# 3D Objects

2.3.8

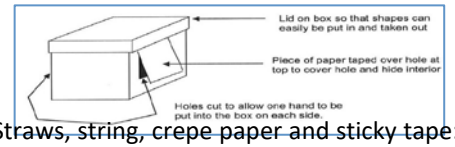
Word Wall: *object, guess, attribute, how many…, cone, sphere, cube, prism, cylinder, cone*

## *Introduction*

Students will describe the features of three---dimensional objects, draw them and use materials to make models of these.

**Resources**

- 3D objects: sphere, cube, prism, cylinder, cone.
- Mystery Box – Cardboard box about 25x25x35cm with a lid. Cut holes in each side (leaving a flap) as in the diagram




•Straws, string, crepe paper and sticky tape: to construct models of 3D objects

**Time / Classroom Organisation**

Each activity process may be introduced in a small or whole group context. Allow 15---20 minutes for each part of this activity. Use every opportunity to identify and describe the properties of 3D objects in the environment.

**Australian Curriculum---Year level Two** Describe the features of three-dimensional objects (ACMMG043)

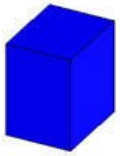
Proficiency Strand:

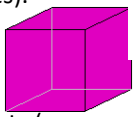
*Problem Solving* – making models

## *Activity Process---Sorting and Constructing 3D Objects.*

1. Hold up a cube and review the properties. Use the terms 'faces'; 'edges' and 'corners' / 'vertices' e.g. *a cube has 6 faces, 12 edges and 8 corners/vertices.*

2. Hold up a rectangular prism. Compare and contrast the cube and the rectangular prism. Ask: *What is the same about these two objects* (both have 6 faces, 12 edges and 8 corners/vertices). *What is different about these objects* (Length of edges).





3. Give each pair of students two 3D objects (e.g. a pyramid and a cone) to discuss similarities and differences. Ask students to record what is the same and what is different.

**Same**

**These shapes both come to a point at the top**

**They both have a flat base**

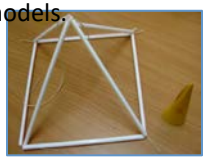
**Different**

**The cone is curved and the pyramid has all flat faces.**

4. Ask students to have a go at constructing the objects using straws, string, paper, and sticky tape

5. Discuss the properties in the whole group – display the properties and the models.

*Source: Marj Horne, ACU.2010.*



## *Activity Process – Mystery Box*

1. Use 3D objects including triangular prisms, rectangular prisms, cubes, cylinders, sphere, pyramid. Have one full set on display.
2. Select one 3D object to secretly place In the mystery box. Replace the lid.
3. Select a student to pick up the shape in the box and describe it without revealing the name of the object.
4. Support the student in using geometric language in his/her description by prompting. *Could you tell us how many faces it has? Number of corners/vertices? Straight or curved sides?*
5. When students have guessed the name of the shape, and selected this shape from the display, the student reveals the shape in the box.
6. Reflect on the types of questions which were most helpful in enabling the students to see the shape in their minds? Were there any problems with interpretation where the listener had a different understanding of the words used?
7. The box then passes to the next student with a new 3D object inside.

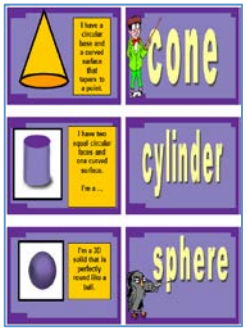
*Source: Marj Horne, ACU.2010.*

## *Variations & Extensions*

**1. 3D Object Concentration**

Resources: Game Cards

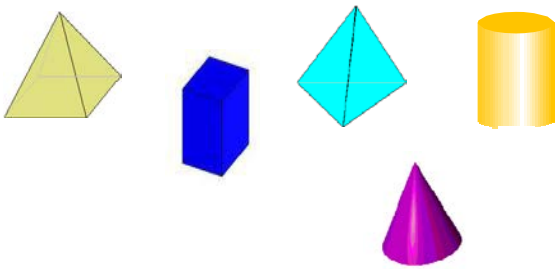
This game matches common 3D objects. This game is available for download at www.adrianbruce.com




**2. Shape Heads (Celebrity Heads)**

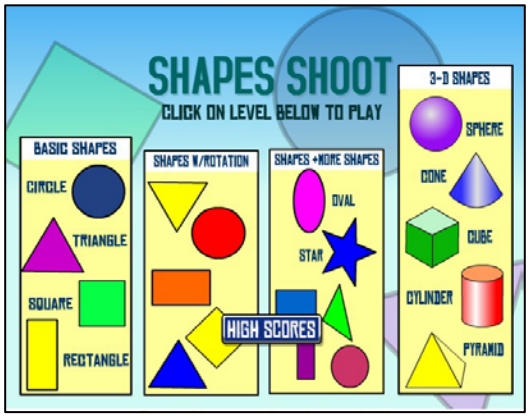
Resources: Shape cards/Students

This game is played the same as celebrity heads. Although instead of being a celebrity students are allocated a 3D objects. The selected student need to ask the class yes or no questions to determine which shape they are.



## *Digital Resources*

http://www.sheppardsoftware.com/mathgames/earlymath/shapes_shoot.htm




## *Contexts for Learning*

**Play:**

*Construction:* Provide students with a variety of construction boxes (all being 3D objects) and ask students to create a mode of transport/ animal/ building and identify which and how may 3D objects they used.

**Investigation:**

*Boxes:* Provide each student with a sheet of coloured card. Ask students to create a container without a lid that is suitable for carrying 1 cup of sand.

Source: *First steps in Mathematics – Space,* 2009. Rigby: Port Melbourne. p65

**Real life experience:**

*Posters:* In small groups ask students to create 3D shape posters by selecting one 3D object and then either draw pictures or use magazines pictures to create a collage of everyday items that are of that particular 3D object.

**Routines and Transitions:**

When transitioning ask students to locate a 3D object in the classroom.

## *Assessment*

Observe the students as they discuss the properties of shapes in activity process A and B.

Display the 3D objects: sphere, cube, prism, cylinder, cone; pyramid. Select a shape and ask the student to name the object and describe two properties, for example: *It's got a circle shaped based and one edge. It's a cone.* This could be done as a transitional activity.

### *Background Reading*

Identifying a shape by using the sense of touch rather than sight can assist children to visualise the shape through its properties. This task also requires the use of language to connect the visual picture with properties of shapes.

A **cube** has 6 flat square faces. All faces are the same size; 8 corners (vertices); 12 edges.

A **sphere** has one curved round surface. It is a perfectly round 3D shape like a ball.

A **cylinder** has two ends which are parallel to each other. Each end is exactly the same size circular shape; no corners (vertices); 2 flat faces; 2 edges.

A **cone** has a flat circular base; sides are curved; 1 edge; top is pointed and is called an apex.

A **rectangular prism** has 6 flat rectangular faces; 8 corners (vertices); 12 edges.

A square **pyramid** is a space figure with a square base and 4 triangle---shaped sides.

A triangle **pyramid** (or tetrahedron) is a 4---sided space figure. Each face of a tetrahedron is a triangle.

For more detail, please go to:
http://www.mathleague.com/index.php/about-the-math-league/mathreference?id=73

### Year three NAPLAN Numeracy links

3D objects – Properties
3D objects – View, flip, slide, turn, nets

### Links to Related MAGs

1.3.9 - 3D Objects
2.2.8 – 2D Shapes
3.2.8 - 3D Objects 1
3.4.6 - 3D Objects 2