

2D Space (including angles) 1

Outcome	Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Language / Date
<p>A student:</p> <ul style="list-style-type: none"> › describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols MA1-1WM › supports conclusions by explaining or demonstrating how answers were obtained MA1-3WM › manipulates, sorts, represents, describes and explores two-dimensional shapes, including quadrilaterals, pentagons, hexagons and octagons MA1-15MG <p>Syllabus reference: Hardcopy: 112 Digital: 117</p>		<p>Manipulation of a variety of real objects and shapes is crucial to the development of appropriate levels of visualisation, language and representation.</p> <p>The skills of discussing, representing and visualising three-dimensional objects and two dimensional shapes are developing in Stage 1 and must be fostered through practical activities and communication. It is important that students have experience involving a broad range and variety of objects and shapes in order to develop flexible mental images and language.</p> <p>Students need to be able to recognise shapes presented in different orientations. They need to develop an understanding that changing the orientation of a shape does not change its features or its name. In addition, students should have experiences identifying both regular and irregular shapes, although it is not expected that students understand or distinguish between regular and irregular shapes in Stage 1. Regular shapes have all sides and all angles equal.</p> <p>Many shapes used in Aboriginal art are used with specific meanings. Local Aboriginal communities and many education consultants can provide examples. Further exploration of such meanings could be incorporated in students' studies within the Creative Arts Key Learning Area.</p>	<p>shape, two-dimensional shape (2D shape), circle, triangle, quadrilateral, parallelogram, rectangle, rhombus, square, trapezium, kite, pentagon, hexagon, octagon, regular shape, irregular shape, orientation, features, properties, side, parallel, pair of parallel sides, opposite, length, vertex (vertices), angle, right angle, symmetry, line (axis) of symmetry, rigid.</p>

Activities		Register
<p>Explain what a hexagon is. Why is it called "hex"-agon. How will students remember the name? What are the features of hexagons? Six sides. Explain the difference between a regular hexagon (all sides / angles equal) and an irregular hexagon (six sides in any size)</p> <p>Explore, demonstrate and name hexagons in different orientations. Find examples from magazines / internet to show applications. Is a STOP sign a hexagon? Why or why not? Students explore the shape in their own environment.</p> <p>Use pattern blocks to combine shapes to make hexagons - is it regular or irregular?</p> <p>Introduce rhombuses as an irregular shape. All sides are equal but not all angles are equal. Use popsticks and blutack to demonstrate a rhombus. Show how a rhombus can become a square if the angle becomes a right angle - is this a regular shape? A square is a special type of rhombus - it is the only regular rhombus possible.</p> <p>Introduce a trapezium (plural - trapezia). What makes it different from the rhombus? What makes it the same (both quadrilaterals)? What is the important feature in a trapezium - at least one pair of parallel lines - do they remember what parallel lines are? Children draw parallel lines using the sides of a ruler. They join the ends to form a trapezium. Discuss the differences between the trapezia. Why didn't everyone get the same trapezium?</p> <p>Use pattern blocks to make new shapes. Discuss how it changed by putting two shapes together. Were some shapes easier to put together than others?</p>		
<p>Introduction resource – note taken from HCC stage 2</p> <p>What is a shape? A polygon (Greek term meaning many angles) is a closed shape with three or more angles and sides. The angles are the focus for the general naming system used for shapes.</p> <p>What is a regular shape? Shapes which have equal angles and sides of equal length. This means that a rectangle is an irregular shape. If you turn (rotate) regular shapes they look the same. There are many more lines of symmetry in regular shapes. There has to be a certain length to sides of shapes to make it a closed shape eg a triangle cannot be constructed from three straws if the sum of the lengths of the two shortest straws is less than the longest straw</p> <p>Shape Word Beginnings-Discuss the fact that many shape words have a beginning</p>		

<p>element (sometimes a prefix) that has a specific meaning, eg poly (many), octa (eight), tri (three) etc</p> <p>Discuss metalanguage in lessons eg Why is a pentagon called that? What does it have to do with the Pentagon in the US? (five sided building) What does the prefix 'pent-' mean? What other 'pent-' words can you think of? (Pentathlon, pentominoes). Are the following shapes pentagons? (Yes)</p> <p>Why or why not? What makes a regular pentagon? Extension: Can a regular pentagon have a right angle? Repeat for octagon.</p>		
<p>Celebrity Quadrilateral. (Played like Celebrity heads but with shapes instead) Use hints about parallel sides, right angles and equal sides to identify the quadrilateral.</p>		
<p>New Shapes from Old Shapes Students are given a variety of regular and irregular shapes. Students are asked to:</p> <ul style="list-style-type: none"> ■ arrange two or more shapes to create a new shape eg combine 6 triangles to form a hexagon ■ cut a square into four triangles and put the triangles together to make other shapes eg a rectangle ■ cut a rectangle into two triangles and create new shapes. <p>Students describe and record what they have done. Some students might use fraction language in their description.</p> <p>Make a new shape In pairs students make a six sided shape using 2 pattern blocks. Demonstrate how sometimes 2 trapezia together make a hexagon and sometimes they don't. What features make them able to form hexagons?</p> <p>Geoboard Shapes Identify the attributes of hexagons, rhombuses and trapezia. What is similar? What is different? Make the shapes on geoboards - draw and label on dot paper. Year 2 - show these shapes in different orientations. Make these shapes using toothpicks / popsticks / straws / computer</p>		

