Booragul Public School NSW Syllabus for the Australian Curriculum – Measurement and Geometry

Sub Strand – Volume and Capacity 1			
Outcome	Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Date
Stage 2 A student: › uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM › checks the accuracy of a statement and explains the reasoning used MA2-3WM › measures, records, compares and estimates volumes and capacities using litres, millilitres and cubic centimetres MA2-11MG		**Language** Students should be able to communicate using the following language: capacity, container, **litre**, volume, **layers**, **cubic centimetre**, measure, estimate. The abbreviation cm$_3$ is read as 'cubic centimetre(s)' and not 'centimetres cubed'.	
# Ignition Activity Find examples of millilitres/litres on containers in magazine pictures. Discuss need for formal units			
Containers Students are to collect in bring in 3 different sized containers to compare and order their capacity.			
# Explicit Mathematical Teaching Measure, order and compare objects using familiar metric units of capacity • recognise the need for formal units to measure volume and capacity ⬦ explain the need for formal units to measure volume and capacity (Communicating, Reasoning) • use the litre as a unit to measure volumes and capacities to the nearest litre ⬦ relate the litre to familiar everyday containers, eg milk cartons (Reasoning) ⬦ recognise that one-litre containers can be a variety of shapes (Reasoning) • record volumes and capacities using the abbreviation for litres (L) • compare and order two or more containers by capacity measured in litres • estimate the capacity of a container in litres and check by measuring ⬦ estimate the number of cups needed to fill a container with a capacity of one litre (Reasoning)			
Compare objects using familiar metric units of volume • recognise the advantages of using a cube as a unit when packing and stacking • use the cubic centimetre as a unit to measure volumes ⬦ pack small containers with cubic-centimetre blocks and describe packing in terms of layers, eg 2 layers of 10 cubic-centimetre blocks (Problem Solving) • construct three-dimensional objects using cubic-centimetre blocks and count the blocks to determine the volumes of the objects ⬦ devise and explain strategies for counting blocks (Communicating, Problem Solving)			

• record volumes using the abbreviation for cubic centimetres (cm3) • compare the volumes of two or more objects made from cubic-centimetre blocks by counting blocks • distinguish between mass and volume, eg 'This stone is heavier than the ball but it takes up less space'		
# Whole Class Teaching **One Litre Exactly (see lesson plan on pg 88-89 for more details)** Students estimate, measure and record how many 100 mL cups or scoops are required to fill a litre. Students repeat this process with another small container, using the previous measure to assist in estimating before measuring. **Teaching Measurement Stage 2 and Stage 3** pg 86 -89		
Make A Litre Measure Students make a litre measure 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. *Note:* if different bottles are used, students could compare the heights and shapes of their litre measures and discuss the results. **Teaching Measurement Stage 2 and Stage 3** pg 86		
Layer Count (refer to Lesson Plan pg 92-93 for more details) Pairs of students make a rectangular prism with centimetre blocks. Students commence with a base which has twelve blocks. Students record the number of blocks and the array pattern in the first layer. Two more layers are added and the total number of blocks and volume in cubic centimetres are recorded. Students look at the number pattern of the layers to predict how many blocks will be needed for five layers. *Note:* wooden or plain centimetre blocks, rather than interlocking blocks, may be easier to build into a prism; if blocks in different colours are available, layers made in different colours may assist students to identify the layers. *Extension*: students draw their prisms, ensuring that the correct number of blocks is indicated. **Teaching Measurement Stage 2 and Stage 3** pgs 90-93		
Cubic Units - Students are offered a choice of objects to fill a box eg bolts, marbles, lids etc - Include centi-cubes as an option - Groups fill their box with their chosen object and record their findings and comments - Choose another object with which to measure the capacity of their box - Compare, discuss and report findings to the class - Students may want to investigate the spaces left when using some objects by pouring sand or rice into the gaps and comparing results - Discuss the accuracy of each measuring object: - Which fitted together without gaps - Did each group use the same number of objects to fill the container - Which gives the most accurate result - What name can we give this object - Introduce the term cubic centimetre		

