

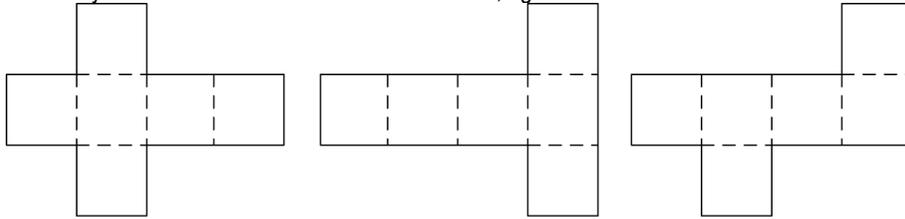
# Booragul Public School NSW Syllabus for the Australian Curriculum – Measurement and Geometry

## Sub Strand – Three Dimensional Space 1

Outcome	Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Date
<p><b>Stage 2</b> A student:</p> <ul style="list-style-type: none"> <li>› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM</li> <li>› checks the accuracy of a statement and explains the reasoning used MA2-3WM</li> <li>› makes, compares, sketches and names three-dimensional objects, including prisms, pyramids, cylinders, cones and spheres, and describes their features MA2-14MG</li> </ul>		<p><b>Language</b></p> <p>Students should be able to communicate using the following language: object, two-dimensional shape (2D shape), three-dimensional object (3D object), cone, cube, cylinder, prism, <b>pyramid</b>, sphere, surface, flat surface, curved surface, face, edge, vertex (vertices), <b>net</b>.</p> <p>In geometry, the term 'face' refers to a flat surface with only straight edges, as in prisms and pyramids, eg a cube has six faces. Curved surfaces, such as those found in cylinders, cones and spheres, are not classified as 'faces'. Similarly, flat surfaces with curved boundaries, such as the circular surfaces of cylinders and cones, are not 'faces'.</p> <p>The term 'shape' refers to a two-dimensional figure. The term 'object' refers to a three dimensional figure.</p>	
<p><b><u>Ignition Activities</u></b></p> <p><b>Blindfold</b> Students handle and discuss geometric models or everyday examples of 3D objects They count the faces, edges and corners and describe the shape of the faces. Students could use a feely bag instead of being blindfolded. When the object is visible – discuss whether the descriptions were correct. Students are to name them as prisms, pyramids, cylinders, cones or spheres. Students described curved and flat surfaces of these.</p>			 Literacy Critical and creative thinking
<p><b>What Shape Am I?</b> A child describes an object to the class, eg I have 4 triangular faces and 4 corners. The class takes turns to guess. The child who guesses correctly then chooses another object.</p>			
<p><b><u>Explicit Mathematical Teaching</u></b></p> <p>Make models of three-dimensional objects and describe key features (ACMMG063)</p> <ul style="list-style-type: none"> <li>• identify and name three-dimensional objects as prisms (including cubes), pyramids, cylinders, cones and spheres</li> <li>▮ recognise and describe the use of three-dimensional objects in a variety of contexts, eg buildings, packaging (Communicating)</li> <li>• describe and compare curved surfaces and flat surfaces of cylinders, cones and spheres, and faces, edges and vertices of prisms (including cubes) and pyramids</li> </ul>			

▮ describe similarities and differences between prisms (including cubes), pyramids, cylinders, cones and spheres (Communicating)  
 • use a variety of materials to make models of prisms (including cubes), pyramids, cylinders, cones and spheres, given a three-dimensional object, picture or photograph to view  
 • deconstruct everyday packages that are prisms (including cubes) to create nets, eg cut up tissue boxes  
 ▮ recognise that a net requires each face to be connected to at least one other face (Reasoning)

▮ investigate, make and identify the variety of nets that can be used to create a particular prism, such as the variety of nets that can be used to make a cube, eg



(Communicating, Problem Solving, Reasoning)

▮ distinguish between (flat) nets, which are 'two-dimensional', and objects created from nets, which are 'three-dimensional' (Communicating, Reasoning)

## **Whole Class Teaching Activities**

Present a variety of Prisms and Pyramids. Discuss with children why the groups have been formed. -  
 Definitions of Prisms - Ask children to come up with a definition looking at the prisms. \*(Teachers definition - A solid comprising two congruent parallel faces and the lateral faces that connect them. Prisms are named according to their two matching parallel faces.  
 Possible extension lateral faces are parallelograms. If they are all right angled (ie rectangle) the prism is a "right prism"; if they are not all right angled, then the prism is an oblique prism.

