**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 4 | STRAND: Measurement and Geometry | **SUB-STRAND:** Volume and Capacity 2 | **WORKING MATHEMATICALLY:** MA2 – 1WM |
| OUTCOMES: MA2 – 11MG | **Measures, records, compares and estimates volumes and capacities using litres, millilitres and cubic centimetres.** |
| **CONTENT:**  | U**se scaled instruments to measure and compare capacities (ACMMG084)*** Compare the volumes of two or more objects by marking the change in water level when each is submerged in a container
* Estimate the change in water level when an object is submerged (Reasoning)
* measure the overflow in millilitres when different objects are submerged in a container filled to the brim with water
* estimate the volume of a substance in a partially filled container from the information on the label detailing the contents of the container
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | Worksheet – Students work out the capacities of different everyday containers and record their answers in millilitres and litres.  |
| WARM UP / DRILL | * IWB - Millilitres and litres: Activity 4

 <http://www.studyladder.com.au/resources/teacher/mathematics?section=40> |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | The price of 1 litre of petrol is $2.10. My car has a capacity of 10 litres. How much money will it cost me to fill up my car? |
| 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
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| RESOURCES | IWB, measuring device calibrated in multiples of 100, containers with different capacities and volumes, cubic centimetre blocks and water. (Page 41- Signpost Maths Assessment Middle Primary). |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| Explicitly communicate lesson outcomes: Students should be able to accurately measure the capacities of everyday containers.* **Teach and review:** Students make a litre by pouring 1 L of water from a 500 mL or 1 L jug, into an empty, plastic soft drink bottle. Mark the water level on the bottle with a waterproof marker.
* Challenge students to make a rectangular prism with centimetre blocks. Ask for a base of twelve blocks and have students complete an array of the first layer. Ask students to add two more layers and volume in cubic centimetres is recorded. Students look at the number pattern of the layers to predict how many blocks will be needed for 5 layers.

**Capacity** can be measured in millilitres (mL) and/or litres (L). **Volume** can be measured in cubic centimetres and cubic metres.* **Define and reinforce metalanguage:** capacity, container, volume, measure, estimate, full, empty, liquid.
 | LEARNING SEQUENCERemediationS1 or Early S2 | * **Different Cups**

The teacher collects cups of different shapes and sizes and ice cream containers of the same size. Each pair of students has a different cup and an ice cream container. Students are asked to fill the ice cream container with water using repeated cupfuls and record how many cups it took to fill the container. |
| LEARNING SEQUENCES2 | * **Brainstorming:** Ask students to discuss in groups what happens when you submerge an object in a container? Ask the question is it possible to compare the volumes of objects by submerging them? How?
* **Kinaesthetic challenge**: Students work in pairs or small groups to compare the volumes of objects by submerging them in a container. Have students put water in a container and mark the water level, then ask them to submerge an object and mark the new water level on the container. Students then measure the distance between the first water level and the new water level. Discuss results. Repeat with different objects. Estimate the change in water level of objects before submerging them.
* **Investigation**: Students work in pairs and fill a container to the brim with water. Place a bowl or bucket underneath the container to catch any excess water when objects are submerged. Measure the overflow of water in millilitres when an object is submerged in the container.
* **Assessment –** Students are presented with a large group of containers of various sizes and shapes. Students choose a container which they estimate will have a capacity of one litre. Students measure the capacity of their chosen container by using a litre measure, and record as more than 1 L, exactly 1 L, less than 1 L.
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| LEARNING SEQUENCEExtension Late S2 or Early S3 | * Students individually construct a prism using 24 centicubes. No other instructions are given, except that all centicubes must be used. Students share their construction and discuss the differences in design. Discuss: Do they all have the same volume?
* **3D Boxes:** Students calculate how many cubes they would need to make the rectangular prism displayed <http://www.interactivestuff.org/sums4fun/3dboxes.html>
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| **EVALUATION & REFLECTION** | Where the students engaged? Where resources appropriate? Did students achieve outcomes? What follow up is recommended? |

* 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.