Pupils should be taught to:	As outcomes, Year 1 pupils should, for example:
Describe and classify common 3-D and 2-D shapes according to their properties	Understand and use in practical contexts: *shape, pattern... flat, solid, hollow, side, edge, face, straight, curved, round, point, pointed, corner...* *sort... make, build, draw...* Use everyday language to name, sort and describe some features of familiar 3-D and 2-D shapes such as: *cube, cuboid, sphere, cone, cylinder...* *circle, triangle, rectangle, square...* For example: *3-D shapes* • Identify solid shapes in the classroom: for example, find a cuboid (a box) or a cylinder (baked bean tin)... • Sort 3-D shapes in different ways according to properties like: whether they have any corners; whether all their edges are straight; whether they are solid or hollow. • Using a collection of solid shapes, choose an example, and describe it. For example: *This shape has six faces, and each face is a rectangle.* *This shape has five faces – four are triangles and one is square.* *This cube has 12 edges...* • Recognise a solid shape placed in hands behind back and be able to name it by feeling. *2-D shapes* • Using a collection of flat shapes (thin plastic shapes, or shapes drawn or stuck on card): Choose own example, and describe it in everyday language. Choose an example to match properties described by the teacher or other children, and name it. For example, find and name a shape which: has four sides of the same length; is round; has three corners and three sides which can be different; has six points... has four corners and two short and two long sides... is not square... • Talk about the shapes and patterns in curtains, clothes, ornaments...

As outcomes, Year 2 pupils should, for example:

Understand, use and begin to read the vocabulary from the previous year, and extend to:
circular, triangular, rectangular...
surface...

Use mathematical vocabulary to name, classify and describe some features of 3-D and 2-D shapes, extending the shapes used to:
pyramid...
pentagon, hexagon, octagon...

For example:

3-D shapes

- Collect examples of cubes, cuboids, cylinders and spheres and match them to name labels.
- Sort 3-D shapes in different ways according to properties of their faces such as whether they:
  have six faces;
  have a triangular face, a rectangular face...
- Using a set of solid shapes, choose an example to match properties described by others.
  For example, find and name a shape with:
  one curved face, and two flat circular faces;
  eight corners and six square faces;
  one square face and four triangular faces...
- Ask 'yes' or 'no' questions about a hidden shape in order to identify it. For example:
  'Does it have a curved face?'

2-D shapes

- Using a collection of flat shapes (thin plastic shapes, paper shapes, shapes drawn on paper):

  Choose own example, name and describe it.

  Choose an example to match properties described by the teacher or other children.
  For example, find and name a shape which:
  has one curved edge;
  has five corners and five sides;
  has four straight equal sides;
  has four square corners but sides that are not all equal...
  is not rectangular...

- Sort a set of flat shapes according to properties such as:
  the numbers of corners;
  the number of sides;
  whether the sides are straight or curved.

As outcomes, Year 3 pupils should, for example:

Use, read and begin to write the vocabulary from the previous year, and extend to:
pentagonal, hexagonal, octagonal...
right-angled... vertex, vertices... layer...
diagram...

Name, classify and describe some properties of 3-D and 2-D shapes, extending the shapes used to:
prism, hemi-sphere...
quadrilateral, semi-circle...

For example:

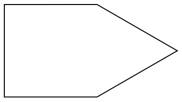
3-D shapes

- Know that a prism has the same cross-section along its length, and that its two end faces are identical.
- Collect examples of prisms and cylinders and match them to name labels.
- Sort 3-D shapes in different ways according to properties such as:
  whether or not they are prisms;
  the numbers of faces, edges or vertices...
- Name and describe solids. For example:
  A triangular prism has two identical triangular faces at opposite ends, and all the other faces are rectangles.
  A hemi-sphere is a sphere cut in half, and its flat face is circular...

2-D shapes

- Know that a quadrilateral is any flat shape with four straight sides.
- Using a collection of flat shapes, choose an example to match properties described by others.