### **Real Life 3D Prisms**

Children look for 3D objects in the 'real' world. Collect pictures from magazines, old photographs, birthday cards etc of 3D objects. In art, children could make a collage using these objects.

### **Guess The Prism**

Put a 3D prism in a container or under a cloth. Allow a child to feel, but not see the object. The child describes the object and the class takes turns in guessing what it is. Repeat the exercise with as many different 3D prism as possible.

### **Constructing Prisms**

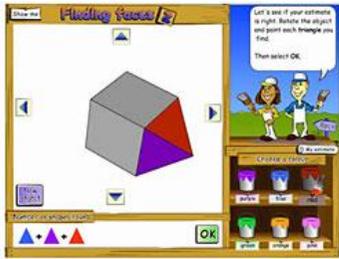
Students build and stack attribute blocks, books, or pattern blocks to develop the idea of a prism as an object having a consistent cross-section.  
 Students can also construct models, plasticine, playdough, clay, polydrons, copied from models provided by the teacher. Sets of prisms can then be built up. Students can informally compare attributes such as height, width, length, and number of faces.

Display a variety of pyramids and ask children what do we know about these objects. Children discuss features.

<p>Definition of pyramids - Have children come up with their own definition of what is a pyramid? (Teachers definition - A solid with any polygon as its base. The other faces are triangles that meet at a common vertex. Pyramids are named according to their base.)</p>		
<p><b>Using Maths Tracks- Stage Two-3D Objects</b>  Student activities include making models of prisms, pyramids, cylinders, cones and spheres given a three-dimensional object, picture or photograph to view; sketching prisms, pyramids, cylinders and cones, attempting to show depth; sketching three-dimensional objects from different views including top, front and side views. Meets BoS outcomes SGS2.1, WMS2.2, WMS2.3. Includes teacher notes. Click on link below and scroll through activities and visuals  <a href="http://lrr.dlr.det.nsw.edu.au/LRRDownloads/8126/1/44300_2B_u13_Print.pdf">http://lrr.dlr.det.nsw.edu.au/LRRDownloads/8126/1/44300_2B_u13_Print.pdf</a></p>		
<p><b>Using Maths Tracks-Stage Two-Cross Sections</b>  Student activities include making and visualising the resulting cut face (plane section) when a three-dimensional object receives a straight cut; recognising that prisms have a uniform cross-section when the section is parallel to the base; recognising that pyramids do not have a uniform cross-section. Meets BoS outcomes SGS2.1, WMS2.2, WMS2.5. Includes teacher notes.  <a href="http://lrr.dlr.det.nsw.edu.au/LRRDownloads/8741/1/44347_2B_u60_Print.pdf">http://lrr.dlr.det.nsw.edu.au/LRRDownloads/8741/1/44347_2B_u60_Print.pdf</a></p>		
<p><b>Teaching Space and Geometry CD ROM Unit: From 3D to 2D</b>  These activities assist students to focus on the connections between three-dimensional objects and two-dimensional shapes.</p> <p><b>Lesson One: Shadow Shapes Part A- <i>Investigating the shadows made by a cone</i></b>  <b>Purpose:</b> Students need to produce and manipulate images of shapes in a variety of orientations to develop abstract geometric ideas.</p> <p><b>Lesson Two: Shadow Shapes Part B- <i>Investigating the shadows made by solids</i></b>  <b>Purpose:</b> Students need to create and manipulate images of shapes in a variety of orientations to develop abstract geometric ideas.</p> <p><b>Lesson Three:Nets- <i>Creating nets of boxes</i></b>  <b>Purpose:</b> The students need to predict, make and explore nets to develop an understanding of the features and properties of three-dimensional objects.</p> <p><b>Teaching Space and Geometry CD Rom-Stage Two-Unit Two-From 3D to 2D-Lesson 1-3</b>  <b>Refer to CD ROM for more details, videos,work samples etc</b></p>		
<p><b>3D Object Words</b>  Have models of 3D objects. Allow children to examine for 3-4 minutes. Encourage them to talk about the objects. Build a list of 3D object words. Write the list on chart paper and display.</p>		
<p><b><u>Guided Group/Independent Activities</u></b></p> <p><b>Playing With Pyramids</b>  Provide students with a variety of pyramids, eg square, hexagonal and triangular pyramids. Students discuss faces, edges, corners and bases and the similarities and differences between the pyramids.</p>		

