**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

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| TERM: | WEEK: | STRAND: Measurement & Geometry | **SUB-STRAND:** 2D Space 1 | **WORKING MATHEMATICALLY:**  MA3-1WM & MA3-2WM |
| 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 * Create symmetrical patterns, pictures and shapes, with and without the use of digital technologies | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | **Pre-Assessment:** Students complete worksheet on Identifying and drawing lines of symmetry on regular and irregular 2D shapes. | | |
| WARM UP / DRILL | | **Lines of Symmetry Online Game:**  <http://www.innovationslearning.co.uk/subjects/maths/activities/year3/symmetry/shape_game.asp>  **Lines of Symmetry Online Description:**  <http://www.studyzone.org/mtestprep/math8/f/symmetry5l.cfm>  Read through the description. Students to copy the definition into their books. | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | Sam draws an octagon. She draws lines of symmetry onto the shape. How many lines has Sam drawn? | | |
| 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 | | Symmetry definition poster, posters with 2D shapes and their lines of symmetry, online games / activities and worksheets (as referenced),  A4/art paper for snowflakes, coloured 2D shapes | | |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTIONMODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| Explicitly communicate lesson outcomes and expectations of work quality  * **Define and reinforce metalanguage used in the unit.** Students should be able to communicate using the following language: Teach and review the definition and meaning of symmetry and the mathematical language used to investigate symmetry (e.g. folding, lines, equal parts, half, and diagonal). * **Online Game:** Studentsinvestigate lines of symmetry in 2D shapes.   <http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/SymmetryLinesShapesShoot.htm>   * **Koch Snowflakes:** Starting with an equilateral triangle, students add triangles and see how the symmetry continues in each new snowflake. Students to fold their snowflakes to develop their understanding of the lines of symmetry created. | LEARNING SEQUENCERemediationS1 or Early S2 | * **Lines of Symmetry Worksheet:** Students draw lines of symmetry on 2D shapes. Use *Symmetry Stage 1* worksheet. * **Matching Symmetry & Shapes Worksheet:** Students match the half symmetry with the matching shape. Use *Matching Shape Symmetry* worksheet. * **Letter Symmetry:** Students write out the alphabet in capital letters and find all the lines of symmetry. You can also use the *Alphabet Symmetry* worksheet. |
| LEARNING SEQUENCES2 | * **Symmetry Worksheet:** Students complete the worksheet to determine which line is the correct line of symmetry. Use *Correct Symmetry Lines* worksheet. * **Symmetry Worksheet:** students draw the other half of a shape using a dotted line down the centre as the line of symmetry. Use *Lines of Symmetry* worksheet. * **Which dotted line is a line of symmetry?** Students draw the matching half of a shape so it has a line of symmetry. * **Symmetrical Face:** Students cut out a face from an old magazine. The face should be large and looking straight at the viewer (the larger, the easier the activity). Cut the face down the centre. Children paste one half into their workbook or onto a fresh piece of paper. Children then attempt to draw the missing side to be symmetrical with the side they pasted. When completed they can compare the ‘real’ person with the one they have created. * **Investigation:** Students draw and cut out various shapes, and fold all the lines of symmetry that the shape has. *Use 2D shape worksheet*. Students investigate how many lines of symmetry different 2D shape have. *Use How Many Lines worksheet.* * Example of a symmetrical shape made with blocks.**Assessment - Six Leg Symmetry:** Students create an insect using pattern blocks to create an insect so that it is symmetrical in shape and colour. The insect is then photographed and displayed as an artwork. |
| LEARNING SEQUENCEExtensionLate S2 or Early S3 | * **Reflective Symmetry:** Students draw the reflective symmetry of objects. * **Symmetry worksheet**: Students draw lines of symmetry on regular and irregular 2D shapes. |
| **EVALUATION & REFLECTION** | **Student Engagement: Achievement of Outcomes:**  **Resources: Follow Up:** |