  For example, find and name a shape which:
  is half of a circle;
  is not a right-angled triangle;
  has eight sides and eight vertices;
  has four right angles and opposite sides equal;
  has five equal sides and two right angles...



- Sort a set of flat shapes. Display them on a Venn or Carroll diagram according to properties such as:
  the numbers of vertices or sides;
  whether the sides are the same length;
  whether or not at least one angle is a right angle;
  whether or not a shape has a line of symmetry.

Pupils should be taught to:

Make models, shapes and patterns with increasing accuracy, and describe their features

As outcomes, Year 1 pupils should, for example:

Make models, shapes and patterns with increasing accuracy, and describe their features. For example:

3-D shapes

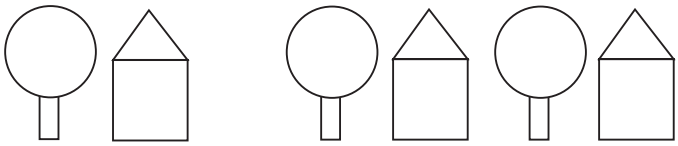
- Make models or patterns using 3-D shapes such as:
  construction kits such as Lego or Duplo;
  everyday materials (packets, rolls, containers...);
  malleable material such as cold clay or Plasticine...

  Describe the model or pattern and say which shapes have been used to make it. For example:
  The top of this tree is a sphere and its trunk is a cylinder.
  This house is made from a cube and its roof is a pyramid...

- Begin to relate 3-D shapes to pictures of them. For example:
  match familiar solids to their pictures;
  use bricks to build models from pictures.

2-D shapes

- Make pictures and patterns using 2-D shapes such as:
  straws and pipe cleaners;
  thin plastic shapes;
  pre-cut sticky shapes;
  stamping or printing shapes...



  Describe the picture or pattern and say which shapes have been used to make it. For example:
  This tree is made from a rectangle and a circle.
  This house is made from a square and a triangle.
  This pattern is made from a tree and a house repeating.

- Make halves of paper shapes by folding them.
  Make them into symmetrical patterns: for example, by cutting out small pieces or by ink blot painting...

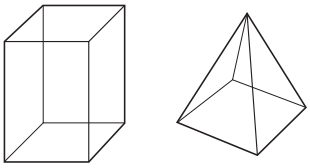
As outcomes, Year 2 pupils should, for example:

Make models, shapes and patterns with increasing accuracy, and describe their features. For example:

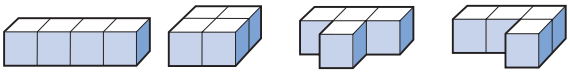
3-D shapes

- Build models out of 3-D shapes and record the shapes used. For example:
  My model was made with 7 cuboids, 10 cubes, 6 cylinders and 1 cone.

- Make a skeleton shape from a construction kit or straws, and count the number of edges or corners.

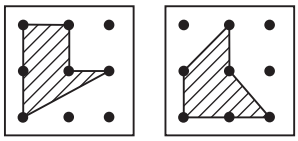


- Relate 3-D shapes to pictures of them.
  For example:
  match familiar solids to their pictures;
  use cubes to make 'single-layered' solids from pictures.



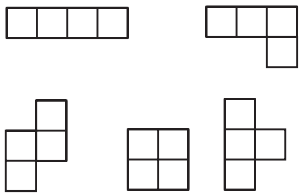
2-D shapes

- Use 2-D shapes to make and describe pictures and patterns:
  by drawing round them;
  using squared paper;
  using pinboard and elastic bands;



pentagons

  by combining four squares to make new shapes, then counting the number of edges...



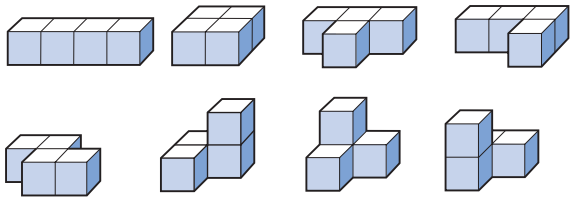
- Use a programmable robot to draw lines, squares and rectangles.

