**MATHEMATICS STAGE 1**

**TEACHING AND LEARNING OVERVIEW**

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| TERM: | WEEK: 3 | STRAND: MEASUREMENT & GEOMETRY | **SUB-STRAND:** VOLUME AND CAPACITY 2 | **WORKING MATHEMATICALLY:**  MA1-1WM, MA1-2WM, MA1-3WM |
| OUTCOMES: MA1 – 11MG | | **Measures, records, compares and estimates volumes and capacities using uniform informal units** | | |
| **CONTENT:** | | **Compare and order several objects based on volume and capacity using appropriate uniform informal units (ACMMG037)**   * Compare and order the volumes of two or more objects by marking the change in water levels when each is submerged * Recognise that changing the shape of an object does not change the amount of water it displaces (Reasoning) * Record volume and capacity comparisons informally using drawings, numerals and words and by referring to the uniform informal unit used | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | * Discuss/revise which of two objects/rocks would have the largest volume. | | |
| WARM UP / DRILL | | * Count forwards and backwards by twos, threes, and fives from any starting point. | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | * Karen puts 2 marbles in her glass of milk. David has the same size glass of milk and puts in 4 marbles. Whose glass of milk will have the most milk displaced? | | |
| 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 | | Read2uChannel - Mr Archimedes' Bath by Pamela Allen: <http://www.youtube.com/watch?v=tP1R-j6xXQY> or text.  ‘Which container contains more magic rocks’ (13 mins 47 secs) Source: Count Us In | Learning area: [Mathematics](http://splash.abc.net.au/search?keyword=learningArea:Mathematics) | Primary: Years F, 1, 2 <http://abcspla.sh/m/29664>. Stones, centicubes, balls, plasticine, clear plastic containers, jars, felt pens,.  Teaching Measurement ES1 and S1, p. 106-107. Teaching Measurement S2 and S3, p 94. | | |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| **Displacement refers to the amount of water that an object displaces.**   * **Read** Mr Archimedes’ Bath to the class or view online reading <http://www.youtube.com/watch?v=tP1R-j6xXQY>. Encourage text to self connections: “Does the water rise at home when you get in the bath?” * **Discuss** the terms volume and displacement. “What causes the water to displace in the book?” and “What could we do to measure the volume of Mr Archimedes and each animal by looking at how much bath water has risen?”   **Or as an alternative introductory lesson:**   * **View** Count Us In, ' Which container holds more magic rocks?', ABC Splash (13mins 47seconds) and discuss ‘Things to think about’ (see website). <http://abcspla.sh/m/29664>. * **Model** dropping a rock into a container and demonstrate how to mark the level of water. Students estimate the volume of a second rock. Question students – What will happen when I drop this rock into the jug of water? Why? How much do you think the water level will rise? Why? How could we measure how much the water level rises? What is your estimate for this rock? Will the water level be higher or lower? What does it mean if the water level is higher? | LEARNING SEQUENCERemediationES1 | * Students play at filling a container of water with smaller and larger objects that sink. Students need to observe and articulate if the water levels change. |
| LEARNING SEQUENCES1 | * **Investigation: Compare and order the volumes of two or more objects by marking the change in water levels when each is submerged**. Students work in a small group to estimate which rocks or other objects (heavy and lighter) are going to displace more water. Students place the rocks/objects into the container and mark the changing water levels, then order the rocks/objects in terms of least increase in the height of the water level to the most. * **Investigation: Recognise that changing the shape of an object does not change the amount of water it displaces.** Students immerse and measure:   + a long, thin plasticine shape and it remoulded   + a ball of plasticine and the ball cut into pieces   + ten loose centicubes and the centicubes formed into a model * **Assessment:** Students to record the processes and results. Observe that students are able to explain their estimates; understand that the amount of water displaced is equal to the volume of the submerged object; understand that the larger the volume of the rock the more water it displaces; and recognise that changing the shape of an object does not change the amount of water it displaces. |
| LEARNING SEQUENCEExtensionEarly S2 | * **Rising levels** – Students use small drink bottles filled with water or unopened bottles. The bottles are to be immersed one at a time in a large calibrated container of water and note the changed water level. Students estimate then measure how many bottles will be needed to displace 500 ml or 1L of water. Record results. |
| **EVALUATION & REFLECTION** | **Student Engagement: Achievement of Outcomes:**  **Resources: Follow Up:** |

* All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.
* Assessment rubrics or marking scale should be considered.