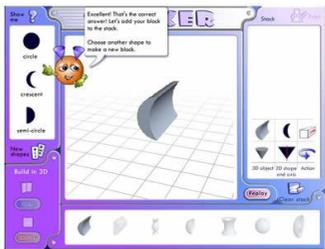
<p>Students make a net pyramid and compare their net/pyramid to other students.</p>		
<p><b>Real Life Pyramids</b> Children look for 3D pyramids in the 'real' world. Collect pictures from magazines, old photographs, birthday cards etc of 3D objects. In art, children could make a collage using these objects.</p>		
<p><b>Pyramids</b> Children can use the Internet or library to research the great pyramids of Egypt and/or any other structures built in the shape of a pyramid.</p>  <p>Give children newspaper to create a variety of pyramids and prisms. Compare similarities and differences. Have children observe different views of the skeleton. Teacher can show a top view of a pyramid skeleton with matchsticks on an overhead projector.</p>		
<p><b>Nets Lesson –refer to lesson plan on 'Teaching Space and Geometry' CD ROM</b></p>		
<p><b>Making A Net</b> Each student needs an empty box, ie cereal, toothpaste, flour or biscuit. Ask students to carefully open out their box by tearing or cutting along the edges. Have each student flatten their box into its net. Discuss and compare. Students can trace around the net, discuss the shape and sides of the traced shape and write about findings. Students fold the net back into a box again. Glue their box beside its traced net and display work.</p>		
<p><b>Investigating Prisms, Cylinders and Pyramids</b> Students make prints of the faces and bases of prisms and pyramids. A chart may be built up to illustrate the prints obtained from the various shapes.</p>		
<p><b>The Great Castle Competition</b> Using shape blocks hold a class competition to see who can build the most innovative castle. Encourage the children to use at least one of every 3D shape in their building. Children can work alone or in groups depending on availability of blocks.</p>		
<p><b><u>Computer Learning Objects</u></b>  <b>Face Painter: Finding Faces 2-Years 3-4</b> <b>TaLe Reference Number: L653</b> The Face painter series of learning objects enables students to explore the properties of, and relationship between,</p>		

2D shapes (polygons) and 3D objects (polyhedrons) by visualising the shapes of the faces of objects, including those distorted by perspective and hidden from view.



**Shape Maker : Blocker-Years 3-4**  
**TaLe Reference Number: L1058**

Students select an object from a bank of simple 3D objects. They discover the method of re-creating this object by choosing from a bank of 2D shapes and then applying an action (spin or extrude) to it.



**Shape Maker : Stacker –Years 3-4**  
**TaLe Reference Number: L588**

## **Planned Assessment**

### **Pre Assessment**

Children are put into groups and sort 3D shapes into categories. ie, pyramids, prisms. Children to discuss and identify features of shapes.

Present a variety of objects. Children select three objects and write all they know about them. Teacher to construct a marking rubric and distribute to students to look at prior to assessment. ie three to four days.

### **Possible Assessment Task**

#### **Classification**

Students sort models, everyday objects into prisms, pyramids and those that are neither.

<p><b>CLASSIFICATION</b> Students sort models, everyday objects into prisms, pyramids and those that are neither</p> <p>Present a variety of objects. Children select three objects and write all they know about them. Teacher to construct a marking rubric and distribute to students to look at prior to assessment. ie three to four days.</p> <p><b>Points of View</b> Ask students to sit at a table in pairs facing each other with a variety of objects arranged between them. Each student takes a turn at describing what they can see from their position. They can sketch what they see and write about it. The students still in pairs then move a little way around the table and repeat this activity. Continue until they are in the other person's position</p>		