3-D shape orientation and size

National Curriculum attainment target

• Recognise and name common 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

Le s son objective

• Recognise and name common 3-D shapes (cuboids, cubes, pyramids, spheres, cylinders and cones) in different orientations and sizes

Previous related lesson

Unit 5, Week 3, Lesson 1

Prerequisites for learning

Pupils need to:

• use everyday language to describe 3-D shapes

• relate simple physical 3-D shapes to drawings of the same shapes

• match 3-D shape names to physical 3-D shapes

• match 3-D shape names to drawings of 3-D shapes

**Vocabulary**

cuboid, cube, pyramid, sphere, cylinder, cone

Future related lessons

Unit 5, Week 3, Lessons 3 and 4

Success criteria

Pupils can:

• use everyday language to describe 3-D shapes of varying sizes and in different orientations

• relate simple physical 3-D shapes to drawings of the same shapes in various sizes and orientations

• match 3-D shape names to physical 3-D shapes in various sizes and orientations

• match 3-D shape names to drawings of 3-D
shapes in various sizes and orientations

Getting Started

• Choose an activity from Geometry – Properties of shapes.

**Year 1, Unit 5, Week 3**

Teach

Resources

child-size 3-D shapes – cuboid, cube, pyramid, sphere, cylinder, cone (per child); Resource 37: 3-D shapes and names (per child) (optional)

• Display: Slide 1 showing a sphere.

• Click to rotate the sphere.

• Ask: **What shape is this?** (a sphere)

• Ask: **How do you know?** (it is curved in every direction)

• Click to make the sphere larger.

• Ask: **What has changed?** (the size; the sphere has got bigger)

• Ask: **What shape is it now?** (still a sphere)

• Ask: **How do you know?** (it is still curved in every direction)

• Display: Slide 2 showing a cuboid.

• Repeat the questioning for the cuboid, but this time click to make the shape smaller rather than bigger.

• Display: Slides 3–6. Repeat for a cylinder, cone, cube and pyramid, click to make them smaller and larger. Emphasise that, while the size of each shape changes, the type of shape does not.

• Display: Slide 7 showing the pyramid. Click to rotate it to a different position.

• Ask: **What has happened to the pyramid?** (it has turned)

Introduce or remind children (from

Unit 1, Week 3, Lesson 2) of the word ‘orientation’. Explain that it describes the direction of a shape; when we turn a shape we can say that its orientation has changed.

• Ask: **What shape is it now?** (still a pyramid)

• Ask: **What features of 3-D shapes might change, without
changing the shape name?** (size and orientation, or direction)

• Give children a 3-D shape each.

• Encourage them to rotate their shape in different directions and
watch how its appearance changes, before swapping with a
partner to repeat this with a different shape.

• Repeat until children have had a go at rotating all the shapes.

Individualised Learning

**Activity Book 1B:** – Page 11: 3-D shapes

Resources: six different-coloured pencils (per child)

**Progress Guide 1:** – Extension, Year 1, Unit 5, Week 3, Lesson 2: 3-D shapes and 2-D shapes

Resources: child-size 3-D shapes – cuboid, cube, pyramid, sphere, cylinder, cone (per child)

Refer to Activities 1 and 2 from the
Learning activities on page 234.

Plenary

Resources

child-size 3-D shapes – cuboid (ideally with two square faces), cube, pyramid, sphere, cylinder,
cone (per pair); large 3-D shapes – cuboid (ideally with two square faces), cube, pyramid, sphere,
cylinder, cone (per class); something to hide the large shapes in or behind, e.g. a bag, board, door
or screen (per class); Resource 37: 3-D shapes and names (per child, optional)

• Give each pair of children six 3-D shapes (cuboid, cube, pyramid, sphere, cylinder, cone).

• Say: **I’m going to reveal a shape slowly. Decide which shape or shapes it could be and hold them up.**

• Reveal a small part of a sphere. Observe children’s shape choices, and any who have chosen more than one possible shape.

• Ask: **Why do you think it could be either/any of those shapes?**

• Discuss children’s ideas and suggestions.

• Turn to children who have chosen only a sphere.

• Ask: **Why do you think it can only be that shape?** Discuss their ideas and suggestions.

• Say: **Those are very interesting answers. Let’s see what you all think when you see more of the shape.**

• Gradually reveal more of the shape. Children should realise that it must be a sphere. Stop just before you reveal the entire shape.

• Ask: **What shape is it?**

• Repeat the activity with a cuboid, using the orientation shown and revealing it from the base up.

• Question children who have chosen different shapes or combinations of shapes to obtain their views.

As you reveal more

of the cuboid, encourage

children to think

about the edges

revealed to help

them distinguish

between the

cuboid and a cube

or pyramid. (The

pyramid should

be ruled out fairly

quickly.)

• Gradually reveal more of the cuboid.

• Reveal more of the shape until children have realised that it is either a cube or a cuboid.

• Ask: **How will you know whether this is a cube or a cuboid?** (it is a cube if the shape seen face on becomes a square; a cuboid if it becomes a rectangle)

• Repeat the activity with the other 3-D shapes in turn, revealing a small amount to begin with and inviting children to show the shapes they think it could be and give reasons for their choices. Continue gradually to reveal the shape until children have all worked out what it is.

• Ask: **How did you know it must be a cone/cylinder/cube/pyramid?**

• Say: **We know that a square is a special
type of rectangle. What shape do you
think a cube is a special type of?** (cuboid)
**Why?** (it’s made up of only squares, rather
than squares and rectangles)

**Homework Guide 1**

Year 1, Unit 5, Week 3, Lesson 2:

Odd shape out

Overcoming Barriers

• Children may not be familiar with all six shape names, or may refer to shapes by the name of a familiar object the same shape, e.g. ‘ball’ for a sphere or ‘dice’ for a cube. To help them learn the mathematical names, some children may find it useful to have a copy of Resource 37: 3-D shapes and names, which shows each shape labelled with its name.