

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

## Sub Strand – Length 2

Outcome	Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Date
<p><b>Stage 2</b> A student:</p> <ul style="list-style-type: none"> <li>› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM</li> <li>› selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM</li> <li>› checks the accuracy of a statement and explains the reasoning used MA2-3WM</li> <li>› measures, records, compares and estimates lengths, distances and perimeters in metres, centimetres and millimetres, and measures, compares and records temperatures MA2-9MG</li> </ul>		<p><b>Language</b></p> <p>Students should be able to communicate using the following language: length, distance, metre, centimetre, millimetre, ruler, <b>tape measure, trundle wheel, measure, estimate, perimeter, height, width, temperature, cold, warm, hot, degree (Celsius), thermometer.</b></p> <p>'Perimeter' is derived from the Greek words that mean to measure around the outside: <i>peri</i>, meaning 'around', and <i>metron</i>, meaning 'measure'.</p> <p>The term 'height' usually refers to the distance from the 'base' to the 'top' of an object or shape. The term 'width' usually refers to the shorter side of a rectangle; another word for width is 'breadth'.</p>	
<p><b><u>Ignition Activities</u></b></p> <p><b>Height of the children.</b> Children estimate first their height. Measurement strips are on the wall. Children measure from strip to top of their head using a tape measure. Students are to record lengths in metres using decimal notation. Two students measure one other student and explain why two students may obtain different measures for the same length.</p>			
<p><b>Distances Around the School</b> Students brainstorm places around the school they regularly visit eg classroom next door, library. In groups, students are allocated a 'place' in the school. Groups estimate the distance from the classroom door to the designated place, select measuring devices and measure the distance eg trundle wheel, tape measure or ruler. They record the distance in metres and centimetres, using decimal notation to two decimal places. Students compare and order the measurements. Students are asked to choose a measuring device and an appropriate unit to estimate, measure and compare length for smaller distances.</p>			
<p><b><u>Explicit Mathematical Teaching</u></b></p> <p>Use scaled instruments to measure and compare lengths (ACMMG084)</p> <ul style="list-style-type: none"> <li>• use a tape measure, ruler and trundle wheel to measure lengths and distances</li> <li>• select and use an appropriate device to measure lengths and distances (Problem Solving)</li> </ul>			

<p>.. explain why two students may obtain different measures for the same length (Communicating, Reasoning)</p> <ul style="list-style-type: none"> <li>• select and use an appropriate unit to estimate, measure and compare lengths and distances</li> <li>• recognise the features of a three-dimensional object associated with length that can be measured, eg length, height, width, perimeter</li> <li>• use the term 'perimeter' to describe the total distance around a two-dimensional shape</li> <li>• estimate and measure the perimeters of two-dimensional shapes</li> </ul> <p>.. describe when a perimeter measurement might be used in everyday situations, eg determining the length of fencing required to enclose a playground (Communicating)</p> <ul style="list-style-type: none"> <li>• convert between metres and centimetres, and between centimetres and millimetres</li> </ul> <p>.. describe one centimetre as one-hundredth of a metre and one millimetre as one-tenth of a centimetre (Communicating)</p> <p>.. explain the relationship between the size of a unit and the number of units needed, eg more centimetres than metres will be needed to measure the same length (Communicating, Reasoning)</p> <ul style="list-style-type: none"> <li>• record lengths and distances using decimal notation to two decimal places, eg 1.25 m</li> </ul>		
<p>Use scaled instruments to measure and compare temperatures (ACMMG084)</p> <ul style="list-style-type: none"> <li>• identify temperature as a measure of how hot or cold something is</li> <li>• use everyday language to describe temperature, eg 'cold', 'warm', 'hot'</li> <li>• recognise the need for formal units to measure temperature</li> <li>• use a thermometer to measure and compare temperatures to the nearest degree Celsius</li> <li>• record temperatures to the nearest degree Celsius using the symbol for degrees (°)</li> </ul> <p>.. use a thermometer to take and record daily temperature readings (Communicating)</p>		
<p><b><u>Whole Class Teaching Activities</u></b></p> <p><b>Using Maths Tracks</b></p> <p>One of a series of teaching units to accompany the Rigby/Harcourt series 'Maths Tracks'. Student activities include using the abbreviation for millimetre; converting between metres and centimetres and centimetres and millimetres; recording lengths or distances using decimal notation to one decimal place; using a tape measure, ruler or trundle wheel to measure lengths or distances. Meets BoS outcomes MS2.1, WMS2.3. Includes teacher notes.</p> <p><a href="http://lrr.dlr.det.nsw.edu.au/LRRDownloads/7917/1/44285_2A_u58_Print.pdf">http://lrr.dlr.det.nsw.edu.au/LRRDownloads/7917/1/44285_2A_u58_Print.pdf</a></p> <p><b>How Many Centimetres in a Metre?</b></p> <p>Students make a metre strip using 1 cm grid paper. In groups, students randomly cut their metre into 3 pieces and place all the group's strips into a bag. Students take turns to select and measure one strip. Students estimate and calculate what length strip they would need to add to their selected length to make exactly 1 metre. They are asked to explain how they know it will be 1 metre. Calculations for each strip are recorded in a table. Students describe one centimetre as one hundredth of a metre and one millimetre as one tenth of a centimetre. Students record length using decimal notation to two decimal places eg 0.75m</p> <p><b>Sample Units of Work</b> pg 106</p>		