As outcomes, Year 3 pupils should, for example:

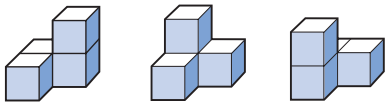
Make models, shapes and patterns with increasing accuracy, and describe their features. For example:

3-D shapes

- Recognise that two or more shapes can be put together in different ways to make new shapes. For example, find all the different shapes that can be made by fitting four cubes together face to face.

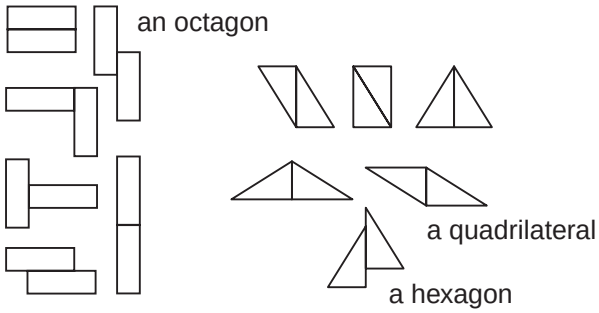


- Relate 3-D shapes to pictures of them.
  For example:
  match familiar solids to their pictures;
  use cubes to build 'double-layered' solids from pictures.

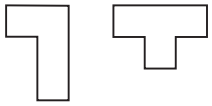


2-D shapes

- Use 2-D shapes to make and describe pictures and patterns:
  by drawing round and cutting out a shape on thin card and using it as a template to make a pattern;
  by folding and cutting paper to make squares, octagons and stars;
  using geo-strips;
  by putting two identical shapes together, then naming the new shapes...



- Use a programmable robot to draw rectilinear shapes such as:



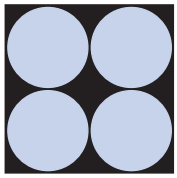
Pupils should be taught to:	As outcomes, Year 1 pupils should, for example:
Recognise line symmetry in simple cases	

As outcomes, Year 2 pupils should, for example:

Understand, use and begin to read:
line of symmetry...
fold, match, mirror line, reflection, symmetrical...

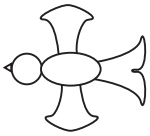
Begin to recognise and sketch a line of symmetry.
For example:

- Use toy kaleidoscopes, mirrors, shiny surfaces... to make and describe reflections.
- Make, talk about and describe symmetrical patterns using paint, ink blots, pegboard, gummed shapes on squared paper, interlocking cubes, laying out thin plastic shapes or coloured blocks...

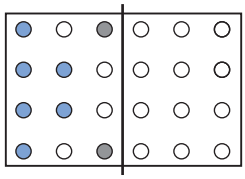


- Recognise and sketch a line of symmetry: for example, in pictures of insects, road signs, flags... testing where appropriate with a mirror.

  For example, draw a line of symmetry:



- Complete a symmetrical pattern by drawing or making the other 'half': for example, using a pegboard.



As outcomes, Year 3 pupils should, for example:

Use, read and begin to write the vocabulary from the previous year.

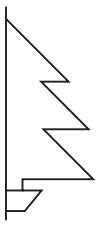
Recognise and sketch more than one line of symmetry.
For example:

- Find examples of patterns, capital letters, logos, road signs... with more than one line of symmetry.
- Make patterns with two lines of symmetry at right angles by folding and cutting paper.
- Recognise shapes with no lines of symmetry.

- Recognise and sketch two lines of symmetry: for example, in diagrams of flags or shapes... testing where appropriate with a mirror.

  Draw two lines of symmetry:

- Sketch the reflection of a simple 2-D shape in a mirror line along one edge, using a mirror to help complete it.



