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

Length 2			
Outcome	**Teaching and Learning Activities**	**Notes/ Future Directions/Evaluation**	**Language / Date**
A student: › describes mathematical situations and methods using everyday and some mathematical language, actions, materials, diagrams and symbols **MA1-1WM** › supports conclusions by explaining or demonstrating how answers were obtained **MA1-3WM** › measures, records, compares and estimates lengths and distances using uniform informal units, metres and centimetres **MA1-9MG** **Syllabus Content Note:** 1st content outcome relates to comparing and ordering objects based on length formally and informally 2nd content outcome relates to recognising and using formal lengths 3rd content outcome relates to **Syllabus reference:** Hard copy: page 90 Digital: page page 95		**Background Information** Students should be given opportunities to apply their understanding of measurement,gained through experiences with the use of uniform informal units, to experiences with the use of the centimetre and metre. They could make a measuring device using uniform informal units before using a ruler, eg using a length of 10 connecting cubes. This would assist students in understanding that the distances between marks on a ruler represent unit lengths and that the marks indicate the endpoints of each unit. When recording measurements, a space should be left between the number and the abbreviated unit, eg 3 cm, not 3cm. Refer also to background information in Length 1.	• length, • **distance**, end, • end-to-end, • side-by-side, • **gap**, • **overlap**, • **measure**, • **estimate**, **hand span**.
Activities			

Explicit Mathematical Teaching

Length is usually one of the first measurement concepts students encounter. An understanding of length is crucial, as it is the foundation for building concepts of area and volume. Sometimes students can measure lengths without really understanding
what a length is. Length can be a property of an object or shape, as in the lengths of the sides of a triangle or the edges of a desk. Length can be a height of a tree or a student, or it can be a distance, such as from the desk to the door, or from the school
to the station.

The three-dimensional nature of the object being measured may obscure the linear nature of length. If the height of a tree or a person is being measured, what is really being measured is an imaginary line, which is perpendicular to the ground or floor,
and joins a point on the ground or floor to a point on the top of the tree or the top of the person's head. Using a string pulled taut to measure heights or distance may help students imagine such a line. In most real-life contexts, the line that is being measured has to be imagined and the person measuring has to decide where and how length will be measured.

Some students learn a procedure to measure lengths by aligning one end of the ruler with the object and reading the number that corresponds to the other end of the object. In this way, students can use a ruler without knowing how its scale is constructed. Students may not be sure whether to measure from 0 or 1 on the ruler.

Frequently students think that the marks, instead of the distance between the marks, are the units of measure. The experience of making a ruler by choosing, marking and numbering the informal units may assist students to understand how a ruler works.

An understanding of geometrical properties can be important in the measurement of length. When students measure a table or a desk, they usually measure along one edge. Some students may not realise that the length of a rectangular desk will be the same if it is measured along any imaginary line parallel to the edge.

Lengths can be added together and when measuring a length that is not in a straight line, such as the perimeter of a shape, each part can be measured separately and the lengths added together. Longer distances may be measured with a trundle wheel but students may need to be convinced that one rotation of the wheel is the same length as a metre ruler.		
How to use a ruler Begin the lesson with a whole-class discussion of how to use a ruler to draw and measure lines which have a length of a whole number of centimetres. Students check their rulers to see where the zero is marked, and practise drawing and measuring a line by starting at this point. Students work in pairs, student A and student B. Student A draws five lines for student B, each line to be an exact number of centimetres and a length of less than 30 cm. Student B estimates the length of each line, records the estimate, then measures and labels each line. The roles are then reversed. **Any three items** Students work in pairs to find three items in the classroom which have a total length of 25 centimetres. Students record their findings by drawing the items, labeling with the measurements in centimetres, and showing how the three lengths were added to make a total of 25 centimetres.		
Ignition Activities Select appropriate informal unit to: - Measure the length of your desk using informal unit (paddle pop sticks). Record. Measure width of desk using same unit. Record and compare length to width. - Use a different informal unit. Will we get same result? Why not? Why do we have to use same informal unit? Year 2: - Compare findings using different informal units. - Discuss how gaps/overlaps will give incorrect result. **Who has the biggest head?** Students measure around their heads with paper strips and mark correctly without overlap. Measure the length of the string in units, (rods, paperclips,		

etc.) to find who has the biggest head in their group. Record group measurements and the units used.

Ready set go!

Students work in small groups to estimate, then measure and record:

How long does it take to write and measure a legible sentence 1 metre long?

How long does it take to make and measure a line of pens (paddle-pop sticks, match sticks) 1 metre long?

How long does it take to make and measure a playdough snake 1 metre long?

Note: students may suggest alternative activities to be measured

Distances Around the School

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. They record the distance in metres and centimetres, using decimal notation to two decimal places.

Students compare and order the measurements.

Variation: Students are asked to choose a measuring device and an appropriate unit for measuring and recording smaller distances.

Guided Group/Independent Activities

Measure me

Students in pairs take turns to lie on the floor or ground to be measured. Partners mark the body length at the top of the head and the heels and draw a straight line joining the two points. Students measure their length in units. They compare the length of different people and check by direct comparison.

Measure with one unit

Students are given one specific unit (e.g. one popstick, streamer or 1 m ruler). Measure and compare objects in the classroom or playground, such as the circumference of the tree.

Snakes Alive Students make snakes from plasticine or play dough and measure them to the nearest centimetre using a tape measure. A partner then checks their measurement. Students compare results. Variation: Students select a length and use estimation to make a snake of this length. Students check by measuring with a tape measure and record their results. Possible questions include: ❚ was there a difference in length when your partner measured your snake? Why? ❚ how close was your estimation to the actual length?		
How Many in a Metre? Sample Units of Work pg 68 Students find the number of their hand spans in one metre. Students find the number of their foot lengths in one metre. Students record their results in a table and discuss variations among students. **Half a metre - Sample Units of Work pg 68** In pairs, one student folds their metre strip in half. Students use the half-metre strip to find objects that are less than half a metre, more than half a metre and about half a metre.		
Lolly Wrappers - Sample Units of Work pg 68 Students attempt to make the longest lolly wrapper strip by tearing the wrapper into a continuous strip. Students measure their strips to the nearest centimetre. Students compare results. *Variation:* Apple peel could be used instead of a lolly wrapper.		
One Metre Sample Units of Work pg 68 Students each cut a strip of tape that is one metre long. Students use these to determine whether objects are more than one metre, less than one metre or about one metre in height, length or width. Students record results in a table. The activity should be repeated for distances		

between objects.

Less than 1m	About 1m	More than 1m

How Many Centimetres in a Metre?
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.
Variation: Students take two strips that together are less than 1 metre, measure them and add the lengths together. They estimate and calculate how long a third strip would need to be to make exactly 1 metre.

Measuring
Students estimate and measure the length or width of a selection of small objects to the nearest millimetre and record in a table using millimetres and a combination of millimetres and centimetres.
Students could also measure larger objects that need to have precise dimensions eg width, height and thickness of the door, the diameter of a CD ROM.