**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

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| TERM: | WEEK: 3.2 | STRAND: Measurement & Geometry | **SUB-STRAND:** 2D Space | **WORKING MATHEMATICALLY:**  MA2-1WM & MA2-2WM |
| OUTCOMES: MA2-15MG | | **Manipulates, identifies and sketches two dimensional shapes, including special quadrilaterals, and describes their features** | | |
| **CONTENT:** | | **Identify symmetry in the environment**   * Identify lines of symmetry in pictures, artefacts, designs and the environment, e.g. Aboriginal rock carvings or Asian lotus designs * Identify and draw lines of symmetry on given shapes, including the special quadrilaterals and other regular and irregular shapes * Determine and explain whether a given line through a shape is a line of symmetry * Recognise and explain why any line through the centre of (and across) a circle is a line of symmetry | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | **Pre-Assessment**  Provide students with a variety of shapes made from paper or cardboard. Ask them to investigate which shapes have at least one line of symmetry. Provide little to no guidance or clarification except to say that having a line of symmetry means that a shape will have two sides exactly the same. Make observational notes as to which students are able to identify shapes with line/s of symmetry. | | |
| WARM UP / DRILL | | Provide students with a whiteboard. Have students draw two capital letters that have at least one line of symmetry. | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | Nancy has a cardboard shape in her hand that has two lines of symmetry. What shape could it be? | | |
| QUALITY TEACHING ELEMENTS | | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge * Deep understanding * Problematic knowledge * Higher-order thinking * Metalanguage * Substantive communication | * Explicit quality criteria * Engagement * High expectations * Social support * Students’ self-regulation * Student direction | * Background knowledge * Cultural knowledge * Knowledge integration * Inclusivity * Connectedness * Narrative |
| RESOURCES | | Variety of paper shapes, small whiteboards, markers, pattern blocks and pattern mats, magazines, paper, large paper and pencils | | |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| * **Explicitly communicate lesson outcomes and expectations of work quality.** * **Define and reinforce metalanguage used in the unit,** 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, rightangle, symmetry,line (axis) ofsymmetry and rigid. * **Fill in gaps in student knowledge**. * **Review existing knowledge by completing the pre-assessment task**. * **Discuss this question.** * When is an object symmetrical?   An object is symmetrical when one half is a mirror image of the other half. If vertical, horizontal, or diagonal lines are drawn through a shape and the halves, when folded across the line, match exactly. The line is referred to as the line of symmetry or the axis of symmetry. Some shapes can have more than one line of symmetry.   * Discuss with students that if a shape or object is not folded correctly down the middle, it has an incorrect line of symmetry. | LEARNING SEQUENCERemediationS1 or Early S2 | * **Symmetrical Pictures:** Provide students with pattern blocks and pattern block mats. Students complete the pictures and then identify if the pictures have line/s of symmetry. * **Face Symmetry:** Have each child cut out a large face from a magazine, or provide each student with the face template attached. (Face must be facing the viewer) Students fold the face in half and then cut. Glue one half onto a piece of paper and ask students to replicate the original side to be symmetrical with the side they have pasted onto the paper. When completed discuss why or why not the drawings are symmetrical. Make a note that faces are never truly symmetrical. |
| LEARNING SEQUENCES2 | * **Shapes with Single Lines of Symmetry:** Provide students with a variety of shapes with only have one line of symmetry and have them fold them in half to identify lines of symmetry. Remind students that each side must be exactly the same. * **Shapes with Multiple Lines of Symmetry:** Discuss shapes that have multiple lines of symmetry. Emphasise that any line drawn across the central point of a circle creates a line of symmetry. Provide students with a variety of shapes that have multiple lines of symmetry. Have them write an estimate of how many lines of symmetry they think each shape will have in their workbook and then have them fold and draw lines of symmetry on the shapes to confirm their predictions. * **Art activity:** Have students trace around each other’s whole bodies. Draw a line of symmetry down the middle and then fill in the details that make a body symmetrical. (This is a good chance to point out that people are not exactly symmetrical e.g. one eye is a little higher or one hand is a bit bigger.) * **Investigation:** Students go out to the playground and make a list of things they can find that have symmetry. * **Assessment** This activity investigates visual symmetry. Have students investigate places in the classroom or playground where symmetry appears. Students group items under the categories symmetrical or not symmetrical. Students could either write a list or draw items. Ask students to explain why certain items/shapes have symmetry. |

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| * **Modelled activity:**   Complete the two activities below to consolidate lines of symmetry.  <http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/SymmetryShapesShoot.htm>  <http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/SymmetryLinesShapesShoot.htm>   * **Modelled Activity 2:**   Discuss with students where symmetry can be found in the real world, e.g. buildings, bridges, animals etc.  The website below discusses symmetry in buildings <http://greatmathsgames.com/Symmetry/taj_mahal.htm>  . | LEARNING SEQUENCEExtensionLate S2 or Early S3 | * **Symmetry in the Alphabet:** Have students draw capital letters and identify which capital letters have lines of symmetry.   Discuss whether there any letters that have multiple lines of symmetry. |
|  | **EVALUATION & REFLECTION** | **Student Engagement:** **Achievement of Outcomes:**  **Resources:** **Follow Up:** |

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| **Have Symmetry** | **Do not have symmetry** |
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