

Unit 6

Perimeter, co-ordinates

Three daily lessons

National
Numeracy Strategy

Year 4
Autumn term

Unit Objectives

Year 4

- Measure and calculate the perimeter of rectangles and other simple shapes using standard units.
- Suggest suitable units and measuring equipment to estimate or measure length.
- Record estimates and readings from scales to a suitable degree of accuracy.
- Recognise position and directions, for example, describe and find the position of a point on a grid of squares where the lines are numbered.

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This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

- Resource sheet 6.1
- Resource sheet 6.2
- Activity sheet 6.1
- OHT 6.1
- Rulers (with mm marked)
- Dice
- Counters
- OHP counters
- Coloured pencils
- Sheet of card 8cm × 6.5cm

Year 3

Link Objectives

Year 5

- Record estimates and measurements to the nearest whole or half unit, or in mixed units.
- Measure and compare using standard units (km, m, cm) including using a ruler to draw and measure lines to the nearest half centimetre.
- Read and begin to write the vocabulary related to position, direction and movement: for example, describe and find the position of a square on a grid of squares with the rows and columns labelled.

- Suggest suitable units and measuring equipment to estimate or measure length.
- Record estimates and readings from scales to a suitable degree of accuracy.
- Understand, measure and calculate the perimeter of rectangles and regular polygons.
- Recognise positions and directions: read and plot co-ordinates in the first quadrant.

(Key objectives in bold)

Planning sheet	Day One	Unit 6 <i>Perimeter, co-ordinates</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To derive doubles of whole numbers.</p> <p>VOCABULARY double total strategy</p>	<ul style="list-style-type: none"> Begin by asking the children to quickly calculate the following: $4 + 4 + 6 + 6 =$ $12 + 16 + 12 + 16 =$ $9 + 13 + 13 + 9 =$ $27 + 27 + 18 + 18 =$ $35 + 42 + 35 + 42 =$ <p>Discuss the strategies that they used.</p> <p>Establish that doubling one number of each pair and adding the result yields the same answer as adding together one of each pair and doubling the result.</p>	<p>To record centimetre and millimetre measurements using mixed units.</p> <p>To measure/calculate the perimeter of rectangles and simple shapes.</p> <p>VOCABULARY perimeter distance centimetre, cm millimetre, mm</p> <p>RESOURCES A4 card Resource sheet 6.1 Rulers Card rectangle 8cm × 6.5cm</p>	<ul style="list-style-type: none"> Hold up a sheet of A4 card and ask the children to imagine they are an ant crawling all round the edge of the paper. Tell the children that the distance the ant crawls is called the perimeter of the rectangle. It is the distance all round the edge. <p>Q What do you know about the lengths of the sides of an oblong or rectangle?</p> <p>Establish that the opposite sides are equal.</p> <p>Q If I know the length of these two sides of my rectangle (point to the length and the width of the A4 card) how can I calculate the perimeter?</p> <ul style="list-style-type: none"> Discuss different strategies for calculating the perimeter of a rectangle which might include: <ul style="list-style-type: none"> adding together the length of each side; doubling the length, doubling the width and adding the two together; adding together one length and one width and then doubling. <p>Remind children that there are 10mm in 1 cm</p> <p>Q If I measure $\frac{1}{2}$ cm how many mm is that?</p> <p>Ask similar questions – if I measure $4\frac{1}{2}$ cm how many cm and mm is that? (4cm 5mm).</p> <ul style="list-style-type: none"> Display a rectangle on an OHP. Ask children to estimate the perimeter. Demonstrate, using a clear ruler, how to measure one of the sides of the rectangle accurately to the nearest half cm. <p>Q Was your estimate a sensible one?</p> <p>Q If I want to find the perimeter of this shape which sides do I need to measure and why?</p> <p>Establish that the width and length will be sufficient to calculate the perimeter.</p> <ul style="list-style-type: none"> Give the children Resource sheet 6.1. <p>Ask the children to estimate the perimeter first.</p> <p>The children then measure and then record the length of the sides.</p> <p>The children then calculate the perimeters in cm and mm.</p>	<ul style="list-style-type: none"> Hold up a card rectangle. Tell the children that the width is 6cm 5mm and the length is 8cm. Ask them to calculate the perimeter and explain their calculations. <p>Q If I know the perimeter is 30cm and the length is 10cm how can I calculate the width?</p> <p>Children to discuss in pairs and then feed back their responses.</p> <p>Children explain their different strategies for solving this problem.</p> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Find a short way to work out the perimeter of a rectangle; Estimate and then measure perimeters. <p>(Refer to supplement of examples, section 6, page 96.)</p>