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• Discuss the advantages of using a standard unit of measurement		
Guided Group/Independent Activities **How Many To The Litre** Students collect containers which have a labelled capacity of less than 1 L, e.g. 500 mL, 250 mL. Students calculate how many times each container will have to be filled to make 1 L, record and then check by filling with water and pouring into the 1 L measure. *Note:* students may need to be reminded to keep an accurate tally of the number of times they filled their container. **Teaching Measurement Stage 2 and Stage 3 pg 87**		
How Many Litres? Students work in small groups to estimate and measure the capacity of four large containers (bucket, large ice cream container, tote tray, bin) using a 1 L measure. Students record their results and explain how the capacity was estimated. *Note:* it may be easier if students commence by filling and measuring their largest container, then use the water to measure the remaining containers. **Teaching Measurement Stage 2 and Stage 3 pg 87**		
Side Views Students work in pairs to build a rectangular prism from interlocking blocks or centimetre blocks. Students draw plans of three faces – top, front and side and record the volume of the model in cubic centimetres. Students give their plans to another pair, who build the rectangular prism to the given plan, then compare their new model with the original model. *Variation 1*: groups of students display their finished rectangular prisms and plans. The teacher rearranges the order of the plans. The group moves to another display of models and matches the rectangular prisms and correct plans. *Variation 2*: pairs of students make a prism and draw a plan. The prism is covered and left on the desk, and the students move to another desk. Students use the plan at the new desk to build a prism and then compare this with the original model **Teaching Measurement Stage 2 and Stage 3 pg 91**		
Plan A Prism Pairs of students discuss what size and shape to make a rectangular prism built from 1 cm blocks. Students draw the front, side and top views of their planned prism on grid paper, estimate how many centimetre blocks will be required to build the prism and the volume of the model in cubic centimetres. Students make the planned prism and compare the model with their plans and estimated volume. **Teaching Measurement Stage 2 and Stage 3 pg 90**		
Previous NAPLAN/BST Questions BST 2006-Year3		

16 The amount of milk in a container is best measured using

○ metres   ○ litres

○ centimetres   ○ kilograms

BST 2006 –Year 3

15. Which one of these has the greatest volume?
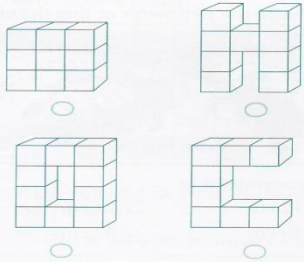
BST 2005

13. Kaz drank 4 glasses of water during the day.

Each glass holds 220 mL.

How much water did Kaz drink altogether?

○ 880 L   ○ 880 mL

○ 8 L   ○ 88 mL

Children's Books – Volume and Capacity
Mr Archimedes Bath by Pamela Allen
Who sank The Boat by Pamela Allen
Counting On Frank by Rod Clements

Planned Assessment

Pre Assessment
Name everyday 1 litre containers
Estimate the volume of partially filled 1 litre containers from the information on the label.
Count the number of cubic centimetres in a 3D shape and label

Choose Me

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.

Note: a wide variety of containers, such as plastic drink bottles, lunch boxes, take-away food or margarine containers should be used for estimating.

Twins

Students find the volume of two identical boxes by packing with centimetre blocks from two different directions (or pack the same box in two different ways by commencing at a different face).

Record the number of blocks in each layer, the number of layers and the volume of the packed blocks, in cubic centimetres.

Extension: experiment with building the same number of blocks into a different rectangular prism.

Capacity at home

Students investigate and list items around the home that are measured in millilitres. They write a report listing items according to capacity both as litres and millilitres e.g.

Item	Capacity as described	No. of Litres	No. of Millilitres