**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:** | | **Compare and describe features of two-dimensional shapes, including 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**    Students complete rigid and non-rigid shapes worksheet. | | |
| WARM UP / DRILL | | Give students a worksheet broken up into rigid and non-rigid columns. Get students to walk around the room and create a list of shapes in the classroom that are rigid and non-rigid. | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | Liz cut two strips of cardboard of different lengths. She joined them at their centres and twisted them. She then drew lines to join corners. What shape has she 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 | | Worksheets, Notebook file, drinking straws/ paddle pop sticks, online resources as referenced | | |

**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.** Students should be able to communicate using the following language: **Teach and review** the definition and meaning of the term rigidity. * **Use notebook file** to explain the definition of rigid objects.      * Use rigidity online link to explain what rigidity means.   <http://www.geom.uiuc.edu/~wanous/rigidityoftriangles.html> | LEARNING SEQUENCERemediationS1 or Early S2 | * Rigid and non-rigid shapes worksheet |
| LEARNING SEQUENCES2 | * **Investigation**: Class discussion on rigidity. Use questions such as: What do you know now about **rigid** and **non-rigid** shapes? Can you give any examples of buildings that use rigid shapes? Can you think of any example of rigidity around your house? * **Practical Activity:** Students view the practical demonstration at <http://www.pbslearningmedia.org/resource/phy03.sci.phys.mfe.zstrawbridge/triangles-designing-a-straw-bridge/> * **Assessment:** Students work in small groups using paddle pop sticks/drinking straws to construct the “strongest” bridge. They develop an understanding of how to construct a strong bridge from the video clip: |
| LEARNING SEQUENCEExtensionLate S2 or Early S3 | **Extension**   * Students can make a short video explaining how they made their bridge and why it is strong/weak. They can research famous bridges around the world and investigate their design features.   <http://www.technologystudent.com/struct1/model1.htm> |
| **EVALUATION & REFLECTION** | **Student Engagement: Achievement of Outcomes:**  **Resources: Follow Up:** |