**Measuring Using Centimetres and Metres**

Students find objects between 1 m and 2 m long and record the lengths in a table.  
 Students compare their table with those of other students to identify the longest and shortest objects.  
*Variation:* Students record lengths in metres using decimal notation and in centimetres eg 1.05 m and 105 cm

Object	Estimate	Measurement	Decimal Notation
Teacher's desk	1 m 15 cm	1 m 7 cm	1.07 m

Discuss objects less than/about the same/ greater than 1 metre. How would you measure them?  
 Investigate the metre ruler and its markings. Have children measure a variety of objects with a metre ruler.

**Sample Units of Work** pg 106

**Worms**

Students make 'worms' using playdough. Students estimate, measure and label the length of their 'worms'. Some students will have the same length written in a different form eg 20 cm, 0.2 m or 200 mm. Students then order their worms in terms of length and note the different ways to record the same length. Possible questions include:

- could you estimate, measure and record the length of your 'worm'?
- did you recognise the length of your worm recorded using a different unit?
- could you record your measurement using decimal notation to two decimal places?
- could you convert your measurement to millimetres? centimetres?

**Sample Units of Work** pg 106

**Measuring**

Students estimate and measure the length, height, width or perimeter of a selection of small objects to the nearest millimetre, centimetre or metre and record in a table using millimetres and a combination of millimetres and centimetres, centimetres and metres or in decimal notation.

	Estimate	Measurement in mm	Measurement in cm and mm
Width of a pencil			
Length of a pencil sharpener			
Length of a paper clip			

**Sample Units of Work** pg 107

**Measuring perimeter of non-polygons.**

Have children measure their partners waist with a ruler. Does this work? Discuss difficulties and how to measure circular objects ie string, ribbon, measuring tape.

Children measure a variety of round objects, ie, drink bottles, rubbish bins, etc.

Using the term 'perimeter' to describe the total distance around a shape, revise Greek meaning "peri"

<p>and "meter" meaning measuring round the outside.</p> <p>Discuss the existence of equivalent sides of some shapes. Point out to children the most efficient way of measuring ie, opposites sides of a rectangle.</p> <p>Estimating and measuring the perimeter of two dimensional shape.</p>		
<p><b>Investigating Perimeters</b></p> <p>Students use geoboards to investigate perimeters of shapes.</p> <p>They use shapes that have square corners. Students construct shapes that have perimeters of 4 units, 6 units, 8 units, etc.</p> <p>They record the shapes on dot or square paper. Students try to make different shapes that have the same perimeters. Students are asked if it is possible to make shapes which have a perimeter of 3 units, 5 units, 7 units, etc. They use the geoboard to make a shape which has:</p> <ul style="list-style-type: none"> <li>■ the smallest perimeter</li> <li>■ the largest perimeter.</li> </ul>		
<p><b>Perimeter Match</b></p> <p>In pairs, students are given a length (eg 16 cm) and are required to construct a two-dimensional shape on a card with this perimeter. The teacher collects, shuffles and re-allocates cards to each pair. Students estimate and then measure the perimeter of their allocated shape. They then find their partner and compare and contrast their shapes.</p>		
<p><b>Daily Temperature</b></p> <ol style="list-style-type: none"> <li>1. Show students a thermometer. Point out its parts and discuss its purpose. Ask students if they know what temperature is the freezing/boiling point.</li> <li>2. Place a thermometer outside the classroom window (or in some other easily accessible location).</li> <li>3. At the same time every day, read the thermometer with students. Model for students how to record the temperature on the record sheet.</li> <li>4. Ask students if today's temperature is above or below the previous day.</li> <li>5. After several demonstrations, assign different pairs of students to record the temperature on a daily basis and share their findings with the class. Display the thermometer record sheet each day. Together, look for patterns over time.</li> <li>6. To go further, graph the temperature each day. As students check the temperature, they can record it on the thermometer record sheet and on the graph. Look for patterns on the graph.</li> </ol>		
<p><b>MAKE A THERMOMETER</b></p> <p>MATERIALS:</p> <ul style="list-style-type: none"> <li>• clear, plastic bottle (11oz. water bottle works)</li> <li>• water</li> <li>• rubbing alcohol</li> </ul>		

