**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 3 | STRAND: MEASUREMENT AND GEOMETRY | **SUB-STRAND:** **VOLUME AND CAPACITY 2** | **WORKING MATHEMATICALLY:** **MA3-1WM** |
| OUTCOMES: MA3-11MG | **Selects and uses the appropriate unit to estimate, measure and calculate volumes and capacities and converts between units** **of capacity.** |
| **CONTENT:**  | **Convert between common metric units of measurement (ACMMG136)*** convert between millilitres and litres,
* explain the relationship between the size of the unit and the number of units needed to assist in determining whether multiplication or division is required when converting units eg. ‘Fewer litres needed to measure the same capacity and so to convert from millilitres to litres I need to divide’. (Communicating, Reasoning)
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | * Worksheet-test student knowledge by linking new work about to commence with previous knowledge from both Early S3 and Late S3.
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| WARM UP / DRILL | * Drill-how many millilitres in a litre, multiple litres, reversal of strategies-use of flash cards in speed activity.
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| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | * Joanne mixes these different juices to make a fruit drink. Each juice was in different size bottle with Lemon-100mL, Orange-200mL, Apple-300mL, and Pineapple-500 mL . She uses only full bottles and uses at least one of each juice.

How many full bottles of each juice does Joanne use to make exactly 1 litre and 500 millilitres (1 L 500 mL) of the fruit juice?  |
| 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 | standard and non- standard e.g. jugs, litre bottle of orange, mug, teapot, can of coke, 2L bottle of coke, jugs with no scales, calibrated measuring jug etc.  |

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES |  GUIDED & INDEPENDENT ACTIVITIES-minimum three lessons suggested |
| Explicitly communicate outcomes of lesson and quality of work.Teach and ReviewMillilitres to litres, litres to millilitres,Reversal rule in multiplication and division, measuring using a calibrated measuring jug.* **Define and Reinforce metalanguage used in this unit.**

Capacity, millilitres, litres, calibration,Scale of measurement, division, multiplication, reversal rule, decimal measuring, and conversion.* **Demonstration of Measurement.**

Teacher modelling of scoop measuring of whole litres using a 100mL scoop.Teacher modelling of calculating millilitres to litres, litres to millilitres. | LEARNING SEQUENCERemediationS2 or Early S3 | * Introduce the litre as a formal unit for measuring the capacity of large containers.
* Begin to estimate the capacity by ordering the objects from the container that holds the smallest amount to the largest amount.
* Find out the capacity- learn how to read scales. Using a calibrated measuring jug measure each container of water in millilitres. Colour the water to make reading the scales easier.
* Write labels for each container.-record measurements for next lesson.
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| LEARNING SEQUENCES3 | * Looking at measurements recorded in practical lesson convert the millilitres into litres and millilitres, then into decimal measurements (build on knowledge from previous lessons).
* Display a 100 mL scoop or small container and ask students to estimate how many cupfuls would be necessary to fill the litre container. Demonstrate filling, pouring and counting the cupfuls.
* Record how many scoops are needed to fill the one litre container.-answer-10.
* Questioning-if ten scoops fill one litre, how many scoops fill two litres-20. Three litres-30.
* Display-this in a number sentence-what operation would you use?- 3x10=30
* If each scoop measures 100mL and there are 10 scoops in a litre how many millilitres is this=3000mL
* Display this in a number sentence.100x10x3=3000mL.
* Confirm this by measuring different amounts of litres using the 100mL scoop to create 4 and 5 litres of water then use calculations involving repeated multiplication of 10 to confirm numbers of millilitres in each number of litres.
* Use this calculation method by reversing the operation i.e. 2000mL/100=20 scoops. Reinforce this skill using the concrete method of measuring out the amount in scoops of water.
* Discussion question-“Can you jump division steps and use 1000 to divide into the number of millilitres eg. 4000mL /1000=4L. Drill with children then test the understanding of this method on several measurements using worksheet provided.
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| LEARNING SEQUENCEExtension Early S4 | * Challenge children’s understanding of place value by providing the “three places to fill rule after the decimal point” eg. 5.6L=5.600L=5600mL.
* Questioning framework provided in converting decimal litres to millilitres-

 7.2L-“How many whole litres to you have?”=*7* “How many places after the decimal point”=*three places to fill*  “Starting with 2 fill in the three places”=7**200** (when you run out of digits you write in place filler zeroes.)* Drill until understanding is complete-reverse operation by counting three places in on millilitres only to create decimal litres i.e. 9836mL –count three places in from 6 to place decimal point at the end of the nine to create 9.836L. Drill and assess children’s knowledge of reversal method through practice.
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| **EVALUATION & REFLECTION** | **Student engagement Achievement of Outcomes****Resources Follow-up** |