**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 3 | STRAND: MEASUREMENT & GEOMETRY | **SUB-STRAND: VOLUME AND CAPACITY 1** | **WORKING MATHEMATICALLY:** **MA3-1WM & MA3-3WM** |
| OUTCOMES: MA3-11MG | **Selects and uses the appropriate unit to estimate, measure and calculate volumes and capacities, and converts between units of capacity.** |
| **CONTENT:**  | **Choose appropriate units of measurement for volume and capacity.*** Construct and use the cubic metre as a unit to measure larger volumes
* Estimate the size of a cubic metre, half a cubic metre and two cubic metres
* Select and use appropriate units to measure the volumes of objects, e.g. cubic centimetres for a lolly jar, cubic metres for the classroom
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | * Students brainstorm items/objects/situations where volumed would be measured in cubic metres.
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| WARM UP / DRILL | * **Revise** the cubic centimetre – students create 3D models using centicubes with a volume of 18$ cm^{3}$, 26$ cm^{3}$ and 35 $ cm^{3}$.
* **Times Table Drill-** students participate in a whole class times table game (e.g. Buzz Off, Bing Bang Bong, etc).
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| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | * How many cubic metres of bark will it take to fill a children’s play area that measures 10 metres long, 8 metres wide and ½ metre deep?
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| 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 | Wooden dowel, plastic sticks, newspaper, metre rules, tape measures, IWB, trundle wheels |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| * The *cubic metre* can be introduced and related to the *metre* as a unit to measure length and the *square metre* as a unit to measure area. It is important that students are given opportunities to reflect on their understanding of length and area so they can use this to calculate volume.
* **Explicitly communicate lesson outcomes and work quality.**
* **Define and reinforce metalanguage used in the unit** e.g. volume, capacity, mass, three-dimensional shape (3D shape), prisms, cube, rectangular prism, full, space, cubic-centimetre, cubic-metre, container, centicubes, displace, side, face, regular shape, irregular shape, edge, millilitre, litre, packing, layers, mL, $cm^{3}$, $m^{3}$
* **Discuss** with students the need for a larger unit of measurement than the cubic centimetre $cm^{3}$.
* **Brainstorm:** Students identify as many situations possible, where cubic metres are used to measure volume.
 | LEARNING SEQUENCERemediationS2 or Early S3 | * Review terms in volume and capacity, using manipulatives as needed.
* Revise the cubic centimetre.
* Explain why volume is calculated in cubic centimetres and cubic metres.
* Students calculate how many centimetres are in a metre.
* Students fill containers with centicubes to find the volume.
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| LEARNING SEQUENCES3 | * **Make a Cubic Metre:** Students discuss what a cubic metre is, and what is measured in cubic metres. Small groups make a skeleton model of a cubic metre with wooden dowel or plastic sticks, rolled newspaper or a commercial kit. Students check all dimensions with a metre rule or tape measure.
* **How big is a cubic metre?** <http://www.scootle.edu.au/ec/viewing/L163/index.html>
* **Volume and Displacement:** Students participate in the following interactive, solving the volume problems:<http://www.learnalberta.ca/content/mesg/html/math6web/index.html?page=lessons&lesson=m6lessonshell15.swf>
* **Object sort:** On the IWB, sort objects into two groups; those objects that are measured in $cm^{3}$ and those, which are measured in $m^{3}$.
* **What’s the volume of our classroom?** Using trundle wheels and tape measures, students measure the length, width and depth of the classroom in metres. Students calculate the volume of the classroom using half cubic metres if necessary.
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| LEARNING SEQUENCEExtension Late S3 | * **Gorilla Fort:** I made a fort for my pet gorilla by connecting two boxes. The first box is 6 meters long, 9 metres wide and 9 metres high. The second box is 10 metres long, 8 metres wide and 10 metres high. How many cubic metres of space does my gorilla have to play in her fort?
* **Posting Flour:** Vanessa needs to ship a package of flour to a baker. She has 168 cubic centimetres of flour to send. The post office will not ship any box which has an edge of 10 centimetres or longer. What dimensions will hold exactly 168 cubic centimetres of flour, but whose edge lengths are all whole numbers less than 10 centimetres?
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| **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.