

LEVEL: Year 3 and 4	CONTENT: Measurement	FOCUS: How do we measure?
In the Classroom		
PURPOSE	<ul style="list-style-type: none"> • Explain what measurement is and why we measure • Identify the different measurement types • Develop a definition for each measurement type • Link the measurement types to their standard unit • Recognise the different types of units used to measure (standard, uniform, informal units, etc.) • Identify different measurement instruments • Recognise the important features of different measurement instruments and explain how they can be used to accurately measure • Estimate and compare the size of various objects • Use equipment to accurately measure the size of various objects 	
INTRODUCTION	How do we measure? Brief discussion about measurement. What is it? What are the different ways we measure? How do we measure? Why do we measure?	
EXPLICIT TEACHING & LEARNING	Measure Me Students are asked to choose a container and to use the equipment provided to estimate, find and record its measurements. Each student is given a handout that has place to record all the measurements. Note: You may need to set a time limit for the measuring as some students will spend the whole time exploring the equipment and not allow any time to record their findings. Challenge Write a definition for each of the measurement terms, including: length, mass, capacity and volume, and identify the standard measurement unit	
DISCUSSION/KEY QUESTIONS	<ul style="list-style-type: none"> • What is measurement? • Why do we measure? • What are the different measurement types? • Can you develop a definition for the different measurement types? • What units can we measure in? What is the standard unit for each measurement type? • What is the difference between standard units, uniform units, uniform informal units, informal units? • What are the names for the different measurement instruments? What are they for? How can they be used accurately? • How else can we measure? What if we “run out” of a unit? • What is iteration? What is important to remember if we are using iteration? • How can we use estimation to help us measure? 	
DELIBERATIVE PRACTICE	The focus of this activity is to find out what students know and understand about measurement. Often students can recall some pieces of information regarding measurement, but may hold some minor misconceptions. It is important to let students explore the materials and identify what they do know and any questions they may have, before further explaining topics.	
REFLECTION	Ask students to share their strategies for measuring their container. Develop definitions for the different ways to measure – ensure to highlight any misconceptions, e.g. mass and weight are different	
RESOURCES	A range of different sized containers (at least one per student) and measurement equipment, include: tape measures, rulers, plastic containers, cubes, counters, icy pole sticks, matchsticks, scales, bucket balance, etc. NOTE: As this is a pre-assessment task to find out what students know it is important to have both useful measuring equipment (such as a ruler) and less helpful items like mixed sized teddy counters. Measure Me Handout (below)	

Curriculum Connections	
CONTENT	<p>VICTORIAN CURRICULUM F-10</p> <p>LEVEL 3 – USING UNITS OF MEASUREMENTS Measure, order and compare objects using familiar metric units of length, area, mass and capacity (VCMMG140) Elaborations: Recognise the importance of using common units of measurement; recognise and use centimetres and metres, square centimetres, grams and kilograms, and millilitres and litres; measure the area of rectangles (including squares) by counting the number of square centimetres</p> <p>LEVEL 4 – USING UNITS OF MEASUREMENTS Use scaled instruments to measure and compare lengths, masses, capacities and temperatures (VCMMG165) Elaborations: Read and interpret, to the nearest graduation, the graduated scales on a range of measuring instruments Compare objects using familiar metric units of area and volume (VCMMG166) Elaborations: Compare areas using grid paper; compare volume using centicubes; recognise that metric units are not the only units used throughout the world</p>
WHAT CAME BEFORE	Often students have a basic understanding of measurement, but unknowingly hold misconceptions. The language of measurement is very important, many measurement terms, like mass or volume, have a different meaning, i.e. volume on the radio. It is important to develop clear definitions of the measurement terms to help avoid the development of misconceptions.
WHAT COMES NEXT	Once students have a clear definition of the different types of measurements, the focus switches to using the standard units and converting between measurements. This is a key area for students going forward. Using the numbers alone, particular decimals, can result in misconceptions, while actually using the materials can help students see the relationship between the different forms of measurement.
VOCABULARY	Measure, size, length, width, height, perimeter, circumference, meters, standard unit, area, mass, weight, grams, capacity, litres, volume, square centimetres, cubic centimetres, estimate, actual, iteration, compare
MISCONCEPTIONS	Although students may be familiar with length, they may not realise that height, width, perimeter and circumference are also measures of length. Students may also have trouble with defining the other measurement types. Other issues may revolve around using the measuring equipment, e.g. not measuring from 0, not calibrating the scales or having gaps between the materials, etc.

<p>WHAT PROFICIENCIES ARE TO BE UTILISED?</p> <p>Understanding Fluency Problem Solving Reasoning</p>	<p>Level 3 (Australian Curriculum) Understanding includes connecting number representations with number sequences, partitioning and combining numbers flexibly, representing unit fractions, using appropriate language to communicate times, and identifying environmental symmetry Fluency includes recalling multiplication facts, using familiar metric units to order and compare objects, identifying and describing outcomes of chance experiments, interpreting maps and communicating positions Problem-solving includes formulating and modelling authentic situations involving planning methods of data collection and representation, making models of three-dimensional objects and using number properties to continue number patterns Reasoning includes using generalising from number properties and results of calculations, comparing angles and creating and interpreting variations in the results of data collections and data displays.</p> <p>Level 4 (Australian Curriculum) Understanding includes making connections between representations of numbers, partitioning and combining numbers flexibly, extending place value to decimals, using appropriate language to communicate times and describing properties of symmetrical shapes Fluency includes recalling multiplication tables, communicating sequences of simple fractions, using instruments to measure accurately, creating patterns with shapes and their transformations and collecting and recording data Problem-solving includes formulating, modelling and recording authentic situations involving operations, comparing large numbers with each other, comparing time durations and using properties of numbers to continue patterns Reasoning includes using generalising from number properties and results of calculations, deriving strategies for unfamiliar multiplication and division tasks, comparing angles, communicating information using graphical displays and evaluating the appropriateness of different displays.</p>
<p>ASSESSMENT</p>	<p>Exit Pass Students record the information (different measurements) they have discovered about their chosen object. Students write a definition for the different ways we measure, e.g. length is how long something is (???) and identify the standard unit, e.g. The standard unit for length is metres.</p>

NAME:

MEASURE ME

Draw and label your container

Use the equipment to measure the following (include the unit)

Measure	Estimate	Actual
Length		
Perimeter		
Area		
Mass		
Capacity		
Volume		

Write a definition for the different measurement terms (length, mass, etc.) and identify the standard unit for each measure.

CHOOSEMATHS