LEVEL: Upper Primary	CONTENT: Measurement & Geometry	FOCUS: Shapes
In the Classroom		

PURPOSE	• Identify and name two-dimensional shapes • Identify and describe the properties and features of two-dimensional shapes • Recognise and describe polygons • Identify and name three-dimensional objects • Identify and describe the properties and features of three-dimensional objects • Describe the similarities and differences between 2D shapes and 3D objects • Classify 2D shapes and 3D objects • Use the properties of shapes to justify how shapes are classified • Recognise and describe the difference between one, two and three dimensions
INTRODUCTION	**Growth Mindset – Learning to struggle** Place examples of the paper object around the classroom. Instruct students they cannot touch the structure, but they are encouraged to move around it and view it from all angles. Encourage students to discuss their ideas and methods as they go, but if they are successful, they are to keep their method to themselves. Now challenge the students to make the structure. Record the language you hear the students using (positive or negative). After 5 ish minutes stop and as a class discuss how students felt during the activity. • Did anyone make it? How long did it take? How many tries? • Was the first ten seconds of trying much different from the last ten seconds? How? Why? • What was it like when someone else got it? • How many attempts did you take? • How long did you look at the structure before you first started? • How many breaks did you take? • Did you look at what other people were doing? Why? How did it make you feel? Did you learn anything from what they were doing? Refer to the language used during the activity and remind students how the language we tell ourselves quickly becomes our own best friend or worst enemy. Include a discussion about having a growth mindset, persistence, learning from each other and working together.
WARM UP	Place pictures of 2D shapes, 3D objects and real-life objects around the room – enough for each student. Instruct all students to choose an item. Think about how you would describe this item to someone else without using its name – can use features and properties.
EXPLICIT TEACHING & LEARNING	Once students have thought of a description of their own shape have them join with a partner and describe the similarities and differences between their items. Teacher needs to walk around and record on the board any of the language they hear. Now have students join in a group of 4 and again describe the similarities and differences between their shapes. Stop and refer to the language – categorise the terms as features or properties of shapes, include additional terms students name during the discussion. Using what students know and have discovered today about shapes – as a class I want you to work together to classify all the objects in the room into groups. Each group nominates a leader to justify reasons for classifications. Other students can contribute.
DISCUSSION/KEY QUESTIONS	• What is a 2D shape? What is a 3D object? • What are features of shapes? What are properties of shapes? • What is the difference between the different dimensions? • What are the similarities and differences between 2D shapes and 3D objects? • What is a polygon? Are all 2D shapes polygons? • What is a regular shape? What is an irregular shape? • Can you describe a pyramid? Can you describe a prism? • What is the difference between a pyramid and a prism?
DELIBERATIVE PRACTICE	The focus of this activity is to discover what it is that students know about 2D shapes and 3D objects. Often students will be able to name some shapes and identify some properties but sometimes this is only a surface level understanding and may hide common misconceptions.
REFLECTION	Discussion with students about the power of having a positive mindset, learning from each other and working together to achieve a task.

CHOOSEMATHS

RESOURCES	Collection of 2D shapes (blocks and images on cards), 3D objects and real 3D objects, such as tubes, boxes and other containers. **Growth mindset through paper folding** http://blog.classcreator.io/teaching-kids-to-struggle-growthmindset/

Curriculum Connections	
CONTENT	**VICTORIAN CURRICULUM F-10** **YEAR 6 – NUMBER & ALGEBRA** Construct simple prisms and pyramids (VCMMG228) **Elaborations:** Consider the history and significance of pyramids from a range of cultural perspectives including those structures found in China, Korea and Indonesia; Construct prisms and pyramids from nets, and skeletal models.
WHAT CAME BEFORE	Students need to know the names of the different shapes, the properties of the different shapes, including unpacking each property, e.g. what is a side? And they need to be able to articulate the differences and similarities between shapes.
WHAT COMES NEXT	Students need a solid understanding of the different properties of shapes so they can begin to classify and describe triangles and quadrilaterals according to their angles. They also need a solid understanding of what prisms and pyramids look like so they can begin to combine objects to create their own objects and draw these new objects from different points of view.
VOCABULARY	Shape, object, dimensions, features, properties, corners, sides, vertices, angles, faces, edges, curves, surface, classify, categorise, polygon (many angles), polyhedron (many faces), regular, irregular, opposite, adjacent, parallel, prism, pyramids, open, closed, concave, convex
MISCONCEPTIONS	Do not assume that students are aware that 2D means two-dimensional; some students simple think it is a term to describe those particular shapes and not an actual measurement of length in one direction. The same applies to terms like side. Students know that a triangle has 3 sides, but what is a side? Does a circle have a side? Or is does it have a curve?
WHAT PROFICIENCIES ARE TO BE UTILISED? **Understanding** **Fluency** **Problem Solving** **Reasoning** **Communicating (NSW)** **Justifying (NSW)**	**Year 6 (Australian Curriculum)** **Understanding** includes describing properties of different sets of numbers, using fractions and decimals to describe probabilities, representing fractions and decimals in various ways and describing connections between them, and making reasonable estimations **Fluency** includes representing integers on a number line, calculating simple percentages, using brackets appropriately, converting between fractions and decimals, using operations with fractions, decimals and percentages, measuring using metric units and interpreting timetables **Problem-solving** includes formulating and solving authentic problems using fractions, decimals, percentages and measurements, interpreting secondary data displays and finding the size of unknown angles **Reasoning** includes explaining mental strategies for performing calculations, describing results for continuing number sequences, explaining the transformation of one shape into another and explaining why the actual results of chance experiments may differ from expected results.
ASSESSMENT	**Exit Pass –** Choose a 2D shape or 3D object and create a What am I? Fold paper in half on the front record the clues to the what am I? inside record the name of the shape with a labelled diagram

CHOOSEMATHS