Pupils should be taught to:	As outcomes, Year 1 pupils should, for example:
Describe positions and directions	Understand and use in practical contexts: *position, over, under, underneath, above, below, on, in, outside, inside, in front, behind, beside, before, after, next to, opposite, between... close, far, apart...* *middle, centre, edge, corner, top, bottom, side...* *direction, left, right, up, down, forwards, backwards, sideways, across, along, around, through, to, from, towards, away from...* *journey...* Use everyday language to **describe positions**. For example: • In PE, stand in front of, behind, beside, opposite a partner... or between two others... • Describe how the furniture is arranged in the doll's house; put a chair in front of the TV, a stool under the table, the cooker beside the fridge... • In the classroom, name an object which is above the door, behind the desk, between the window and the sink... • Describe where an object is on a large sheet of paper: for example, near the middle, at the edge, at the top... • Describe the position of an object in a picture or on a magnetic board relative to another object: for example, the house is below the aeroplane, the window is above the door... Use everyday language to **describe directions**. For example: • In PE, follow and give instructions to move in particular directions: climb upwards, downwards, towards, away from, across, along, through... turn to the left or right... move forwards, backwards or sideways... face towards the door, away from the window... • Talk about a journey: for example, how to go home from school, how to follow a track painted on the playground... • Devise instructions to make a floor robot reach a particular place.

As outcomes, Year 2 pupils should, for example:

Understand, use and begin to read the vocabulary from the previous year, and extend to:
higher, lower...
clockwise, anti-clockwise...
route...

Describe positions. For example:

- Respond to oral or written questions or instructions by describing, placing, ticking or drawing objects which are in a position:
  higher than, lower than, next to, below, further away from, on the edge of, at the corner of...
  a given object.

  For instance, describe the position of a feature on a simple map in different ways.

- Use squared paper and a counter to move from a square near the centre of the paper to a square near the edge, describing the route as three squares along and two squares down, or three squares to the left and two squares up...

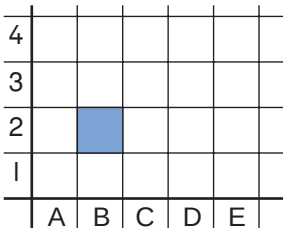
Describe directions. For example:

- In PE, move clockwise, anti-clockwise, face inwards, face outwards...
- Give instructions for someone else to follow to find a route through a simple maze drawn on squared paper.
- Devise instructions to make a floor robot navigate a floor plan or maze in which all the paths are at right angles to each other and some are dead ends.

As outcomes, Year 3 pupils should, for example:

Use, read and begin to write the vocabulary from the previous year, and extend to:
grid, row, column... map, plan...
compass point, north, south, east, west...
horizontal, vertical, diagonal...
descend, ascend...

Describe and find the position of a square on a grid of squares with the rows and columns labelled.
For example:

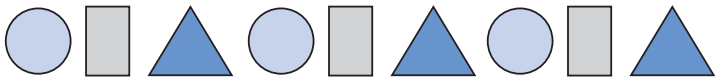


Square B2 is shaded

- Play Noughts and Crosses, telling the other player where to put a mark, or games like Battleships or Treasure Hunt.
- In geography, make and use simple maps or plans on squared paper and describe the position of a feature.

Describe directions. For example:

- In geography, recognise the four compass directions N, S, E, W.
- Use squared paper and a counter to move, for example, from A3 to C1, describing the route as two squares east and two squares south...
- Give instructions for a floor robot to navigate a route, based on instructions such as 'Go north 12, west 7...' or 'Go forward 6, turn a right angle anti-clockwise, backward 8...'
- Tell a story which must include key words such as *north, ascend, clockwise, left, horizontal...*

