**This Learning Progression begins at Foundation Level of the Victorian Curriculum and concludes at Level 8. Nine progressions are provided in this span.**

*Description:* This Learning Progression describes how a student becomes increasingly able to recognise attributes that can be measured and how units of measure are used and calculated. In making the transition from informal to formal units, a student attends to the structure of units used to measure, how they are assembled end-to-end, side-by-side or in layers without gaps or overlapping. The structure of the units gives rise to ways of calculating length, area and volume. In dealing with mass and capacity, experience helps develop estimates associated with commonly available reference objects (a cupful in cooking or the mass of an egg). Developing standard and agreed units of measurement is critically vital in areas as diverse as medicine and trade. The relationship between units of measurement is applied in ratios, rates and proportions as well as decimals and percentages.

*Details of progression provide nuanced and detailed descriptions of student learning – what students can say, do, make or write. Examples of student learning in each step are not hierarchical, nor are they to be used as a checklist.*

|  |  |  |
| --- | --- | --- |
| **Victorian Curriculum Foundation Level**  |  | **Victorian Curriculum Level 8** |
| **Describing length** The student:* identifies the attribute of length (using gestures)
* identifies the longest object using direct comparison
* compares the length of two objects by aligning the ends
* uses everyday language to describe attributes that can be measured.
 | **Comparing and ordering objects** The student:* compares objects and explains how they have been ordered using comparative language (shorter, longer, lighter, heavier)
* orders three or more objects by comparing the size of each of the objects
* makes a copy of the length of one object (with fingers) to then make a comparison with another object.
 | **Using informal units of measurement** The student:* estimates the total number of units needed to measure
* uses multiple informal units to measure length, mass or capacity (uses paper clips to measure the length of a line)
* chooses and uses a selection of the same size and type of units to measure length, area and volume (without gaps or overlaps)
* counts the individual units used by ones to find a total to then make comparisons.
 | **Using equal units for indirect comparison** The student:* describes the qualitative relationship between the size and number of units (with bigger units you need fewer of them)
* chooses and uses a selection of the same size and type of units to make indirect comparisons of mass and capacity.
 | **Repeating a single informal unit to measure**The student:* measures the length and area of a shape using a single informal unit repeatedly (iteration) (uses one paper clip when measuring the length of a line, making the first unit, marking its place, then moving the unit along the line and repeating this process)
* estimates length or area by visualising how many of the units will fit into the space to be measured
* explains that the distance measured is the space between the marks or ‘ends’ of each unit, not the marks themselves
* uses appropriate uniform units when measuring mass and capacity.
 | **Identifying the structure of units** The student:* draws and describes the column and row structure to represent area as an array, moving beyond counting of squares by ones
* calculates the total area using rows and/or columns as composite units
* uses familiar household items as benchmarks when estimating mass and capacity (compares capacities based on knowing the size of a bottle of water)
* estimates lengths that lie between full units by visualising subdivisions of the unit.
 | **Using the structure of units** The student: * explains the difference between different measures of the same shape or object (area and perimeter, volume and mass, volume and capacity)
* uses rows, columns and layers to find the number of units needed to measure volume
* creates and uses the structure of repeated layers in determining the volume of a rectangular prism
* uses dissection and rearrangement to calculate composite areas of unfamiliar shapes.
 | **Converting units** The student:* converts between formal units of measurement
* recognises the relationship between metric units of measurement and the base-ten place value system
* explains why having 100 cm in a metre results in 10 000 cm2 in a square metre (using a diagram).
 | **Calculating measurements** The student:* uses dissection and rearrangement to calculate volumes of objects
* identifies appropriate levels of precision with measurement (significant figures).
 |
| **Circle measurements**The student:* understands that the relationship between the circumference and the diameter of a circle is constant (pi)
* uses the constant pi to determine the circumference and the area of a circle.
 |
| **Using formal units** The student:* measures, compares and estimates length, area, mass, volume and capacity using standard formal units
* calculates perimeter using properties of two-dimensional shapes to determine unknown lengths.
 |

Student learning in numeracy has links beyond Mathematics in the Victorian Curriculum F–10. Teachers are encouraged to identify links within their teaching and learning plans.