

# Reasoning and Problem Solving

## Step 10: Construct 3D Shapes

### Teaching Note:

We recommend using modelling materials to help children's understanding of constructing 3D shapes.

### National Curriculum Objectives:

Mathematics Year 3: (3G3b) [Make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them](#)

### Differentiation:

Questions 1, 4 and 7 (Problem Solving)

**Developing** Given the resources needed to create a 3D shape, children find the single correct answer. Shapes include cylinders, cuboids, cones and pyramids.

**Expected** Given resources to create a number of 3D shapes, children find 2 correct answers. Shapes include cubes, cuboids, cylinders, cones, triangular and square based pyramids and triangular prisms.

**Greater Depth** Given resources which will have spare items when a number of 3D shapes are created, children find all possible correct answers. Shapes include cylinders, cuboids, cones, pyramids, and prisms including more complex pyramids and prisms.

Questions 2, 5 and 8 (Reasoning)

**Developing** A simple clear statement given, children decide if true sometimes, always or never and give reasoning to support their answer. Shapes as in Q1.

**Expected** A clear statement given, children decide if true sometimes, always or never, and give reasoning to support their answer. Shapes as in Q4.

**Greater Depth** A complex statement given, children decide if true sometimes, always or never, and give reasoning to support their answer. Shapes as in Q7.

Questions 3, 6 and 9 (Problem Solving)

**Developing** Partial net of a 3D shape given. Children find the one missing shape. Shapes as in Q1.

**Expected** Partial net of a 3D shape given. Children find the 2 or 3 missing shapes. Shapes as in Q4.

**Greater Depth** Partial net of a 3D shape given. Children find the missing shapes. Shapes as in Q7.

More [Year 3 and Year 4 Properties of Shapes](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

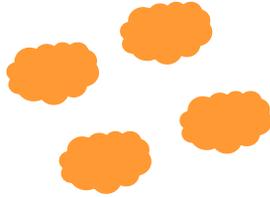
# Construct 3D Shapes

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1a. You have the following resources:

Straws (6)

Playdough balls (4)



Which 3D shape can you make?

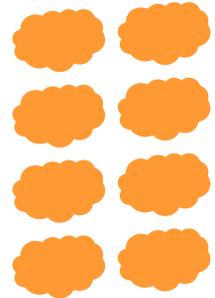
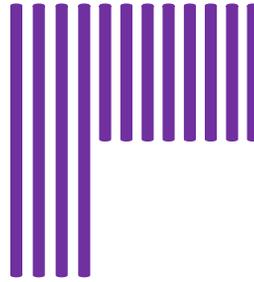


3 PS

1b. You have the following resources:

Straws (12)

Playdough balls (8)



Which 3D shape can you make?



3 PS

2a. Read the following statement:

All pyramids have only one vertex.

Is it sometimes, always or never true?

How do you know?



3 R

2b. Read the following statement:

Pyramids only have triangular faces.

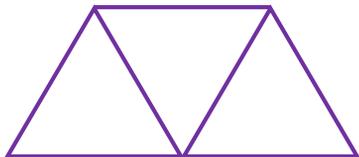
Is it sometimes, always or never true?

How do you know?



3 R

3a. Complete the net below to make a pyramid.



3 PS

3b. Complete the net below to make a cuboid.

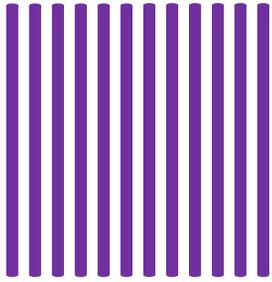


3 PS

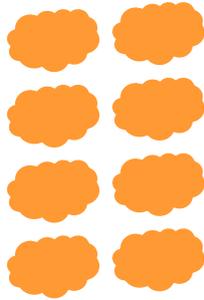
## Construct 3D Shapes

4a. You have the following resources:

Straws (12)



Playdough balls (8)



Name two 3D shapes you could make.

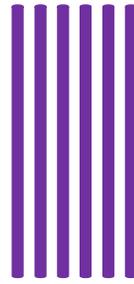


3 PS

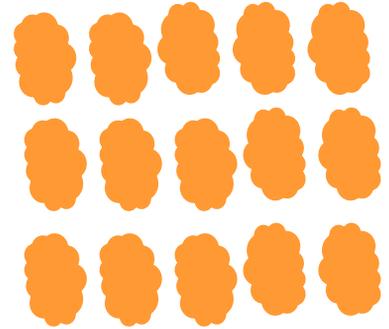
## Construct 3D Shapes

4b. You have the following resources:

Straws (6)



Playdough balls (15)



Name two 3D shapes you could make.



3 PS

5a. Read the following statement:

Prisms have rectangular faces.

Is it sometimes, always or never true?

How do you know?



3 R

5b. Read the following statement:

3D shapes with a circular face will also have a curved surface.