<ul style="list-style-type: none"> <li>• clear plastic drinking straw</li> <li>• modeling clay</li> <li>• food coloring</li> </ul> <p>PROCESS:</p> <p>Fill about 1/4 of the bottle full with equal parts of water and rubbing alcohol.</p> <p>Add a few drops of food colouring.</p> <p>Put the straw in the bottle, but don't let it touch the bottom.</p> <p>Use the modeling clay to seal the neck of the bottle, so the straw stays in place. (Make sure the straw does not touch the bottom of the bottle.)</p> <p>Hold your hands on the bottom of the bottle and watch the mixture move up through the straw.</p> <p>EXPLANATION:</p> <p>Why does this happen? Just like any thermometer, the mixture expanded when it was warmed. This made the mixture no longer fit in the bottom of the bottle. As the alcohol expanded the colored mixture moved up through the straw. If the bottle were to get extremely hot, the mixture would have come up through the top of the straw.</p>		
<p><b><u>Guided Group /Independent Activities</u></b></p> <p><b>Measuring Devices</b></p> <p>In pairs, students are given a ruler, a trundle wheel and a tape measure. They select one of the measuring devices and choose an appropriate object and its dimensions to be measured using the device.</p> <p>Students estimate, measure and record the measurements of each of the dimensions of the object in metres, centimetres and/or millimetres and use decimal notation where appropriate. Students repeat the activity, selecting two objects for each of the measuring devices.</p> <p>Possible questions include:</p> <ul style="list-style-type: none"> <li>■ how did you estimate the length or distance?</li> <li>■ what did you use to measure the length or distance? Why?</li> <li>■ what unit/s did you use to record your measurement?</li> <li>■ could you record your measurements another way?</li> <li>■ can you compare your measurements of the same lengths or distances with those of a friend?</li> <li>■ were they the same? Why? Why not?</li> </ul>		

<p><b>Measure and record in centimetres or millimetres-Bottle measures</b>  Students examine a plastic drink bottle and predict which length will be the greater – the height or the measurement around the bottle (circumference), by estimating the two lengths in centimetres. Paper streamers may be used to record the lengths. As an extension activity, students may predict how many times the bottle will roll along a metre length.</p>		
<p><b>Perimeter of 20 centimetres</b>  Students are asked to investigate how many different four sided shapes they can construct with a perimeter of 20 cm.  Students record and share findings.  Possible questions include:</p> <ul style="list-style-type: none"> <li>■ how did you determine the dimensions of one shape?</li> <li>■ how did you find another shape?</li> <li>■ do you have all possible shapes that have a perimeter of 20 cm? How do you know?</li> </ul>		
<p><b>Rectangular Dimensions</b>  In groups, students use a piece of string about 20 metres long to form a closed shape. Students make different rectangles using this fixed perimeter. Students record dimensions using metres and centimetres. Students share their solutions and look for patterns.</p>		
<p><b><u>Planned assessment</u></b></p> <p><b>Pre Assessment</b>  Students estimate and then measure to the nearest centimetre, the perimeters of small items such as book covers, art paper, leaves. Students record the results and discuss.</p> <p><b>LENGTH (Page 37 Teaching Measurement.)</b>  <b>Centimetres, centimetres, centimetres!</b>  Students work in pairs or small groups to measure, cut and label lengths of streamer:  one 1 m strip  two 0.5 m (1/2 m) strips  four 0.25 m (1/4 m) strips  five 0.2 m (1/5 m) strips  ten 0.1 m (1/10 m) strips  On a large piece of paper at least 1 m x 20 cm, students paste the smaller strips under the 1 m strip, so that each line is equal to 1 metre. Label each line, e.g.  50 cm + 50 cm = 1 m or 0.5 m + 0.5 m = 1 m  <i>Note:</i> the finished product may look more attractive if students are able to select a different colour for each line.</p> <p><b>Make an envelope</b>  Students design a greeting card approximately 12 cm by 18 cm.  Students make a simple envelope for the card, ensuring there is enough space around the card so that it</p>		

will fit into the envelope. Students draw diagrams of how to cut and fold the envelope and label with the correct measurements.

**Design a container**

Choose an object and discuss features that could be measured. Students write a design brief for a container or an object that is to be manufactured. Students must ensure that the brief contains all necessary measurements.

**Straw javelin**

In pairs, students throw a straw for distance. The distance is measured in metres and centimetres. Students complete a table, first estimating then measuring the distance.

**Room for elbows**

Students design a dinner table which will seat four students along each side, with enough space to eat comfortably. Students draw a diagram of the table with listed reasons for the dimensions.

(p. 33 *Teaching Measurement Stage 2 and Stage 3*)