Pupils should be taught to:	As outcomes, Year 1 pupils should, for example:
Describe movements (in a straight line and turning), and understand angle as a measure of turn	Understand and use in practical contexts: *slide, roll, turn...* *whole, half...* Recognise and talk about movements. For example: • In PE, slide down the bench, roll over on the mat, turn towards the windows, move in a straight line, move in a circle, turn on the spot... • Talk about things that turn about a point, such as a spinning top, taps, windmill arms, wheels, the hands of a clock, turnstiles, the blades of scissors... • Talk about things that turn about a line, such as a door, the pages of a book, a hinged lid... • Find and sort objects that will: roll (a ball, an orange, a wooden egg, a sphere); slide (a book, a cuboid box, a cube, a pyramid); both roll and slide (a cotton reel, a coin, a tin of soup, a cone, a cylinder)... • In technology, make things that turn, such as a simple clock with hands, a simple windmill... • Recognise whole turns and half turns. For example: In PE, make 2 whole turns to your left, make a half turn to your right... Move the windmill sails through 2 whole turns; Move the minute hand of the clock through one whole turn, through half a turn, and talk about times like 'half past three'... • Talk about and make repeating patterns using a variety of media, describing what is happening. For example:  *There are 3 shapes in this pattern... a circle, rectangle and triangle, then another circle, rectangle and triangle...*

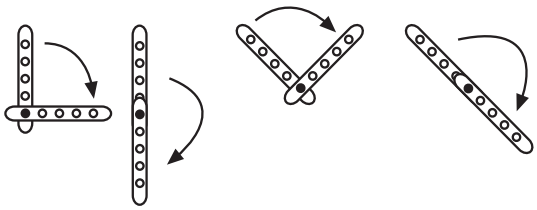
As outcomes, Year 2 pupils should, for example:

Understand, use and begin to read the vocabulary from the previous year, and extend to:
quarter turn...
right angle, straight line...

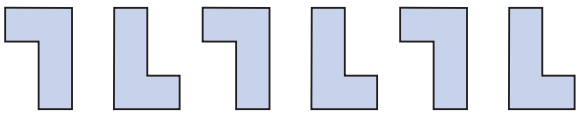
Recognise whole, half and quarter turns.
Know that a quarter turn is called a right angle.

For example:

- In PE, turn on the spot, turn through whole, half or quarter turns, either clockwise or anti-clockwise...
- In the classroom, recognise that the corners of doors, windows, books, tables... are right angles.
- Recognise that a square and a rectangle have right angles at each corner/vertex.
- Use two geo-strips to make and draw half and quarter turns from the same starting position.



- Talk about and make repeating patterns, describing what is happening. For example:



In this pattern the L-shape slides along and turns through half a turn...

As outcomes, Year 3 pupils should, for example:

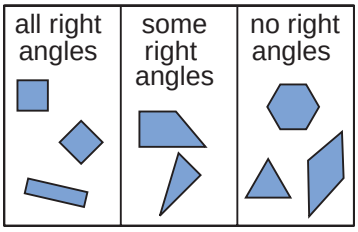
Use, read and begin to write the vocabulary from the previous year, and extend to:
angle ... is a greater/smaller angle than ...

Recognise whole, half and quarter turns.
Know that a quarter turn is called a right angle and that a straight line is two right angles.

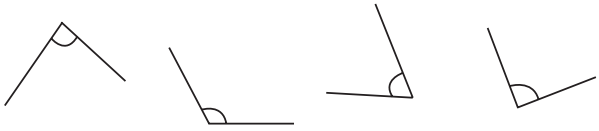
For example:

- In PE, follow instructions such as face west, turn clockwise through one right angle...

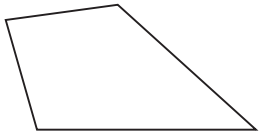
  Know that after turning through half a turn, or two quarter turns in the same direction, you are facing the opposite direction.
- Sort 2-D shapes according to whether they have all, some or no right angles...



- Fold paper to make a right angle. Use it to find right angles in the classroom.
- Use a template to draw and measure right angles. For example, decide which of these angles are greater than a right angle and which are less than a right angle.



- In this shape, mark:
  the smallest angle with the letter S;
  the largest angle with the letter L.



- Use a tiling computer program to create a pattern which is repeated along a line. Reflect the tile in one axis, and describe how the pattern changes.