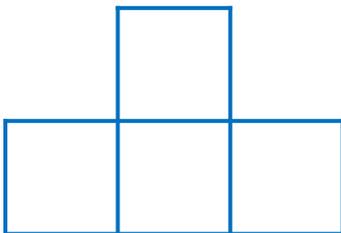
Is it sometimes, always or never true?

How do you know?



3 R

6a. Complete the net below to make a cube.



3 PS

6b. Complete the net below to make a triangular prism.



3 PS

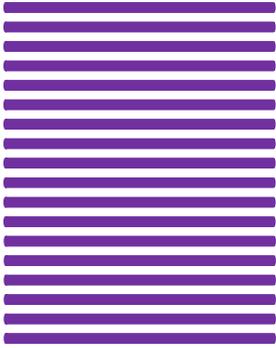
# Construct 3D Shapes

# Construct 3D Shapes

7a. You have the following resources:

Straws (18)

Playdough balls (5)



Name all the 3D shapes you could make.

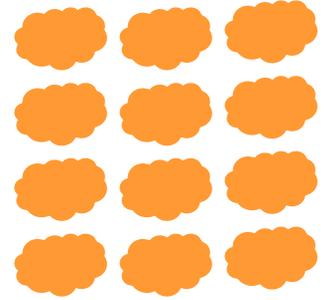
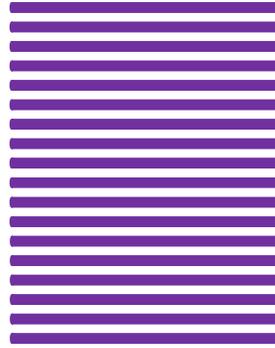


3 PS

7b. You have the following resources:

Straws (18)

Playdough balls (12)



Name all the 3D shapes you could make.



3 PS

8a. Read the following statement:

A prism has 3 times as many edges as the number of vertices on the base or top face.

Is it sometimes, always or never true?

How do you know?



3 R

8b. Read the following statement:

The number of vertices on a pyramid is calculated by taking the number of corners on the shape of the base and adding 1.

Is it sometimes, always or never true?

How do you know?



3 R

9a. Complete the net below to make a pyramid.



What other 3D nets can you make from this shape?



3 PS

9b. Complete the net below to make a prism.



What other 3D nets can you make from this shape?



3 PS

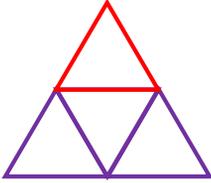
## Reasoning and Problem Solving Construct 3D Shapes

### Developing

1a. **Triangular based pyramid**

2a. **Never true. Pyramids need a base shape which, when the triangular faces are added, create one vertex on each corner of the base, and another at the top where all the triangles meet.**

3a.

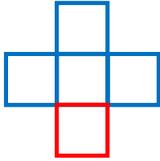


### Expected

4a. **Various possible answers, for example: cube, triangular prism, triangular pyramid, square based pyramid**

5a. **Always true. Prisms have rectangular faces which connect the base and top of the prism.**

6a. **Various possible answers, for example:**

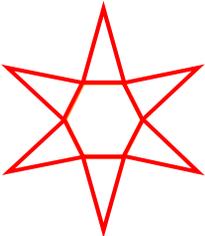


### Greater Depth

7a. **Various possible answers, for example: Triangular pyramid, square based pyramid**

8a. **Always true. Each side of the 2D base and top face creates an edge, which is twice as many. The base and top shape are then connected by rectangular faces which adds an extra edge between the two vertices, so this is 3 times as many.**

9a.



**Other 3D net: hexagonal prism**

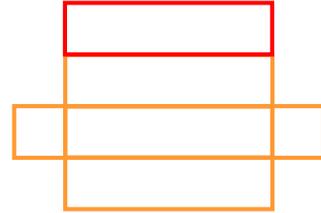
## Reasoning and Problem Solving Construct 3D Shapes

### Developing

1b. **Cuboid**

2b. **Sometimes. A triangular based pyramid only has triangular faces, whereas a square based pyramid is made up of 4 triangular faces and 1 square face.**

3b.

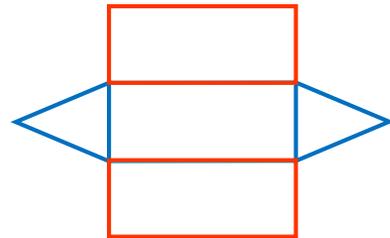


### Expected

4b. **Various possible answers, for example: triangular pyramid, square based pyramid**

5b. **Always true. As the 3D shape has a circular face, the attached surface must be curved.**

6b. **Various possible answers, for example:**

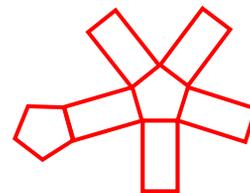


### Greater Depth

7b. **Various possible answers, for example: hexagonal prism, pentagonal based pyramid, cube, cuboid, triangular prism**

8b. **Always true. The base shape creates a vertex at each corner as the triangular faces are joined and one more where the triangular faces meet. So each corner of the base plus one is the number of vertices in the pyramid.**

9b.



**Other 3D net: pentagonal pyramid**