**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

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| TERM: | WEEK: 3.1 | STRAND: Measurement & Geometry | **SUB-STRAND:** 2D Space 1 | **WORKING MATHEMATICALLY:**  MA2-1WM & MA2-2WM |
| OUTCOMES: MA2-15MG | | **Manipulates, identifies and sketches two dimensional shapes, including special quadrilaterals, and describes their features** | | |
| **CONTENT:** | | **Compare and describe features of two dimensional shapes, including special quadrilaterals**   * Determine that a triangle cannot be constructed from three straws if the sum of the lengths of the two shorter straws is less than the length of the longest straw * Compare the rigidity of two-dimensional frames of three sides with the rigidity of those of four or more sides * Construct and manipulate a four sided frame and explain how adding a brace can make a four sided frame rigid | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | **Pre-Assessment:** Ask students to draw a rigid shape. Offer the explanation that a rigid shape cannot be changed when one side is pushed on. | | |
| WARM UP / DRILL | | Review what students know about changing squares to diamonds etc. Can other shapes be changed? | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | If I have a square and push on one side, what shape will I end up with? | | |
| 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 | | Maths books, computers and straws | | |

**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:** parallel, congruent, angles, edges and vertices. 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 and vertex (vertices). * **Demonstrate** to students that you cannot construct a triangle from three straws if the two shorter straws do not add up to more than the length of the longer straw. * Cut up a variety of straws and attempt to make triangles. * **Introduce/revise the term rigid.**   Meaning: *Not moving*.  *For a construction: where the angles cannot be changed.*   * **Modelled Activity - Exploring Rigidity:** | LEARNING SEQUENCERemediationS1 or Early S2 | * Students identify a triangle and its properties.   **Video:** Students can watch this revision video of polygons, angles and triangle attributes either as a whole class or individually. Have students then draw and label different triangles. <https://learnzillion.com/lessons/3055-identify-triangles> |
| LEARNING SEQUENCES2 | * **Investigation 1:** Replicate the modelled lesson for students to experience the activity first hand. * **Investigation 2:** This is a continuation of the activity above. Follow the link on the website to investigate other rigid items in the environment. Ask students to investigate things in the environment that are rigid. Discuss why these items are rigid. Example could include a house, table or chair. Ask the students what shapes were used to help these things become rigid.   <http://www.geom.uiuc.edu/~wanous/rigidityoftriangles.html>   * **Assessment: Building Rigid Shapes.** Please refer to the package detailed below.   <http://www.suffolkmaths.co.uk/pages/Problem%20solving/Cre8ate/Rigid%20Structures%20-%20Package.pdf> |
| LEARNING SEQUENCEExtensionLate S2 or Early S3 | * **Investigation 1:** Students follow the links on this website to construct a bridge or other item such as a gate using their acquired knowledge. This task could be done in class or as a project at home. In class this could be constructed as a group project.   <http://www.geom.uiuc.edu/~wanous/buildingbridges.html> |
| **EVALUATION & REFLECTION** | **Student Engagement:** **Achievement of Outcomes:**  **Resources:** **Follow Up:** |