Shapes within shapes

National Curriculum attainment target

• Identify 2-D shapes on the surface of 3-D shapes [for example, a circle on a cylinder and a triangle on a pyramid]

Lesson objective

• Identify 2-D shapes on the surface of 3-D shapes

Previous related lessons

Unit 1, Week 3, Lessons 1–4; Unit 5, Week 3, Lesson 2

Prerequisites for learning

Pupils need to:

• use everyday language to describe 3-D shapes

• understand the terms face, edge and vertex

• identify common 2-D shapes

**Vocabulary**

edge, vertex, vertices, face, surface

Future related lessons

Unit 5, Week 3, Lessons 3 & 4

Success criteria

Pupils can:

• identify 2-D shapes

• identify a face, edge and vertex on a given 3-D shape

• recognise that many faces of 3-D shapes are 2-D shapes

• read and write names for shapes



Getting Started

Choose an activity from Geometry – Properties of shapes.

**Year 2, Unit 5, Week 3**

Teach

Resources

set of 3-D shapes (cube, cuboid, cylinder, cone, sphere, pyramid) (per pair/group), set of large 3-D shapes (cube, cuboid, cylinder, cone, sphere, pyramid) (per class)

• Say: **Today we will be looking more closely at the faces of 3-D shapes.**

• Say: **Describe to your partner what the face, edge and vertices of a shape are. You can use your own shapes to demonstrate.** Establish that a face of a shape is like the surface of the shape.

• Display: Slide 1 and say: **We are going to look through our shape telescope and see if we can guess which shapes are up in the sky.**

• Start with the top left shape (cuboid). Click to reveal an edge and ask: **Is this a curved edge or a straight edge?** (straight) Continue moving around the shape and clicking each side of the square face.

• Ask: **What 2-D shape is this?** (square because all four sides are the same length)

• Ask**: What shape could this be?** Say: **Put the possible shapes from your set in front of the others** (cube or cuboid) **Look at your shapes.** Ask: **What else do we need to find out to tell the difference between a cube and a cuboid?** (the shape of all the faces, to see if they are all square shaped or if some are rectangular)

• Move around the shape slowly revealing that some of the faces are rectangular, so it cannot be a cube. Click to reveal the full shape.

Children may

want to use

their sphere but remind them that a sphere is a very special shape with one curved face that is not actually circular.

• Say: **Tell your partner what the shape is and how you know.** (a cuboid, as some of the faces are rectangular, with two long edges and two shorter edges; it cannot be a cube as a cube’s faces are all square)

• Say: **The 2-D shapes we see on the surface of 3-D shapes are really important. They are another ’property’ of that shape and help us work out what the 3-D shape’s name is.**

• Start to reveal the next shape on the right (cylinder). Ask**: Does this shape have a curved edge or straight edge?** (curved) Continue to reveal this face so that the class can see there is a circular face.

• Ask: **What shapes do we know that have circular faces? Say: Put the possible shapes from your set in front of the others.** (cylinder and cone)

• Continue to reveal the cylinder and say: **This part of the shape is not getting narrower; it is staying the same height.** Ask: **What is at the end of this shape: a point or another circular face?** (circular face)

Slides 1–3 can also be revisited

 during Plenary if necessary.

• Click to reveal the full shape as a cylinder.

• Say: **We can see that there are two circles on the end surfaces or faces of the cylinder.** Ask: **Can you picture what shape the middle curved face would have if we unrolled it?** (rectangle)

• Display: Slide 2 and show children that if a cylinder’s curved face is unrolled it is rectangular.

Explain to children that

there are pyramids with square bases like this one, but that there are also pyramids with triangular bases.

Explain to children that another name for a cylinder is a circular prism, and if you change the

shape at the ‘ends’ of a cylinder to a triangle/pentagon/hexagon/octagon you would have

a triangular/pentagonal/hexagonal/octagonal prism. Display the Nets tool for examples of triangular,

pentagonal and hexagonal prisms if it is appropriate to explore this further with the class.

• Display: Slide 3. Repeat the above process for a pyramid (square-based).

Individualised Learning

**Activity Book 2B:** – Page 11: Matching faces to 3-D shapes

**Progress Guide 2:** – Extension, Year 2, Unit 5, Week 3, Lesson 2:

Investigating 3-D shapes

Resources: 3-D shapes – semi-circular prism, cylinder, cone, sphere, cuboid, square-based pyramid, triangle-based pyramid, pentagonal prism (per group) (optional)

Refer to Activity 2 from the
Learning activities on page 246.

Plenary

There are 15 cards on the

resource sheet so you may need two or three copies. Alternatively, give some children real 3-D shapes.

**Resources**

Resource 76: 2-D and 3-D shape cards (per pupil); set of 3-D shapes (cube, cuboid, cylinder, cone, sphere, pyramid) (optional)

• Say: **We are going to split into two groups: 2-D shapes and 3-D shapes.** Give each pupil a 2-D or 3-D shape card from Resource 76: 2-D and 3-D shape cards.

• Say: **3-D shapes, you have to find all the 2-D shapes that fit on your surface. 2-D shapes, you have to find a 3-D shape you can fit onto.**

• Encourage the 3-D shapes to hold out their shape card so it is clearly visible.

• Once everyone has a place, ask children to sit down in their new configurations.

• Go around each new group and ask**: Do you have all the faces to make the 3-D shape in your group or do you need more/less shapes?** For example, if a child holding a cylinder card has joined up with a child holding a circle card, they will need another circle and a rectangle.

• Ask: **Why does the sphere not have any 2-D shapes in their group?** (because the sphere does not have any common 2-D shapes on its surface)

• Ask**: What else does the cone need?** (the cone should only have the circle in its group as the other face is not a common 2-D shape)

Overcoming Barriers

• Children may need support visualising all the faces on the 3-D shapes so a lot of exposure to real 3-D shapes can be beneficial.