8, 6) and discuss the factors. Repeat by illustrating the factors of 18 in the same way.
Independent work: Ask the children to work out the factors of numbers on the sheet 'Factor seeds'. Encourage them to be methodical by working up and finding pairs of factors in ascending order.

Review
Discuss the findings and ask: *How do you know if a number has a factor of 2?* (It is even.) *How do you know if a number has a factor of 5?* (It ends in a 0 or a 5.) *How do you know if a number has a factor of 10?* (It ends in a 0.) *Are there any other factors that are easy to find out?* Discuss the conclusions from the challenge on the extension version of the sheet.

Differentiation
Less confident learners: Use the support version of 'Factor seeds', with the roots already drawn in and some factors provided.
More confident learners: The extension version of the sheet challenges children to answer a number of true or false statements.

Lesson 12 (Teach and practise)

Starter
Reason: Call out instructions for the children to draw a shape on their whiteboards. For example: *Draw me a shape with four sides that has two lines of symmetry.* (Rectangle.) *Draw me a polygon that has three equal sides and three equal angles.* (Equilateral triangle.) *Draw me a polygon that has five sides and only one line of symmetry.* (Pentagon.)

Main teaching activities
Whole class: Use the 'Grids, patterns, reflection and rotation' interactive resource to draw an L-shape (or use OHP with squared paper). Ask: *What is the area of this shape?* Count the squares together and ask: *What is the perimeter of the shape?* Now reflect the shape in the horizontal mirror line. *How has this shape been moved?* Encourage the use of correct vocabulary and agree that it has been reflected. Draw some more shapes on the interactive whiteboard (for example, squares, rectangles, irregular shapes), or highlight individual squares in different colours. Invite individuals to the board and ask them to draw the reflections, then click on 'Show reflection' to see if they are correct. Switch between horizontal, vertical and diagonal mirror lines. Display some examples of repeating patterns, including Islamic patterns and tiling patterns. Discuss these with the children and ask them to predict how they would continue.
Group work: Give each mixed-ability group a copy of the 'Reflections' sheet. Ask them to discuss and describe each pattern on the sheet. Provide a supply of squared paper, pencils and rulers to enable the groups to make their own translations and reflections. This fits in with the QCA ICT Scheme of Work, Unit 4B 'Developing images using repeating patterns', so, if appropriate, ask groups to use a computer to produce their repeated translations or reflections.

Review
Review the children's selection of patterns and ask other children from each group to describe each pattern. If possible, display all the children's patterns in the classroom after the lesson.

Differentiation
Less confident learners: Provide these children with the support version of the activity sheet and coloured paper to cut out shapes and move them around the grid.
More confident learners: Challenge these children to make up a translation or reflection of their own on the extension version of the sheet.