<p>Sorting Shapes</p> <p>Students are given a collection of regular and irregular shapes with three sides, four sides, five sides and six sides. Students are asked to sort the shapes into groups according to the number of sides. Students select one of the groups and arrange the shapes to form a picture. Students write a description of their picture, commenting on the shapes they have used.</p> <p>Possible questions include:</p> <ul style="list-style-type: none"> ■ can you show me how to draw and name each shape? ■ what can you tell me about each shape? ■ how are these shapes different/the same? 		
<p>Shape Symmetry - Sample Units of Work pg 77</p> <p>Students find shapes that have a line of symmetry by folding the shapes in half. In pairs, they are given a collection of regular and irregular shapes that could include squares, rectangles, triangles, trapeziums, rhombuses, hexagons and circles.</p> <p>Possible questions include:</p> <ul style="list-style-type: none"> ■ which shapes can be folded in half? ■ which shapes can be folded in half in a different way? ■ which shapes do not have a line of symmetry? <p>Students glue their shapes onto paper and record their findings.</p>		
<p>Flags</p> <p>The teacher provides a number of flags for students to investigate symmetry. In pairs, students choose flags from those displayed, determine which are symmetrical, and give reasons for their choice. In pairs, students design their own symmetrical flags and display these for others to determine the lines of symmetry.</p>		
<p>Alphabet Symmetry</p> <p>In pairs, students cut out and fold capital letters in different ways to investigate their symmetry. They are then asked to glue the symmetrical letters onto one sheet of paper and the non-symmetrical letters onto another sheet. Some letters have more than one line of symmetry. Students compare and discuss their responses.</p> <p>Possible questions include:</p> <ul style="list-style-type: none"> ■ does any student in the class have a name with letters that are all symmetrical? eg TOM 		

<p>Lines and Shapes in the Environment Students identify lines and shapes in the classroom and playground eg the flag pole, a telegraph pole, the edge of the roof, the edge of the floorboards. Students discuss and record their observations. They are encouraged to identify the most commonly occurring shapes, and horizontal and vertical lines.</p>		
<p>Weaving Lines Sample Units of Work pg 78 The teacher provides students with several strips of paper in two colours to weave together. Students identify and comment on the types of lines they have created eg straight lines, crossed lines, horizontal lines, vertical lines, parallel lines. Variation: Students could make the loom with wavy lines. Possible questions include: ■ can you identify and name parallel, vertical and horizontal lines?</p>		
<p>Corners as Angles Sample Units of Work pg78 Part A Students use one corner of a large cardboard square or rectangle to find other corners of the same size eg the corner of the classroom, the corner of a book. They then find angles that are smaller or larger than the corner of the square.</p> <p>Part B In pairs, students are given a selection of regular shapes including squares, rectangles, and triangles to compare the angles at the corners by superimposing one over the other. They could sort the shapes according to the size of the angles eg the same as a square, larger than a square, smaller than a square. Students then discuss and record results.</p> <p>Geoboard Shapes and Angles In pairs, students use geoboards and elastic bands to create shapes and discuss which shapes have the most sides and the most corners. Students investigate angles on the geoboard and compare the number of sides and corners of the shapes they have created. Students transfer shapes to dot paper and record the name of the shape, the number of sides and the number of corners. Possible questions include:</p>		

<ul style="list-style-type: none"> ■ how can you describe the angles at the corners of each shape? ■ are the angles at the corners of each shape the same or different? ■ what happens when you place an angle from a square on top of an angle at the corner of a hexagon? ■ can you describe the difference? 		
<p>Angle Hunt In pairs, students find angles around the room that are larger, smaller or the same size as an angle tester made from cardboard or geostrips. Results could be recorded in a table.</p>		
<p>Creating Angles - Sample Units of Work pg79 Students construct a variety of angles using cardboard strips or geostrips. Students are asked to make:</p> <ul style="list-style-type: none"> ■ an angle and then make one that is smaller and one that is larger ■ an angle that looks like the corner of a square ■ angles of the same size but with arms of various lengths ■ an angle that looks like one made by another student. <p>Results can then be recorded in a table.</p>		