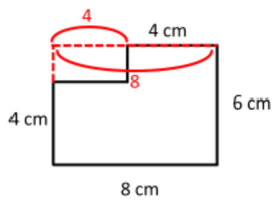
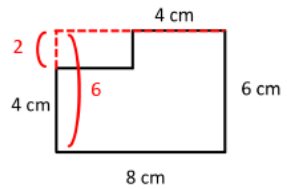
Year 5 Unit 5: Perimeter and Area (1 week)

Before you start…

- *Do pupils have a range of strategies for addition and multiplication?*
- *Can pupils find the perimeter of simple 2-D shapes?*
- *Are pupils familiar with counting squares on a grid to calculate the area of a rectangle?*

Video: *Calculating the perimeter of rectilinear shapes*

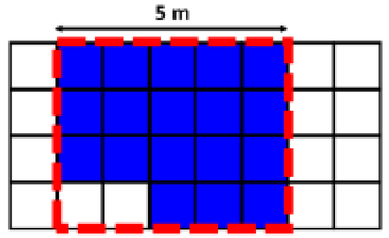


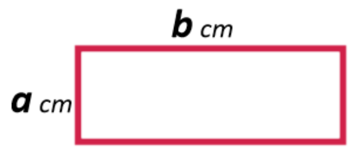


The terms 'length' and 'breadth' are used throughout this unit. Breadth may be used interchangeably with width. Be flexible with these terms – using rectangles in different orientations and labelling in different ways.

Area or perimeter?

Pupils can mix up the meaning of area and perimeter. Ensure understanding of the fact that length (perimeter) is a measure of something one dimensional and area is a measure of something two dimensional.





Video: *Calculating the area of rectilinear shapes*

Calculating perimeter

L1 Calculate and measure perimeter

Pupils review what perimeter is and find the perimeter of 2-D shapes, before moving on to composite rectilinear shapes. As there are different ways to calculate the perimeter of the same shape, pupils should explore and make connections between these. This provides an opportunity to consolidate mental calculation strategies.

? *What opportunities will you provide pupils to generalise about perimeter, such as using formulae or rules for the perimeter of regular shapes?*

Calculating area of composite rectilinear shapes

L2 Calculate the area of rectangles

L3 Calculate the area of rectilinear shapes

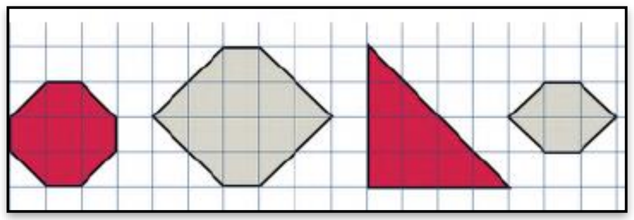
Pupils build on the work from Year 4 where area was introduced as a measure of surface and connected to multiplication and arrays. Encourage pupils to generalise this relationship and express that area = length x breadth. Building on this, pupils compare and contrast different strategies for calculating the area of composite rectilinear shapes. This includes partitioning the shape in different ways and finding the area of a larger rectangle and subtracting the missing section.

? *What opportunities will you provide for pupils to become flexible using different strategies?*

Rectilinear vs non-rectilinear

Rectilinear shapes are 2-D shapes made up of rectangles. Non rectilinear shapes are 2-D shapes that are not rectangles or made up of only rectangles. As the shapes are not made up of just rectangles, it is harder to calculate the area – shapes can cover half squares as well as whole squares.

Video: *Estimating and calculating the area of non-rectilinear shapes*



You may wish to adapt the examples in lesson 5, making them more meaningful and relevant to your pupils e.g. using online mapping tools of local parks, school grounds, a country etc.

The abstract notation cm^2 can be read as 'centimetres squared' and 'square centimetres' both of which are commonly used. Pupils need to know both and understand that they mean the same thing and can be used interchangeably.

Video: *Generalising about the perimeter of rectangles*

You may use a consolidation lesson to split this learning over more than one lesson for further opportunities to deepen understanding.

Investigating the relationship between area and perimeter

L4 Compare the area and perimeter of rectangles

Investigating the relationship between the value of the perimeter and area is interesting as pupils may feel that these should be related, but generally there is no direct relationship which may be something of a surprise. Pupils are encouraged to test out conjectures, look for patterns and find ways to work systematically. In this lesson, pupils are challenged to express the perimeter and area of a rectangle using algebraic notation.

? *Algebra is not explicitly part of the Year 5 curriculum. How could you take the opportunity to think about different ways to express the generalisations about perimeter and area in this investigation? Guidance is provided in a video.*

? *Pupils may believe that performing an operation on perimeter will always have a similar effect on area (e.g. if I double the area, the perimeter will also always double). How could you use this lesson's investigation to overcome this misconception?*

Calculating area of non-rectilinear shapes

L5 Calculate the area of non-rectilinear shapes

Provide pupils with opportunities to imagine and visualise rectangles within non-rectilinear shapes (e.g. a triangle). Pupils record the area of these rectangles and then count the remaining whole squares and then half squares in the shapes. Afterwards, pupils work with more challenging shapes with curved sides which involve more complex decisions when deciding on an estimate.

? *What opportunities will you provide for pupils to discuss their different strategies, making connections between them?*

? *Pupils may forget which squares they've already included in their calculations. How will you explicitly model strategies to keep track and therefore increase the accuracy of an estimation?*