Planning sheet	Day Two	Unit 6 <i>Perimeter, co-ordinates</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To measure / calculate the perimeter of rectangles.</p> <p>To derive doubles of whole numbers.</p> <p>VOCABULARY perimeter centimetre, cm</p> <p>RESOURCES Activity sheet 6.1</p>	<ul style="list-style-type: none"> Give each child Activity sheet 6.1 <p>Taking each rectangle in turn ask the children to trace around the edge of the shape with their fingers and estimate what the perimeter might be in cm. Take a variety of responses.</p> <p>Give the children a few minutes to measure the perimeter of the shape and then confirm the answer.</p> <ul style="list-style-type: none"> Ask the children to calculate quickly the perimeter of the following, explaining their methods; <ul style="list-style-type: none"> a square measuring 5cm × 5cm a rectangle measuring 10cm × 12cm a rectangle measuring 7cm × 9cm. 	<p>To record metres and centimetres using decimals, and other measurements using mixed units.</p> <p>To measure / calculate the perimeters of rectangles</p> <p>VOCABULARY perimeter centimetre, cm</p> <p>RESOURCES Rulers</p>	<ul style="list-style-type: none"> Discuss definitions, oblong and square. Ask children to give examples of differences and similarities between them. Establish that the set of rectangles is split into two distinct sets: squares and oblongs. <div>Q Given the perimeter of a square – for example 48 cm, is it possible to calculate the length of one of the sides?</div> <p>Children discuss in pairs, then take feedback and establish that by dividing the perimeter by 4 it is possible to calculate the length of one of the sides.</p> <div>Q If the perimeter of a square is 22cm what is the length of one of the sides?</div> <p>Children discuss in pairs, then take feedback and establish that in this case the side would be 5½ cm. Ask the children to convert this to cm and mm. (5cm 5mm)</p> <div>Q I have a rectangle with a perimeter of 24 cm. Each side is a whole number of cm. What might the length and width of the rectangle be?</div> <p>Take feedback for various sizes of rectangle e.g. 10cm × 2cm asking the children to explain their reasoning.</p> <div>Q Can you suggest a length and width for a rectangle with a perimeter of 24cm where the sides are not an exact number of cm?</div> <p>One possibility is 2½ cm × 9½ cm.</p> <ul style="list-style-type: none"> Give children the following problems to solve in pairs. <p>Squares have perimeters of:</p> <p>28cm 81cm 32cm 44cm</p> <p>What is the length of the side of each square?</p> Ask the children to draw different rectangles with a perimeter of 36cm and record the length of each side. 	<ul style="list-style-type: none"> Go through the solutions to the squares problems asking children to explain their methods. For a perimeter of 81cm the length of the side is 20¼cm. Convert this to cm and mm. Discuss the rectangle problem. <div>Q How many different rectangles are there with a perimeter of 36cm with the lengths being a whole number of cm?</div> <p>Establish that some of the possible dimensions are 1cm × 17cm, 2cm × 16cm, 3cm × 15cm, 4cm × 14cm, 6cm × 12cm and 9 × 9cm. Establish that 9 × 9cm is a rectangle that is also a square, all the others are oblongs.</p> <div> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Respond to questions such as ‘The perimeter of a square is 28 cm. What is the length of one side?’ <p>(Refer to supplement of examples, section 6, page 96.)</p> </div>

Planning sheet	Day Three	Unit 6 <i>Perimeter, co-ordinates</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To recognise positions on square grids with numbered lines.</p> <p>VOCABULARY origin co-ordinates horizontal vertical grid</p> <p>RESOURCES OHT 6.1 Resource sheet 6.3 OHP counters Counters for children Large dice (2) Dice</p>	<ul style="list-style-type: none"> Display OHT 6.1 and remind children that it can be used to show positions. Place a counter and reinforce the method for reading this as (4,5). Show the children how to record this point including the convention of using brackets. Demonstrate how to play the game of 3 in a row using the OHT, two different coloured counters and a pair of dice (large). Two children take it in turns to roll the dice. The first dice is the horizontal position and the second dice rolled is the vertical position. The child then places a counter of their colour on that point. The second child then rolls the dice and places their counter. Once a point has been covered it cannot be covered by another colour. The winner is the first child to place three counters in a row horizontally, vertically or diagonally. Children play the game in pairs using Resource sheet 6.2. 	<p>To recognise positions on square grids with numbered lines.</p> <p>VOCABULARY origin co-ordinates horizontal vertical grid</p> <p>RESOURCES OHT 6.1 Resource sheet 6.2 OHP counters Small counters Coloured pencils</p>	<ul style="list-style-type: none"> Continue using OHT 6.1. Remind children of the way in which co-ordinates are written using brackets with the numbers separated by a comma. Reinforce the order of recording co-ordinates. Demonstrate by placing an OHT counter at various co-ordinates emphasising that: the counter is placed at the intersection of the two lines; the first number is counted along the horizontal axis and the second number up the vertical axis. One way the children can remember this is 'you need to go into the house before you go upstairs'. Introduce the origin (0,0) and demonstrate several examples where one of the co-ordinates is 0. Ask children to plot several different co-ordinates using Resource sheet 6.2 and small counters. Check that they are placing their counters correctly on appropriate intersection. Place a counter on the OHT and ask the children to give you the co-ordinates of the point. Repeat with other points. Tell them you are thinking of a shape which is made by joining points on the grid. Ask the children to record the following points on their grids: (0,0), (4,0), (4,4) and (0,4). Ask them to identify the shape. Demonstrate on OHT 6.1, marking a point with a small cross and emphasising that it is the intersection of the lines that is marked. Explain that they will now do this with a partner. Ask them to take it in turns to draw a simple straight-sided shape and then give the co-ordinates to a partner. The partner should mark the points and then join them up. They should then compare their grids to see if they have drawn the same shapes. Recommend that they use a different coloured pencil for each new shape and that they should label each point with its co-ordinates so that if they make a mistake they will be able to identify this afterwards. 	<ul style="list-style-type: none"> Ask the children to close their eyes. Read the following co-ordinates out: (1,0), (5,0), (5,1) and (0,1). Ask if the children can imagine what the shape might look like. Ask them to draw it in the air. <div>Q How many corners does this shape have?</div> <div>Q Are its sides equal in length?</div> <ul style="list-style-type: none"> Use counters to plot the shape on OHT 6.1 to confirm the children's ideas. <div> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Describe and find the position of a point on a grid of squares where the lines are numbered; Begin to understand the convention that (3,2) describes a point found by starting from the origin (0,0) and moving three lines across and two lines up. <p>(Refer to supplement of examples, section 6, page 108.)</p> </div>





